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Collaborative decision-making and sustainable food security: Rethinking the role of indigenous knowledge and farming practices in Uganda

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Abstract

The paper examines the role of stakeholders' joint decision-making in exploiting indigenous knowledge and practices of local people to achieve sustainable food security. It assesses ways in which the collaboration of farmers and stakeholders in Uganda enhances knowledge sharing, which is vital for sustainable food security. Specifically, the study assesses the significance of indigenous knowledge in enhancing food security, the importance of joint decisions of stakeholders (farmers, community development workers, and extension workers) to food security enhancement, and the factors farmers consider when choosing indigenous/modern practices for enhancing food security. Qualitative methods of data collection were used to get views and experiences of the selected sixty-seven rural farmers in their efforts to enhance food security. Findings reveal that collaboration between farmers and stakeholders is vital for providing opportunities of sharing knowledge and experience and for determining the right combination of practices that enhance sustainable food security. The study recommends designing guidelines for routine monthly meetings between farmers and key stakeholders to share knowledge and experiences that are relevant to enhancing sustainable food security.

Keywords: stakeholder collaboration; decision-making; indigenous knowledge; food security; rural farmers

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Introduction

Indigenous knowledge and practices play a crucial role in maintaining food crop diversity, reducing environmental damage, increasing peoples' resilience to the effects of climate change, and, above all, enhancing sustainable food security (Mazibuko & Chitja, 2021). The United Nations (2015) acknowledges in its Sustainable Development Goal number 2 (SDG2) that innovations that integrate local peoples' knowledge offer climate-smart alternatives that can significantly enhance food productivity while maintaining genetic diversity. The Food and Agriculture Organization (FAO, 2014) acknowledges the breakdown of traditional systems and how this has caused environmental destruction, undermining the long-term food viability of rural farmers' livelihoods, especially in Sub-Saharan Africa. Mulungu and Manning (2023) observed that while access to adequate food is a basic human right, this is still a challenge to many people, especially in Sub-Saharan Africa. Food insecurity compromises the nutritional well-being and health of the population (FAO, IFAD, UNICEF, WFP, & WHO, 2017; Obayelu & Ayansina, 2022; USAID, 2016). Although Uganda is an agricultural-based economy, food insecurity remains a big challenge (USAID, 2016). That is partly due to the nature of the economy, which is characterized by low productivity, high levels of poverty, and increasing environmental degradation. That leads to persistent hunger and childhood malnutrition, the outcome of which is the breakdown of the socioeconomic development of the population (FAO et al., 2017; Tugume, 2017; Uganda Bureau of Statistics, 2016; USAID, 2016).

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In many developing countries, Uganda inclusive, the agriculture sector is predominantly managed by peasant smallholder farmers using family labour as well as traditional knowledge and practices (Asogwa, Okoye, & Oni, 2017; Healy, Callihoo, & Booth, 2023). According to Kamwendo and Kamwendo (2014), local farmers' knowledge is a key path-way to agricultural transformation, and it is potentially a reliable alternative to modern agriculture, especially in ensuring sustainable food security. Indigenous practices are believed to be a guarantee of the survival of biological diversity and do consider the experiences of local people as solutions to climate change (Wang, Hsu, Li, & Gu, 2023). Societies world over, value and trust indigenous knowledge and practices in solving food insecurity problems (Garutsa & Nekhwevha, 2018; Masuku & Bhengu, 2021; Tweheyo, 2018).

Indigenous knowledge is vital for addressing environmental challenges and for adapting to climatic changes. Nonetheless, indigenous knowledge is on the verge of vanishing not only because of the effect of international processes of rapid changes but also due to the lack of competencies required for its protection in most developing countries (Nwokoma, 2012). Besides, in Uganda, there are no explicit government interventions for managing, safeguarding, and disseminating indigenous knowledge for sustainable use, particularly in the programs for enhancing food security. Indigenous knowledge is not fully recognized by policymakers as having the potential to transform society (Ponge, 2013). The awareness of the usefulness of indigenous knowledge is perhaps limited by the domination of exotic and high-tech innovations that are well publicized. While indigenous knowledge is vital for ensuring sustainable food security (FAO, 2014), some people in Uganda, especially the young generation and perhaps the extension workers, underestimate its value, probably because of lack of the awareness of its usefulness.

