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Research Article

Feasibility of using photovoice for assessment of peanut quality and safety along the value chain: Perspectives of youth in rural Uganda

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Abstract

Generally, contamination of peanuts is due to improper pre- and postharvest handling technologies practiced along the value chain. This leads to low-productivity which exacerbates food insecurity discouraging youth participation in agriculture. There is need to interest and retain youth in agriculture whilst producing safe and high-quality products. This study aimed to provide insight into the use of photovoice (participatory research approach) to assess peanut quality and safety along the value chain. Thirty youth engaged in a photovoice study responded to open- and closed-ended inquiries on the use of photovoice to assess peanut quality and safety. The data was analysed using NVIVO-12 and SPSS-version-21 packages. Results showed that 88.5% of participants appreciated photovoice (loved taking and discussing photos), whereas 11.5% considered photo explanations subjective. All participants reported acquisition of knowledge about peanut quality and safety through photovoice and referred to the technique as suitable for peanut quality and safety assessment in their communities. Furthermore, 92.4% of participants were willing to use photovoice as a continuous learning and knowledge-sharing platform in their communities. From the findings, photovoice was suitable for assessment of peanut quality and safety in resource-limited rural communities. The technique also actively encouraged youth participation along the value chain.

Keywords: Peanut, Value chain, Quality and safety, Photovoice, Youth, Uganda

INTRODUCTION

Agriculture is one of the dominating sectors in Uganda's economy that is considered to provide job-multiplying effects to many households and livelihoods (Kaweesa et al., 2018). Uganda's agricultural sector was reported to

absorb 54% of youth aged 18-30 years compared to 31% of adults (31-64 years old) excluding subsistence farming (FAO, 2019). Furthermore, FAO (2019) reported that young people were absolutely important to the future economic development of Uganda with the agricultural sector considered the most important driver for this achievement

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to be realized. According to UBOS (2018) report, Uganda's population is mainly youthful with 45% aged 18-30 years. However, there is a decline in youth participation in agriculture following reports from UBOS (2020). In the report, it was stated that only 38% of youthful households (15-30 years) reported agriculture as their first occupation. The reasons for the drift of youth from agriculture were highlighted by FAO (2017) such as; poor economic diversification, development of the private sector, underdevelopment of rural areas, low productivity and returns from subsistence farming. In addition, Mwesigwa & Mubangizi (2019) reported that as a result of rural-urban migration, young people abandoned agricultural activities which affected food security since youth formed the largest proportion of the Ugandan population. To curb the situation, USAID (2016) reported that Ugandan youth were drawn to modern technologies and tools and sought business opportunities in the agricultural sector. Therefore, the use of modern technologies or techniques that employ modern equipment could serve as an incentive to encourage youth to actively participate in the agricultural value chain in Uganda.

According to Bates et al. (2018), photovoice, a community participatory research technique employs a combination of photography and critical dialogue to record and reflect on community strengths and concerns. Different photovoice studies have employed youth to assess different aspects in different fields of research for example ethical studies (de los Ríos, 2020), health (Niepage et al., 2018), nutrition (Lam et al., 2019) etc. Photovoice has been documented to be appealing, interactive and educative among youth (Yang et al., 2020) and leads to the acquisition of knowledge both at individual and community levels (Leung et al., 2017). Due to the visual nature of photovoice and its positive feedback about its interaction with youth, it can act as an incentive to increase youth participation along the agriculture value chain. Such a technique would be in line with the suggestion made by Veettil et al. (2021). It was stated that making the sector intellectually stimulating and economically rewarding would give a chance for youth to stay involved in agricultural activities.

Peanuts are one of the five major oil crops planted in developing countries such as Africa, Asia, South America and some developed countries such as the USA (Archer, 2016). Also known as groundnuts, peanuts are mainly grown in eastern and northern regions in Uganda by smallholder farmers who mainly depend on rain-fed agriculture during the two seasons of the year (Okello et al., 2018). Although the legume is extremely nutritious, it is one of the host crops that is most susceptible to invasion by toxicogenic moulds and subsequent aflatoxin contamination (Okano et al., 2021). The latter is one of the most common food safety risks posing serious threats to human health as well as nutrient deficiencies and delays in cognitive development

(Pena et al., 2018). Chilaka et al. (2022) reported that even with efforts such as the use of fungi-resistant varieties, improved drying and storage conditions, and biological and chemical agents in Africa, the region is faced with mycotoxin contamination as one of the major food safety issues. Omara et al. (2020) stated that the poor pre-, peri-, and postharvest practices, government legislation lack of awareness and low levels of education about aflatoxin contamination among farmers, entrepreneurs and consumers are probable reasons for the high aflatoxin levels recorded in Uganda. The cost of aflatoxin testing is also considered high since each sample costs 220,000 Ugshs (approx. 59 USD) (UNBS, 2018) which constraints rural communities more. Wacoo et al. (2014) also reported that available aflatoxin testing methods employed laboratory procedures which were labour-intensive, expensive and time-consuming. In Uganda, Omara et al. (2020) stated that testing labs are mainly in Kampala making accessibility difficult for rural communities. Therefore, there is a need to improve peanut quality and safety by providing a low-cost assessment technique which can be accessed easily by rural communities. This study aimed at using photovoice among rural youth farmers as an alternative for the assessment of peanut quality and safety along the value chain in rural communities.