However, indigenous knowledge and practices are known for protecting biodiversity and are vital for sustainable agriculture and food security (Asogwa et al., 2017). Although Briggs and Moyo (2012) argue that indigenous knowledge is elusive and can only work in particular societies, rural farmers' decisions are usually made based on the information they have at hand (Tweheyo, 2018). Smallholder farmers have been able to withstand and endure environmental hazards because of their indigenous knowledge (Shukla, Barkman, & Patel, 2017; Ting, 2015). Therefore, agricultural policies ought to focus on the protection of the agroecosystem, and the concern should be geared towards the support of small-scale farmers. Local knowledge and practices need to be acknowledged as one of the foundations for developing rural communities, especially in the domain of food production (Ponge, 2013).

The increasing fear about the alarming levels of food insecurity, especially in Sub-Saharan countries, has led governments to accept high-tech innovations. These innovations are seen as the only way out for increasing food production, hence ignoring indigenous peoples' practices (Shukla et al., 2017; Ting, 2015). Alongside globalization, several international companies are dumping their products, such as genetically modified seeds, biochemical fertilizers, and pesticides, into developing countries with the excuse of helping these countries increase food productivity (USAID, 2016). Nonetheless, maintaining productivity with modern technologies has become more challenging (Eyong, 2007; Ponge, 2013; Shukla et al., 2017). Modern technologies call for the use of chemical fertilizers and pesticides, which are not only costly for smallholder farmers but also environmentally harmful.

Apparently, many people calling for sustainable food production are not comfortable with the imposition of Western knowledge on their indigenous practices, which they believe may jeopardise their health (Kamwendo & Kamwendo, 2014; Masekoameng & Molotja, 2019). As argued by Ting (2015), it is possible to enhance food productivity using modern techniques, but at the expense of vulnerable poor people by damaging the natural resource base on which their livelihoods depend and at the cost of reducing the quality of their entitlements (Asogwa et al., 2017). Multinational corporations with their market-oriented technologies may, therefore, not benefit rural smallholder farmers in developing countries as assumed by modernization theories (Ponge, 2013; Thrupp, 1989). Promoting and sharing local knowledge would reverse the damage caused by high-tech agriculture and would work as a complement and alternative to high-tech knowledge if sustainable food security is to be realized (Magni, 2016). Producing abundant, high-

quality food in an environmentally friendly way would be a fundamental step toward food and nutrition security. Smallholder farmers and poor communities should be helped to have the right to quality food that is safe, nutritious, and acceptable (Tasmanian Food Security Council, 2012).

The fact that food security has multi-dimensional parameters makes the collaboration of key stakeholders paramount in making effective decisions. The involvement of different stakeholders enhances the acceptability and implementation of the agreed resolutions (Mazibuko & Chitja, 2021). Collaboration enables different people with varying views and knowledge to work together to achieve sustainable solutions to a given problem (Konaté, Sahraoui, & Kolfschoten, 2014). Collaboration entails open discussion of each participant's viewpoints for novel and strategic conclusions (Kolfschoten, Lukosch, & Seck, 2011). With joint discussions, there is a likelihood of coming up with the best outcomes. According to Lasker, Weiss, and Miller (2001), and Konaté et al. (2014), teamwork offers a mechanism for engaging participants in an effort to identify and address challenging problems. Collaboration of stakeholders yields robust and acceptable decisions that can have a consequential impact (U. Eseryel, Wie, & Crowston, 2020). It is argued that poor stakeholder engagement is a challenge to successful problem-solving (Amiyo, 2012).

Key stakeholders' meetings enhance knowledge sharing and lessen individual biases in the decision-making process (Kao & Wu, 2021; Xue, Killingsworth, Liu, Seeman, & Hauser, 2022). The strength of collaborative problem-solving is that there is a likelihood that one of the members has had a similar problem before and maybe knows how he solved it (Fernandez & Gutierrez, 2010; Ranganathan, 2005). In joint decision-making, varying views are generated, something that may not be possible with one or two individuals who may have limited perspectives. Besides, a lot of ideas are gathered in brainstorming from where consensus building begins. It is important to have onboard everyone knowledgeable on the issue at hand for better and effective decisions (U. Eseryel et al., 2020; Kolfschoten et al., 2011; Konaté et al., 2014). Sony and Baporikar (2019) noted that the process of making decisions is vital than the right or wrong decisions.

Collaborative decision-making implies brainstorming with different actors who have varying views in the decision-making process. Participants in the decision-making process may be experts in different disciplines with different information and knowledge about the problem (U. Eseryel et al., 2020; Xue et al., 2022). Collaborative decision-making can help in balancing the biases and ensures that the team clearly articulates the goals of the decision before moving to its analysis. Straus (2002) argues that human beings usually solve problems heuristically, using earlier experiences. Through experience sharing, each person brings in his/her own ideas that can be used to resolve the problem quickly (Tweheyo, 2018). Individuals who are usually affected by problems present their ideas, and they are deliberated on in a brainstorming manner.

Community (citizens) engagement is considered one of the important strategies for making effective decisions (Haltofová, 2018). Engagement serves as a mechanism by which community members are able to participate and give their views regarding the project in which public money is being invested (Boukhris, Ayachi, Elouedi, Mellouli, & Amor, 2016). It empowers citizens by providing them with mechanisms to express their preferences and opinions as well as contributing to civic engagement (Haltofová, 2018). Such engagement is an inclusive method that supports lateral communication and shared views.

Furthermore, collaborative decision-making offers a structured way of incorporating shared values of stakeholders into effective decisions. According to Curşeu, Meslec, Pluut, and Lucas (2015), decisions made collectively tend to be more effective than decisions made by an individual. Collaboration provides an opportunity to utilize many minds to develop a host of ideas, leading to informed and effective decisions (Schulz-Hardt & Mojzisch, 2012). Collaboration generates better outcomes than individuals acting on their own (Curşeu et al., 2015). A group may have a moderator who takes the responsibility of facilitating and guiding members through the collaboration process (Azadegan & Kolfschoten, 2014; De Weger, Van Vooren, Luijkx, Baan, & Drewes, 2018). The skilfulness and understanding of the moderator have substantial outcomes in collaborative decision-making. This study answers the following questions: What is the significance of indigenous knowledge and practices in enhancing food

security in Uganda? How do farmers utilise indigenous knowledge in their farming practices within the modern setting? How potential is the collaboration of farmers and stakeholders in enhancing food security? What influences farmers' choice of indigenous, modern, or a combination of the two?

Methods

A community engagement research approach was used (Tweheyo, 2018; Van de Ven, 2007). The study aimed at engaging small-scale rural farmers and key stakeholders in the field of food security for discussions about the importance of collaboration and the role of indigenous knowledge. Stakeholders in this study included Community Development Workers (CDWs), local leaders, extension workers, officials from National Agricultural Research Organisations (NARO), officials from National Agricultural Advisory Services (NAADS), and community elders.

The study was conducted in South-Western Uganda, East Africa, in the districts of Rukiga and Mbarara, where agriculture is predominantly the major source of livelihood. Qualitative methods of data collection were employed, and the study participants were purposively selected to get their lived experiences (Aregu, 2014; Tongco, 2007; Vanderstoep & Johnston, 2009). Sixty-seven (67) farmers were selected for in-depth interviews: 35 farmers from Katyazo Village, Rwanyamahembe Sub County, Mbarara District, and 32 farmers from Rwengongo Village, Kashambya Sub County, Rukiga District). The farmers chosen were known for their engagement in agriculture and had rich farming and food security experiences for a qualitative study. Inclusion in the study was based on the fact that one had to be engaged in farming as his/her source of livelihood. CDWs, local leaders, community elders, NAADS officials, and extension workers (totalling 5 in each parish) were interviewed as key informants. Interviews and engagements with farmers took a period of 60 days.