MATERIALS AND METHODS

Study population

The population under study was rural youth farmers (18-35 years) from the Nwoya (Northern) and Tororo (Eastern) districts of Uganda **Figure 1**, who were engaged in farming activities along the peanut value chain. In both districts, agriculture was considered the dominant sector of the economy. The youth population in Nwoya was reported as 26,372 people with 26.7% of households headed by youth (UBOS, 2017a). In Tororo district, the population aged 18-30 years was 101,178 people with 19.7% contributing to youth-headed households (UBOS, 2017b). Nwoya is one of the locations in northern Uganda that experienced shocks due to the civil war that lasted for about two decades from 1986 (Nukakora, 2014). Furthermore, Nukakora (2014) reported that displacements, and little ability to cope with life-threatening factors such as drought, and high poverty levels as consequences of the war in the region. Apart from being a border district where a lot of commerce takes place, Tororo district was in the transition from growing old peanut varieties to new high-yielding varieties (Jelliffe et al., 2018). Therefore, based on the situations in both districts, there was a need to improve their peanut value chains thus considered as a niche for this study.

Study design

A longitudinal study that covered two peanut seasons in a year was conducted from December 2020 to September

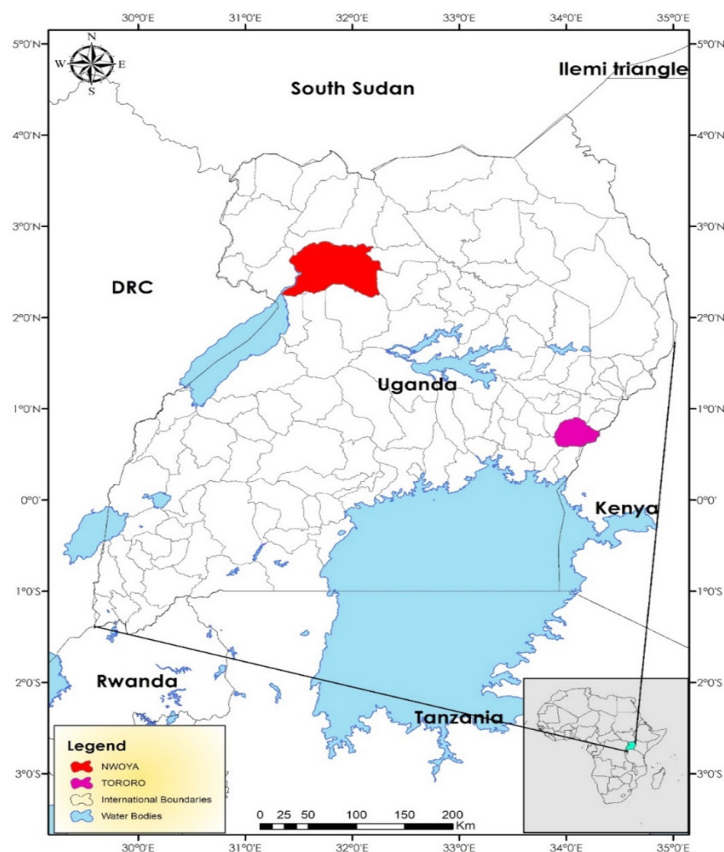


Figure 1: Location of Nwoya and Tororo districts in Uganda.

2021. The rural youth farmers provided their consent and took photos of what they understood about peanut quality and safety along the value chain. Every two months, focus group discussions were conducted with the youth participants and every youth was given a chance to present to the group the photos they had taken and how they related to peanut quality and safety. The focus group discussions (FGDs) were guided by the researcher. At the end of their photovoice exercise (second peanut season), rural youth participants that participated in the study were evaluated using a semi-structured questionnaire to assess their perspectives about photovoice as they used it as an assessment technique for peanut quality and safety along the value chain in their communities. The questionnaire contained both closed and open-ended questions to evaluate their knowledge about photovoice, photovoice as an assessment technique for peanut quality and safety, and the likelihood of adoption of the technique after the study in their communities.

Selection of study participants

Thirty rural youth farmers who were engaged in photovoice activities for two peanut seasons were considered for this assessment. These were consistent peanut growers both

male and female in Nwoya and Tororo districts (15 youth per district) aged 18-35 years who were engaged in Feed the Future project activities. Feed the Future is the United States government's Food and Nutrition Security Initiative with various funding support to the United States Agency for International Development (USAID) for field-based research into food and nutrition security activities underway across Latin America, Africa and Asia. Since Uganda is a target country of Feed the Future, this research was conducted and designed with two Ugandan communities in Nwoya and Tororo districts and implemented by Makerere University, the National Agricultural Research Organization (NARO), and the University of Tennessee (USA). The general purpose of this research was to empower youth with the tools and training necessary to voice their challenges and opportunities in the peanut value chain.

In Nwoya, youth working with ZOA (Christian-based Dutch Non-Government Organization) and Local Seed Business (LSB) groups were considered whereas, in Tororo, youth engaged with the Integrated Seed Sector Development (ISSD) Uganda programme and Tororo District Farmers Association (TODFA) were recruited. In addition, youth that had; direct involvement or their parents in peanut production and farmer groups, roles played along the

peanut value chain, years of participation along the peanut value chain, ability to use or learn how to use phones and take quality photos, ability to speak or at least understand English, high level of commitment and obedience, and ability to carry out assigned tasks were considered to be included in the study. Before using photovoice, the youth provided their verbal and written consent to participate in the study. During the photovoice exercise, the selected youth were asked to take photos of what they understood by peanut quality and safety using smartphones (Techno POP 2, Android) which they received at the beginning of the photovoice activities.

Data collection

At the end of the second peanut season in September 2021, the youth were issued with a semi-structured questionnaire to assess their perspectives about the use of photovoice as an assessment technique for peanut quality and safety along the value chain in their communities with the guidance of the researcher. The questionnaire comprised of closed-ended and open-ended inquiries which generated both quantitative and qualitative data respectively. With the questionnaire projected on the screen, the participants were guided on how to answer the questions on their individual printed copies by the researcher.

Data analysis

Data obtained from the questionnaires (both qualitative and quantitative) was compiled into an Excel file which was later imported into NVIVO-12 software. The open-ended questions were considered as nodes whereas the closed-ended questions were considered as attributes. The

responses for open-ended questions generated qualitative data which was coded and analyzed using NVIVO-12 whereas quantitative data obtained from the closed-ended questions was transferred as an excel file into SPSS version 21 to generate frequencies. After analysis, the two data sets were merged to answer the research question, "Could the photovoice technique be used to capture and assess information on peanut quality and safety along the value chain?"

RESULTS

Demographic characteristics of participants

The profile of participants that took part in the photovoice exercise is provided in **Table 1**. However, some of the participants dropped off during the study and only twenty-six participants were able to fill out the questionnaire at the end of the second peanut growing season. Reasons for dropout included; separation with spouse leading to relocation, going back to school and relocations to other districts. Since the questionnaire had a mixed method approach, the results in this section are presented separately starting with the quantitative results in **Table 2** followed by qualitative explanations. As this section progresses, it should be emphasized that the photovoice participants were the primary respondents of this study, therefore, referred to as "participants." However, when the participants were collecting data, they interfaced with people from the community who are referred to as "subjects" in this section. Such subjects included farmers, input dealers, processors, consumers, transporters, distributors and marketers as they participated along the peanut value chain.

Table 1: Demographic characteristics of participants of this study.

Demographic characteristic	Variables	Number of participants
District	Nwoya	15
	Tororo	15
Sex	Male	19
	Female	11
Marital status	Single	14
	Married	16
Highest level of education	Primary	3
	Secondary	21
	Tertiary	6
Roles along the peanut value chain*	Input dealer	3
	Production	29
	Storage and distribution	20
	Processing	5
	Wholesale	3
	Retail	2
Years of participation along the peanut value chain	1-5 years	9
	6-10 years	9
	11-20 years	8
	More than 20 years	4

*There is an intersection between the roles of the participants: one participant could be involved in various roles

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Table 2: Perceptions of participants while using photovoice for assessment of peanut quality and safety along the value chain (n=26).

Describing photovoice technique	Frequency (%)
What did the youth enjoy about photovoice?	
Taking photos of their interest	96.2
Discussing photos taken with friends	88.5
Interacting with the community	53.4
Contentment while using photovoice	
Yes	88.5
No	11.5
Using photovoice for assessment of peanut quality and safety	
Suitability of using photovoice for assessing peanut quality and safety	
Yes	96.2
No	3.8
Ranking the suitability of the technique	
Excellent	38.5
Very good	30.8
Good	23.1
Bad	3.8
Acquisition of knowledge concerning peanut quality and safety while using photovoice	100
Challenges faced while using photovoice in the community	
Yes	88.5
No	11.5
Likelihood of adoption of photovoice in the community after the study	
Willingness to use photovoice after the study	
Yes	92.3
Not sure	7.7
Frequency of using photovoice	
Every day	50
Weekly	42.3
Monthly	7.7
Nodes of the value chain where photovoice would be used often	
Production	50
Processing	30.8
Marketing and distribution	15.4
Inputs	3.8
Willingness to teach other youth in the community	100

The frequencies reported in **Table 2** were further explained by participants concerning the choices they had taken. These findings were mainly qualitative as presented below.

Knowledge about the photovoice technique

The participants described their knowledge about the photovoice technique based on two premises: a data collection technique and a photo-aided discussion. Participants mainly described photovoice as the use of photos that stimulated discussions based on a certain topic of interest among people in communities. They noted that the photos taken could be presented, explained and used to; display different activities along the value chain, and communicate important issues to the community and for study purposes. For example, one participant wrote, '*Photovoice is the way you can talk to someone using photos*' (Participant 3, male, Nwoya district).