The study adopted a cordial interaction with farmers and stakeholders in the domain of food security and encouraged participants to leverage their divergent views, which they thought were vital in the process of food security enhancement. The interview guide was carefully constructed in English and translated into the local language (Runyankore-Rukiga) to capture participants' experiences with regard to indigenous practices and how these practices influenced their decisions for enhancing household food security. The interview guide was designed to capture farmers' experiences, with local knowledge vis-à-vis modern knowledge, and the sources of information required to enhance food security (particularly in areas of seed selection, food storage, and processing). Besides, the interview guide was meant to capture the challenges farmers face and how they attempt to overcome the aforementioned challenges. Each participant was given a chance during interview time to provide his/her views regarding what he/she thought was essential for making better choices.

In-depth interviews with farmers and key informants were supplemented by focus group discussions (FGDs), which were conducted at two separate research sites (Katyazo Village in Mbarara and Rwengongo Village in Rukiga). Two focus groups of 12 participants each were conducted in each of the parishes in the study areas. Male and female farmers were chosen and grouped separately to allow free expression of their views.

A recorder was used to capture participants' narratives. Focus group discussions were considered appropriate because of they offer direct interaction within a social setting and context about issues under investigation (Denzin & Lincoln, 1994; Hevner & Chatterjee, 2010). FGDs were important in this study mainly to get participants' views and experiences in the decision-making processes. Collected data was transcribed, coded, and analysed thematically by identifying common themes and patterns of indigenous practices that were vital in enhancing food security.

Results and Discussion

Results show that farmers' efforts to enhance food security were centred on knowledge and experience sharing amongst themselves. That was done through farmer meetings, which offered them opportunities to share their ideas, knowledge, and experiences. Farmers' interactions were found to be fundamental for effective and innovative solutions to food insecurity. Furthermore, it was disclosed that rural farming communities preferred working in groups to support each other, particularly in seasons when much labour was needed, like when harvesting crops from gardens to hurriedly escape from the onset of the incoming rainy season.

Membership to farmer group(s)

The study endeavoured to establish how farmers were affiliated and worked in groups and whether decision-making was done in their groups. It was revealed by many of the farmers interviewed that they belonged to farmer groups, and groups were helping them to make joint decisions, have shared visions, and learn from one another.

It was further established that rural farming communities enjoyed working together for mutual benefit and support. Quite often, an individual farmer depends on his/her group for support in terms of knowledge and labour. As Kao and Wu (2021) noted, the interaction of people with common interests enhances knowledge sharing and promotes awareness among team members. Sharing of ideas yields mutual understanding and results in long-lasting solutions to given social problems (Dawra, Chand, & Aggarwal, 2022).

The study noted that members of the group develop a work schedule by which each member is supposed to be assisted in his or her garden. That was being done in turns until everyone benefited from group support in his/her garden. However, it was interesting to note that many of the groups appeared not formal but casual, and their major objective was financial assistance to members (soft loans), labour exchange, and marketing of their agricultural products.

Indigenous knowledge application in crops growing

It was established from the farmers interviewed that those farmers mainly preferred indigenous practices of enhancing food security to modern ones. Practices like organic manure application, terracing, digging trenches along water runways, mulching gardens with dry grass for water and moisture retention in the soil, ash spraying against crop diseases, and pesticides were majorly used as opposed to chemical spraying and inorganic fertilizers. Other practices that were observed being applied were hand weeding, mixed cropping, and planting elephant grass along the terraces to stop soil erosion. It was further noted that 22 out of 67 participants were combining indigenous and modern practices of food production. For instance, practices like ash spraying were being combined with chemical spraying, organic manure was combined with biochemical fertilizers, mulching, and weed spraying, among others, were observed in gardens. Only 14 farmers out of the total interviewed were using modern practices exclusively. Modern practices were taken in this study, as the use of chemical spraying, application of inorganic fertilizers, hybrid crop growing, and exotic/hybrid animals.

Source of planting seeds

The study takes an interest in inquiring about the sources of seeds farmers plant during planting seasons. Participants mention five sources of planting seeds, as indicated in Table 1.