Furthermore, participants described photovoice as a cheap data collection technique that could be used along value chains to address different agricultural needs in communities. For instance, when asked, an interviewee in Tororo district said, '*Photovoice technique is a method of capturing information or data by use of photos. The photos must be clear and should describe a particular activity that you are describing*' (Participant 5, male). In addition, photovoice was reported as a technique that permitted interaction among community members under a certain topic.

Based on **Table 2**, participants who enjoyed using the technique also specified other aspects which made them like the technique such as; the creation of new friendships through the photovoice interactions, acquisition of free smartphones, knowledge sharing with researchers and the community, photo-taking skills and touring new places while

taking photos. However, participants who reported their dissatisfaction asserted that photos could only be properly explained by the person who took them in contrast to a written procedure that could be explained and understood by all; value chain actors asking for money in exchange for information created frustration to the participants and the unavailability of daily data bundles for internet connection, and interruptions in connectivity also made photo-sharing difficult. The participants stated, *'Photos taken can be properly explained by only the person who took them unlike a written method that everyone reads and understands everything'* (Participant 1, male, Tororo district).

The process of taking or capturing the photos may seem to be hectic since we are living in a community where people believe that money should be given in exchange for any information so sometimes the data collector may spend some money in return for information to be given (Participant 5, male, Tororo district)

Use of photovoice to describe food quality and safety

Based on the knowledge obtained from the photovoice discussions, participants were in a position to describe food quality and safety. According to the participants, food quality was referred to as; the different activities aimed at producing nutritious food; and attributes of food acceptable to consumers. In the former, activities mentioned included; proper seed selection, pests and disease identification and management, improved storage, proper hygiene of the processing environment, drying on tarpaulin and food preservation. These were described by participants as;

Every stage involved in the production and processing of a foodstuff and making it safe and protected from pests and diseases, weeds, aflatoxins among others (Participant 3, female, Nwoya district)

Food quality is the way of producing good quality food to the community such as drying gnuts on tarpaulin and proper storage of gnuts not to get the risk of aflatoxins (Participant 11, male, Nwoya district)

Additionally, participants stated that food quality referred to the criteria used by consumers as they considered a product fit for consumption. Aspects shared by participants included; colour, taste, preservation, and proper food standards. According to them, food quality was;

The rate of safety and value of a particular food substance towards being fit for consumption and also having a high level of preference by its final consumer (Participant 2, male, Tororo district)

Quality characteristics of food that are acceptable and allowed for consumers and can meet their needs (Participant 3, female, Tororo district)

Participants described food safety as practices that reduced hazards, especially aflatoxins in food to protect the health of consumers. Furthermore, they stated that all activities aimed at preventing food contamination also contributed to food safety. Such activities included; proper hygiene of the processing environment and store, proper storage of food, improved management of pests and diseases, prevention of mould growth especially during storage, and Good Manufacturing Practices (GMPs). Besides, some participants described food safety as a series of activities aimed at extending the shelf life of food products by practising recommended storage practices. In Tororo district, some participants reported, *'Food safety means that a particular food substance is fit and ideal for human consumption without causing any harm in terms of health, taste and the food should be free from any contamination'* (Participant 2, male).

Food safety means a situation that a food is fit for consumption without causing any harm to human life in terms of their health (Participant 6, female).

Suitability of the photovoice as an assessment technique for peanut quality and safety

Findings in **Table 2** indicated that participants reported that photovoice was a suitable technique for collecting data concerning peanut quality and safety. Their choice was based on the following reasons;

Photovoice encouraged knowledge sharing. Participants reported that photovoice provided room for sharing knowledge about different activities along the value chain regarding peanut quality and safety. Participants stated that through the photo discussions, they were informed about peanut quality and safety aspects which they were not aware of. These aspects included; drying on tarpaulin, identification of pests and diseases, improved modes of peanut storage, proper hygiene of processing environments, and improved peanut varieties. A participant in Nwoya district stated, *'Yes, photovoice is the suitable tool for assessing peanuts because it sensitizes the community of the quality of peanut, the disease which might be affecting the peanuts and the best varieties to be selected by the farmers'* (Participant 11, male)

Another participant in Tororo district highlighted, *'From the photos taken by different participants including myself, we have been discussing different safety and quality issues that need to be worked upon'* (Participant 1, male, Tororo district)

The technique was user-friendly. Participants highly appreciated photovoice because it was brief, easy, fast and summarized data which enabled communication and transfer of information in a short period. Not only were the photos direct, but participants also stated that it was

easier to master what had been captured. Furthermore, they stated that the smartphones were portable which also made storage of photos taken easy. In addition, participants also noted that the technique could be used by everyone including people who cannot read and write. In both districts, participants appreciated photovoice as described below;

Photovoice is suitable because it quickens information transfer and sharing... it helps even those who cannot read and write to get the information on particular activities (Participant 6, female, Tororo district)

The phones are portable to move with and it is also easy to master what you have captured (Participant 1, male, Nwoya district)

Photovoice clearly shows the best ways of capturing peanut quality and safety... It is brief and summarizes the whole groundnut value chain (Participant 3, female, Tororo district)

Photovoice does not waste time and it is easy to capture the information (Participant 2, female, Tororo District)

Photovoice provided faster solutions to community problems. Participants reported that since photovoice could be used to display the good and bad practices, it provided an easy pathway for farmers to realize their mistakes and transform them into improved practices. In this regard, participants stated that photovoice provided faster means of addressing community problems through the photos which were captured. This was noted by a male participant from Nwoya district who stated, ‘... photovoice captured both good and bad practices and after discussion, people would realize their mistakes and transform to the good practices they did not know

In Tororo district, a participant said, ‘Photovoice is a suitable tool because it gives clear information about peanut quality and safety since the photos captured can be seen and the challenges in the photos are addressed with clear knowledge (Participant 5, male, Tororo district)

Photovoice provided a database for future reference. Participants reported that the photos taken could serve as concrete evidence which could be recorded and stored in databases for future reference thus photovoice is a suitable technique for capturing food quality and safety aspects.

Knowledge about peanut quality and safety acquired while using photovoice

All the participants **Table 2** reported that they had obtained knowledge about peanut quality and safety as they interfaced with photovoice. Knowledge obtained was encompassed in the following aspects;

Improvement in agronomic practices ensured the quality of produce. Participants reported that proper agronomic practices carried out by farmers contributed highly to the quality of produce at harvest. Participants listed practices that contributed to peanut quality and safety at harvest and these included; proper variety selection, and harvesting in time to avoid spoiling the peanuts in the garden. Furthermore, participants expressed their gratitude towards pest and disease management during production. They stated that they learnt how to identify and control pests and diseases using the recommended chemicals and practices. This was reported and appreciated in Nwoya district, ‘*I have obtained some knowledge from photovoice in regards to peanut quality and safety in that I was able to select the peanut which yields very well like serenuts 5R, 8 and 14 which has improved the level of production, determining different types of diseases which affect peanuts and harvesting our crops in time to avoid spoilage from the garden*’ (Participant 11, male, Nwoya district)

Proper postharvest handling practices guarantee a better quality of produce. Participants stated that proper postharvest handling procedures highly contributed to the quality of produce. They reported the practices they learnt such as drying peanuts on preferably black/ dark tarpaulin, storing peanuts when they were completely dry and in clean containers, proper hygiene of processing environments, and value addition strategies. Furthermore, participants also stated that they acquired knowledge about how traditional myths and beliefs affected the quality and safety of peanuts. In Nwoya district, some participants said, ‘*The knowledge I have obtained from using photovoice is... I know how to control aflatoxins in peanuts*’ (Participant 4, male).

Some peanut varieties and good management practices were not known to us before using photovoice... we did not know that some traditional practices/ myths may reduce quality and safety (Participant 3, female)

Some Tororo participants also said, *I learnt about seed selection before planting, the best way of harvesting gnuts and the best way of drying it* (Participant 4, male).

Initially, there was a lot of knowledge that I lacked in regards to peanut quality and safety but because of photovoice I have learnt some good practices such as the use of tarpaulin for drying peanuts, photovoice has improved on my hygiene when carrying out activities in regards to peanut quality and safety (Participant 5, male)

Photovoice improved participants’ interpersonal and technology skills. Not only did the participants obtain knowledge about peanut quality and safety, but also, they reported improvements in interpersonal and technology skills. Participants reported improvements in their interpersonal relations in their communities, for example,

an improvement in their presentation and communication skills among themselves. Participants also stated that they had developed new friendships among themselves, researchers and the community which was paramount during the photovoice discussions. In addition, participants reported their improvement in the use of smartphones in their daily lives. They stated that they obtained computer skills and knowledge, on how to capture photos and use them in research, taking photos in short and long distances, and photo interpretation. Participants from Nwoya district highly appreciated the contribution of photovoice to their interpersonal and technology skills as listed below;

I got the knowledge of using a smartphone (Participant 2, female, Nwoya district)

I learnt many styles of taking photos in long and short distances (Participant 7, male, Nwoya district)

Photovoice has made me learn to discuss with my friends and interact with the community (Participant 3, male, Nwoya district)

Challenges faced while using the photovoice technique in the community

During the photo-taking process, participants reported that they faced challenges as described below;

Some subjects were not cooperative during the study.

Participants reported instances when people in the community hesitated to cooperate with them. They reported that some subjects refused the participants to take their photos or photos of their items because they thought participants were going to use them for wrong motives. A participant from Tororo district said, *'There was hesitation from the community members who have a wrong perception about people who take photos since they believe that the photos may be used for wrong motives'* (Participant 5, male).