Table 1.
Farmers' sources of planting seeds (Farmers have multiple sources of seeds)

Source of seed	Number of people
Previous harvest	57
Fellow farmer	17
Bought from seed store	7
Open market	3
From national advisory agricultural services (NAADS)	49

The Table 1 indicates that fifty-seven (57) out of 67 farmers interviewed planted seeds selected from their previous harvests. Forty-nine (49) farmers got planting seeds from seed distributing agencies like NAADS, seventeen (17) got planting seeds from their fellow farmers, seven (7) farmers out of the total farmers interviewed were buying seeds from shops, and only three (3) farmers were found buying planting seeds from the open markets. It was revealed that even when NAADS was distributing free seeds to farmers, not all farmers interviewed were getting seeds from NAADS. The reason given was that farmers liked planting seeds from their own gardens because they selected them well, and they knew they would give them good yields better than what they bought from markets. A woman farmer from Katyazo Village in Mbarara District, during the interview with her, stated that:

> "Quite often, seeds got from NAADS are of poor quality and are very expensive. To be able to afford them, you require fertilizer application and chemical sprays against diseases. This is not the case with local seeds selected from our own gardens."

She further explained that the high cost of these NAADs seeds was mainly due to a fraudulent procurement process. People responsible for distributing seeds and planting materials get them from their relatives and friends without considering the quality of what they give people. Deciding on which type and quality of seeds to plant and where to get them was found to be a critical event in the food security decision-making process. It was noted in the literature that farmers will always use a mixture of practices that are compatible with their farming needs (Asogwa et al., 2017). This finding concurred with Gueye et al. (2013) arguments that smallholder farmers prefer seeds that give them good yields and which are reliable despite the prevailing unfavourable environmental conditions.

Post-harvest handling methods

Individual farmers in Rukiga and Mbarara who participated in this study indicated that they used a variety of methods to prevent harvested foods from pests and weevils. The commonly used methods of preserving food against pests and weevils were the use of pesticides, ash from burnt cow dung, wood ash, pepper, dry cyprus leaves, dry-smashed herbs, and cow urine. Table 2 gives a summary of the methods used.

Table 2.
Food preservation methods used by farmers (A farmer can use different methods)

Methods of preservation	Number of people using the method
Using pesticide/ chemical application	11
Using burnt cow dung ash	21
pepper powder	29
Using native dry herbs	25
Using cow urine	2
Wood ash	22
Nested packaging	13

Looking at Table 2, 29 farmers out of 67 interviewed were using indigenous practices like red pepper powder spray to preserve harvested food such as maize, sorghum, and beans against weevils and pests. Farmers argued that, unlike chemicals, pepper powder was effective in preventing harvested food from weevil infestation and was believed not to have serious health hazards. Some herbs were reportedly popular with many farmers because of their perceived efficiency in preventing food crops from weevil attacks. The use of chemicals was found to be less used because they were reported to be very expensive, and that was feared because of its perceived associated health hazards. Post-harvest management of food was seen as one of the

critical stages in the food value chain farmers pursue to enhance food security. Group members often share knowledge concerning the effective storage of food using different techniques to reduce post-harvest losses. Hussein, Rosita, and Ayuni (2019) noted the importance of the paradigm shift of farmer groups from the resource-based view to the knowledge-based approach for effective and sustainable development. One of the participants in the focus group discussion at Rwengongo, Rukiga District, had this to say:

> "I dry and crash to powder a kilo of red pepper and mix the powder properly with one bag of beans and then cover the beans well or, put them in the granary. I can keep these beans for four months without being attacked by weevils and pests. After four months, I add more red pepper if I still want to store but usually, I use or sell the beans after that period."

Treatment of foodstuff against pests was the first thing to do after harvesting and before storage. That was done for a number of reasons: i) to preserve food against pests, ii) to be able to reserve seeds for the next planting season, and iii) to keep food safe for future use, hence guaranteeing household food security. In a similar manner, Ngubo (2021), Ponge (2013), Kamwendo and Kamwendo (2014), Louette, Charrier, and Berthaud (1997), observed that post-harvest handling of foodstuff is one of the major decisions made by rural farmers to ensure the sustainability of food security.

Participants further narrated how they used different methods of processing food for consumption. They purportedly use both indigenous and modern practices that are easily available to them. Some of the indigenous practices mentioned were using grinding stones and pounding groundnuts using a local motor. Indigenous practices were reported to be cost-effective for local people, but they were being substituted by modern practices because of the young generation's unawareness of them. One of the participants in the Katyazo Village focus group discussion had this to say:

> "Millet that is milled on a grinding stone makes flavoured millet bread (*kalo*) that is so delicious. I like it because of its texture and flavour compared to the one milled by the milling machine. There is a way machine make millet porridge and bread lose texture and taste compared to millet milled on a grinding stone. Besides, a grinding stone is cost-effective and available all the time. I cannot fail to eat "*kalo*" because of power failure or when there is no money in my pocket" (translated from Runyankole to English).

Farmers' sources of information in the decision-making process

In the decision-making process, the right information is very significant for informed and effective decisions (Kao & Wu, 2021; Simon, 1957). The source and accuracy of information are key as far as effective decisions for enhancing food security are concerned. The study revealed that farmers get information that enables them to make food security decisions from different sources. Many of the farmers interviewed said that they got information about good farming practices and markets for their products from collaborative meetings. In these meetings of farmers and stakeholders, participants share success stories and challenges, and this offers the opportunity for others to learn from fellow farmers' experiences. One of the participants in the focus group discussion in Katyazo Village Mbarara District, while responding to the usefulness of farmer meetings, said:

> "I have learnt new knowledge from our monthly meetings. The meetings we have with our community development worker help us to learn from what other farmers do. We meet with experienced farmers and learn new ideas and techniques of farming from them. We share various indigenous practices and experiences on how to improve our household food production and food security using our local resources. We are encouraged to share our stories about what we do in our gardens and homes to improve food security. For instance, I have learnt through the meetings that

> "*kamurar*i" (red pepper) is a good preservative for beans against weevils, I no longer get losses due to the problem of weevils."

Likewise, one of the key informants from Kashambya, Rukiga District, remarked:

> "My neighbour owns a cow, an improved breed given to her by World Vision. She has learnt using herbs for treating and deworming her cow without relying on costly veterinary officers. She is able to get 15 litres of milk from her cow in the morning and 12 litres in the evening. She has learnt new methods of farming from fellow farmers and experts through knowledge sharing in collaborative meetings. By using a smart phone, she is able to consult and get help from fellow farmers and instantly." (CDW, Kashambya).

Farmers expressed concern that extension staff do not usually reach out to them on their farms when they need them. CDWs, instead, were the ones visiting them and providing information concerning food production and other livelihood activities. CDWs were reported deployed by the government in every sub-county, and they were able to reach out to every household, inspecting and guiding them on how to enhance their socio-economic development. While meeting CDWs in Rukiga District, it was revealed that because of the limited number of extension staff, CDWs were added to another role of providing agricultural information to farmers. Through their training, CDWs are social workers or social scientists who work with communities to help them improve their livelihoods. They are community educators who help households to build strong and more resilient livelihoods. CDWs provide supportive information on markets for food items, reminding farmers to plant in time and what to plant depending on the season and location of the farmer. Radios and televisions were reportedly not providing information to farmers well because of the time at which they were broadcasting information. Rural farmers hardly get time for news when broadcasted during the daytime. The timing of agricultural programs, especially on radios and televisions, was not convenient to rural farmers who spend most of their time in gardens.

It emerged in this study that although many farmers were using more indigenous knowledge and practices in the food production and value chain, some farmers were found combining both indigenous and modern practices. The main reasons given in explanation for this were that indigenous knowledge was cost-effective and readily available to them. It was further revealed that farmers trusted their own seeds harvested and selected from their gardens because they found it easy to identify their health traits while still in the garden. That was a similar practice to what Gueye et al. (2013) observed that before a farmer thinks of buying seeds, he/she must be convinced that the types of seeds he/she is buying satisfy his/her needs better than seeds harvested from own garden. Relatedly, one of the participants from the Katyazo focus group discussion said (translated from Rukiga to English):

> "I do not know why people get troubled with money for buying planting seeds during planting season. To me planting seeds cannot be a problem because I keep my own seeds which are well selected from my own harvests. I know how to do it to get better results."