Furthermore, participants stated that some subjects asked difficult questions that they failed to answer in the community. Besides prohibiting access to their premises, participants reported that some subjects also refused to take up advice forwarded to them. In both districts, some participants stated, *'First and foremost, the challenges faced while using photovoice; sometimes farmers don't give the right information and the second problem, some farmers do not want to take photos of their crops'* (Participant 4, male, Tororo district).

Some people ask, "why do you want to take my photo?" Some other people say that you are doing business with their photos and some other people always wanted to know the importance of the research (Participant 4, male, Nwoya district)

In addition, participants reported that the majority of their subjects asked for money in exchange for information about their photos to be taken. A female participant from Tororo district reported, *'I got challenges with the farmers; some refused me from taking their photos and some asked for money before taking their photos'* (Participant 2).

Also, participants noted that some subjects in the community expected more from the participants in terms of agricultural inputs rather than just taking photos and asking questions.

Managing smartphones became costly. Participants reported that taking care of smartphones during the photo-taking exercise became costly. For example, they said that they lacked electricity to charge their phones in some places while others indicated that regular phone charging became expensive. As a result, they reported that smartphones used to shut down due to low battery during the photo-taking process. In addition, participants also reported that sharing photos on storage platforms such as WhatsApp proved difficult because the data bundles were very expensive for them to conduct the exercise smoothly.

Power shortage i.e., phones go off and on when getting data so having power banks for those phones can help a lot (Participant 1, female, Tororo district)

There was a need for data to share the photos and regular charging of phones consumed a lot of money (Participant 6, male, Nwoya district)

Long distances, poor transport means and lockdown.

Participants reported other factors which constrained them further during the photovoice exercise. These included; travelling long distances which was exhausting (especially to the markets given the lockdown regulations), poor transport means during the harsh weather conditions (drought and too much rain), and restricted movement due to the Presidential directives against the spread of COVID-19 especially during the second wave of the pandemic in Uganda (June 2022-August, 2022). From Nwoya district, a male participant said, *'The challenges during lockdown affected the movement from place to place to take photos of new things from other places'* (Participant 10).

Likelihood of using photovoice after the study

From **Table 2**, findings showed that participants projected to use photovoice again in their communities because the technique facilitated continuous learning and knowledge sharing among youth. Participants reported that the technique was interesting, interactive, and exciting to them. They stressed that photovoice was enjoyable because they created new friends, and kept their learning ability high and active. Furthermore, participants termed the technique as reliable, cheap and easy since the photos taken could be assessed and analysed as a group. Some participants

from Tororo district said, *Photovoice is a reliable research method, easy to use since photos under study are examined and analysed as a group. It is cheap since it only requires a camera with no data* (Participant 6, male).

Photovoice has helped me learn more new things and more knowledge and skills as we meet and share a lot. When I go to the field, I also learn a lot (Participant 2, female)

This method is so interesting and interactive. It is very interesting sharing photos with friends and learning from each other (Participant 1, male)

Some participants claimed to use photovoice again because they wanted to be change agents in their communities to contribute to a general transformation of activities along the value chain. They argued that photovoice could lead to improvement of practices since it exposed the good and bad practices carried out by farmers in the community. They asserted, *'Photovoice has helped me change my community since most of the information I have captured has been discussed and well explained. For that matter, most challenges have been responded to and that has given me a clear solution on how to handle the challenges most peanut farmers are experiencing in my community'* (Participant 5, male, Tororo district)

The reason is that I will be going to change the life of our people in the community... I will be using photovoice because I want to be a change agent (Participant 4, male, Nwoya district).

However, participants who were not sure whether they would use photovoice again reported that they feared subjects who would ask for money from them in exchange for information during the photo-taking process. A female participant from Tororo district said, *'I am not sure because the people to provide the information are sometimes mean when they need some money'* (Participant 5)

All the participants reported that they were eager to teach other youth in their communities about photovoice. The readiness and zeal stemmed from the connections and knowledge the participants had acquired from the current study to share with others in their communities. In Tororo district, a participant said, *'Photovoice has helped me to learn many things regarding the peanut value chain and this is something that is going to change my attitude toward doing things. So, I would like my fellow youth to also benefit from me and as a result, I would have given back to my community'* (Participant 5, male)

The participants reported the urge to facilitate the continuous flow of knowledge within their communities thus overcoming ignorance, especially among the youth. Some participants reported that since photovoice could be used by everyone, they wanted to create a platform

for youth to express themselves and also advocate for the activities that are practised along the value chain. In both districts, some participants reported, *'I would be able to teach other youth because I want this message to go over the entire communities'* (Participant 1, male, Nwoya district)

I would be able to teach other youth because most youths are very ignorant on majorly farming particularly on peanut quality and safety (Participant 3, female, Tororo district)

Apart from photovoice, participants reported other techniques which could be used to capture information about peanut quality and safety in their communities. These included; community dialogues, field days, door-to-door visits, exchange visits among farmer groups, interviews (face-to-face, phone, questionnaires), and observations. However, some participants didn't know about any other data collection technique whereas others were not sure.