From further interactions with study participants, it was revealed that decisions concerning the storage of food were circumstantial, depending on the quantity of food one needed to store, the type of food stuff to be stored, and also the locality of the farmer. For instance, the granary storage method was reportedly dying out because of two main reasons: thieves who steal food (because granaries are constructed outside the house) and a reduction in the production of food due to scarcity of land and land degradation because of climate change. Regarding the theft of food, it was reported to be a big risk to store food in the granary built outside the house because thieves usually come and steal everything from those granaries. With the reduction in productivity, participants also expressed their concern that production was steadily going down because of environmental challenges. Little food harvested was being kept indoors using locally

made baskets commonly known as "*Ebiteebo* or *ebitukuru*". Clay pots, sacks, and plastic drums were also cited as other methods of storing food stuff inside the house. Beans and peas were mainly stored indoors because of market demand and also as a measure against thieves.

Food items like Irish potatoes, sorghum, millet, and maize, which were still being produced on a large scale, were being stored in local stores, which were constructed using local materials (wood, grass, and mud). They are constructed such that they have wide ventilation and a rack, which is erected inside the house such that foodstuffs stored do not come into contact with the bare floor and are exposed to mould, termites, and red ants. Besides, the way the structure was being made allowed sufficient air to flow in and out, and temperatures remained regulated, a condition that is, in a way, unfavourable for weevils. Participants gave various ways of treating their foodstuffs. Many of the participants interacted with said that they preferred indigenous techniques of treating harvested foodstuff due to their perceived health issues, cost, and ease of use.

Although farmers were affiliated with various farming groups, they expressed concern that meeting as a group and stakeholders was limited. Participants complained of having limited opportunities to meet as farmers and share their experiences. In their clarification of this problem, they attributed it to poor mobilization and limited time because, most times, they were busy working in their gardens. NAADS Staff who would mobilize farmers do not do it, and they usually come in when they are distributing items like seeds, livestock, and others. In other words, the emphasis of NAADs officials was reportedly put on the distribution of farm items. They were reported as not doing enough to mobilise farmers. One of the participants in the Rwengongo focus group discussion said, "NAADs is probably for rich farmers because it does not help much". That was seen as having less interest by NAADs in poor farmers. Limited information available on alternative ways of improving food security, as well as a common platform for sharing knowledge and experiences, were major challenges adversely affecting farmers' decision-making process.

It was also revealed from focus group discussions that rural farmers always make decisions that are substantial to their livelihoods. Farmers needed to collaborate and coordinate with key stakeholders for effective and impactful decisions. It was further disclosed that farmers liked working together in groups for mutual support, especially in circumstances that required joint operations like harvesting and marketing of food stuffs. It was established that farmers attached great importance to knowledge and experience sharing, notwithstanding a number of constraints they faced in their rural context (biting poverty, poor and inadequate infrastructure, poor leadership, environmental and weather changes, to mention but a few). It was profoundly disclosed that, quite often, rural farmers did not make optimal but rather satisficing decisions due to the circumstances in which they operated. That substantiated what Herbert Simon's principle of behavioural decision-making states, "decision makers do not often go for optimal but satisfactory decisions" (Simon, 2009). These intuitions informed this study of the dire need farmers had for collaborative decision-making that would strengthen their efforts to enhance household food security. It was realized that farmers needed to be facilitated to overcome their decision-making challenges. Best indigenous practices that promoted food security needed to be acknowledged and shared among farmers and stakeholders for sustainable use.

Participants expressed the need for a forum where interactions on food security would be conducted with the aim of sharing the experiences and limitations of farmers. It was understood in the focus group discussions that farmers needed to interact with fellow farmers and other stakeholders to overcome their food security decision-making challenges. That was noted to agree with what Mazibuko and Chitja (2021) pointed out that: the collaboration of stakeholders enhances the accomplishment of desired goals. Therefore, best indigenous practices that promote food security need to be shared among farmers and stakeholders for sustainability.