DISCUSSION

During administering the questionnaires, the participants provided the knowledge they had obtained while using photovoice as a technique in determining peanut quality and safety and their future intentions to use the technique among their communities. From the responses gathered, it was established that the participants understood what photovoice meant and what it can be used to achieve. The responses were in alignment with the principles of photovoice presented by Wang & Burris (1997) which indicated that the participants had understood the concepts and with ease could use the technique even in the absence of researchers.

Furthermore, the findings were an indication that the youth clearly understood what the technique was about as they applied it while taking photos of peanut quality and safety. In comparison, the level of preference outweighed the level of dissatisfaction by the participants while using the technique in their communities. The preferences mentioned by the participants about the photovoice technique were in line with the findings reported by Cheak-Zamora et al. (2016) who documented perspectives of youth with altruism as they transitioned into adulthood. In a study where youth used photovoice to reflect on a college preparation programme, Hunter et al. (2020) reported that the youth enjoyed the group discussions because it allowed them to discuss their experiences, learn from each other, enjoyed the feeling of being heard and allowed thorough evaluation of the photographs they had taken by the evaluators.

The description provided by the participants about food quality and safety reflected the photovoice technique. It portrayed that the participants obtained knowledge about activities in their communities that contributed to the quality and safety of peanuts through the photovoice

discussions. Participants mainly emphasized peanut quality and safety after harvest especially during processing and storage to reduce aflatoxin contamination in their produce. This was also stated by Waliyar et al. (2015) who reported that significant deterioration of grains caused by moulds mainly occurred during storage because of the prevailing ambient conditions. In addition, Baluka et al. (2017) also reported that high aflatoxin contamination of peanuts was attributed to poor practices during harvesting, processing and storage by business people who also bought in bulk during bumper harvest and stored them in poorly ventilated and highly humid premises. Therefore, it is important to practice improved postharvest technologies to preserve the quality of peanuts.

Participants also reported that the photovoice technique was suitable for assessing peanut quality and safety in their communities because it allowed knowledge sharing, was user-friendly and provided fast solutions to community problems via the display of photos. First and foremost, knowledge obtained by the participants during the photovoice discussions demonstrated a strategic movement towards reducing aflatoxin contamination in produce if farmers diligently carried out these recommended practices. Knowledge sharing obtained through photovoice was also documented by youth in China who reported photovoice as an effective, interesting, new and unique research method for them that enhanced their critical consciousness and deepened their understanding of globalization through photovoice discussions (Ting, 2020). While using photovoice to prevent crime in their communities, Ohmer & Owens (2013) also reported that the youth and adults were able to form a community art of garden project which was aimed at improving vacant and dilapidated lots in their community which they felt strongly contributed to the reduction of crime. Therefore, knowledge shared through photovoice can enable a joint effort of communities to improve the food quality and safety status of their produce. Secondly, the use of smartphones made it easy for the participants to carry out the photovoice activities within their communities. This is because smartphones simplified the process of taking, and submission of photos and utilization of social media platforms which the youth were already used to, a cheaper option other than the use of manual cameras (Kingsbury et al., 2021). While studying Asian Immigrants' information needs, Khoir et al. (2019) also noted that when participants used their smartphones for the study, photovoice was effective because it passed some degree of control to the participants even as it enabled researchers to address their aims. Therefore, the use of smartphones made the tool easy and convenient to use in communities, especially among the youth thus suitable to be used for assessing food quality and safety. Lastly, the suitability of photovoice was also highlighted in its ability

to provide solutions faster in communities considering the photos displayed. This is because it was able to display the good and bad practices which could easily be understood by people in communities. Bisung et al. (2015) also noted that photovoice could be able to facilitate change by triggering an immediate reaction and planned action in communities thus encouraging appropriate interventions which improve livelihoods. Therefore, photovoice as a technique can be used to tell a difference between the practices carried out in communities and how they affect livelihoods through displaying photos.

From their responses, it can be reported that youth participants acquired relevant knowledge about peanut quality and safety as they used the photovoice technique in their communities and in the dialogues that followed with the researchers. Knowledge obtained ranged from agronomic practices carried out by farmers to post-harvest handling of the peanuts along the value chain. It was very important for the youth to gain knowledge right from the farm since the quality of produce starts from the farm to the plate. FAO stated that implementing Good Agricultural Practices (GAP) during on-farm production and post-production processes resulting in safe agricultural products is of enormous importance for ensuring a safe food supply. However, the knowledge obtained was not only about peanut quality and safety but also about interpersonal and technology skills. Informed associations and improved technical expertise make it easier for the participants to share information among themselves and other stakeholders in their communities even after the closure of this study. This was in line with findings by Lofton et al. (2020) who reported skill development that improved among youth as they interfaced with photovoice activities in Malawi. Banyard et al. (2022) also stated reflection by youth while using photovoice. The youth reported that they were able to learn from their peers and appreciated the differences in their perspectives during the discussions. Therefore, photovoice can be used as a technique to train peanut value chain players about quality and safety using photos as a basis for discussions at the community level.