Results further disclose that farmers perceived indigenous knowledge as environmentally friendly and a cost-effective measure for enhancing food productivity, storage, and processing. They exhibited the confidence of farmers in their local seeds because they are perceived to be disease and drought-resistant when identified and sorted well in the garden. Findings further indicate that local methods of processing and food storage are preferred because of their availability and cost-

effectiveness. These local practices have been tried and proved over the years. This kind of confidence local farmers had in their indigenous practices reiterates what Ngubo (2021) observed that smallholder farmers in rural areas have faith in their indigenous knowledge. It was observed that the prevailing and previous food security interventions in Uganda (for instance, National Agricultural Advisory Services (NAADS), Plan for Modernization of Agriculture (PMA), Food and Nutrition Policy (FNP), and Parish Development Model (PDM) do not provide adequate support to poor farmers because they do not explicitly encourage the use of indigenous practices. These interventions were perceived as support only for large-scale and commercial farmers who could afford hybrid seeds and exotic animals like cows. All this is done at the expense of smallholder rural farmers.

Collaboration of farmers and stakeholders promotes the sharing of successful stories and promotes social capital for members' socioeconomic development (Al-Shawabkeh, Alhawari, & Al-Kharabsheh, 2022; U. Y. Eseryel, 2014). In collaborative decision-making, farmers brainstorm, tell their stories, and reach a common understanding. The purpose of sharing farmers' experiences is to learn from each other about best and worst practices and come up with workable solutions. Field experts like extension workers can provide technical advice in the discussions. Knowledge sharing stimulates comprehensive thinking and is a means of identifying best practices for addressing food security-related problems (Lasker et al., 2001; Lodhi & Mikulecky, 2010; Raghunath & Devi, 2021).

Collaboration builds teamwork and enables information sharing as a means of identifying alternative ways for addressing food security problems (Lasker et al., 2001). The meetings of farmers and stakeholders provide an avenue for alternative knowledge to farmers by enabling experience sharing. For example, one of the CDWs in Rwanyamahembe, Mbarara, commented that,

> "While interacting with farmers in one of the collaboration meetings, I learnt that "*Omubiriizi*" (a known local medicinal plant/herb for human and livestock) can be administered to a cow that has failed to pass out the placenta after delivery as an emergency measure, while waiting for a veterinary doctor."

That is one of the best practices that other farmers need to share to enhance productivity and food security. Participants in the meeting can identify the most useful insights for getting rural people out of poverty through enhanced livelihoods. In the meetings, coordinators are informed about which inputs (seeds/livestock breeds) are needed in which particular areas given different climatic conditions. The practice of PDM, for example, has been supply-driven: distributing cash, seeds, and planting materials without considering farmers' capacity, preference, and farming practices employed.

Conclusion

The study reveals how food security decisions are more effective when they are made jointly between farmers and stakeholders. Collaboration leverages shared understanding, accommodates the collective values of local people, promotes cultural diversity, and offers lasting and inclusive solutions to food insecurity. The study further demonstrates the strong beliefs and trust rural farmers in Uganda have in indigenous knowledge and practices because of their perceived cost-effectiveness, healthy friendliness, and environmental sustainability. It reveals how indigenous knowledge meets local farmers' expectations by offering quick solutions in all food value chain activities, particularly in seed selection, planting, food storage, and processing. Such useful indigenous practices need to be well documented and shared by all farmers for their positive outcomes. Multisectoral approaches need to be emphasized by the government for effective decision-making to achieve sustainable food security in Uganda and beyond. This study offers a lesson for the ongoing implementation of the Parish Development Model in Uganda. Whereas

modern technologies are significant in increasing agricultural productivity, this study reveals that they do not guarantee production sustainability, and, therefore, they ought to complement rather than substitute local peoples' indigenous practices for sustainable food security. Routine meetings are essential for providing an avenue for sharing knowledge and experience of indigenous and modern practices. However, more detailed studies focusing on the adoption and utilisation of modern farming technologies with poor rural farmers are required.

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