As the youth interfaced with photovoice in their communities for two complete peanut seasons, challenges were expected. Lack of cooperation from the people was the major challenge reported in both districts because people were not sure what their photos will be used for and some requested money in exchange for information. Such challenges have also been reported in other studies. For example, as they used photovoice to research about maternal health in the Wakiso district, youth stated that community members did not trust their motives and expected direct returns after taking their photographs (Musoke et al., 2016).. Since they were in rural areas, smartphone care became costly in terms of charging and buying internet bundles. Lockdown due to

the COVID-19 pandemic also interfered with the photo-taking process since people were prohibited to move as a result of restrictions on transport means. Therefore, in most cases, the participants were forced to walk long distances to capture some relevant information about peanut quality and safety. Due to challenges faced by the participants during the photo-taking process in their communities, some photos could not be taken and some places were not accessed.

Future projections provided by the participants indicated a continuous use of photovoice in communities to effect proper quality and safety practices among communities. Reasons provided by participants served as advantages they had obtained from using the technique in their communities. Some participants reported their zeal for becoming change agents in their communities with photovoice as a suitable technique to achieve their goals. This was also realized by homeless youth who applauded photovoice for equipping them with the skills and desire to serve as change agents for their communities by adjusting their behaviours and morals for a better community (Bender et al., 2017). Furthermore, continuity of photovoice was also reported in the desire by the participants to teach fellow youth about the technique to advocate for better practices that lead to better quality and safety of their produce. However, some participants were not sure whether they would use the tool based on the challenges they had faced even though the majority didn't know any other data collection tool they could use in their communities.

Strengths and limitations of this study

First and foremost, photo discussions and interactions of participants with the communities provided an avenue for knowledge sharing and acquisition. This photovoice insight is vital in the food quality and safety space. This is because it creates awareness among communities about the proper pre- and postharvest technologies which should be adopted along the value chain to preserve quality. Low levels of awareness among communities have been reported as one of the major drivers of the high aflatoxin contamination in agricultural products (Omara et al., 2020). Through this photovoice study, participants had obtained knowledge of different peanut quality and safety they didn't know along the value chain thus creating awareness. In a study to measure and influence behaviour change and diet diversity, Mwema et al. (2022) reported that the use of photovoice encouraged knowledge and increased awareness concerning diet diversity among communities. Therefore, the photovoice technique can play a big role in creating awareness among communities regarding proper pre- and postharvest technologies which have to be practised along the value chain.

Secondly, through the use of photovoice, it was found that the youth were eager to learn and use the technique in their communities. The technique was appreciated by youth because it was user-friendly, encouraged knowledge sharing and acquisition, contributed to overcoming community weaknesses and was a platform for advocacy for change. Such observations indicated a drive for youth to actively participate in agricultural activities which was desired. This is because they contributed to 54% of the workforce in the agricultural sector of Uganda (FAO, 2019). Different photovoice studies carried out in Uganda have also reported the commitment of youth to actively participate in the different sectors where they were employed to effect change in communities [Ssemugabo et al. (2021); Musoke et al. (2016); Musoke et al. (2015)]. Embracing technologies such as smartphones among youth was one of the incentives towards their active participation in this study. This is because once trained, smartphones were easy to use, unlike the digital cameras which were used in some photovoice studies (Kingsbury et al., 2021). Therefore, making the sector intellectually attractive as one of the suggestions by Veettil et al. (2021) is essential for the improvement of youth participation along agricultural value chains.

Finally, challenges faced while using the photovoice technique in the communities cannot be ignored. This is because they are key elements in obtaining data in the community. Participants noted that failure to get consent from the subjects was a key challenge during the photo-taking process. As a result, some of the issues concerning peanut quality and safety along with the value chain might have not been captured using photos by the participants. Therefore, Wang (2006) reported that it was vital for photovoice participants to understand the research procedures, objectives and ethics before the start of the photovoice exercise. While in the community, this would enable them to explain the research purpose, and also equip them with the interpersonal skills and techniques necessary to ask for consent before taking the photos (Musoke et al., 2016). In this study, the youth were given notebooks to encourage them to write down issues they failed to get consent for. Therefore, if consent is not given, chances of losing critical details of the community are high in photovoice studies.

CONCLUSION

Using photovoice as a community participatory research technique among youth along the peanut value chain yielded improved knowledge about peanut quality and safety along the value chain, especially at the postharvest stages, knowledge sharing among youth as well as enhancing better interpersonal and technical skills. The technique was considered user-friendly by the participants

which facilitated a better understanding of the peanut quality and safety status of their communities. The use of photo voice among youth also stirred their zeal and desire to continue participating in the study along the peanut value chain since they considered the knowledge acquired as a foundation for change in their communities. The prospects forwarded by participants indicated the adoption of photo voice methodology in communities and the creation of solutions that are appropriate to solving community problems forwarded during the photovoice discussions. Based on the feedback forwarded by youth, photo voice demonstrated its active role of encouraging youth to continuously take part in agricultural activities using modern tools they are attracted to. Therefore, photo voice can be used as an assessment technique for peanut quality and safety in rural communities and also act as an incentive to encourage youth to actively participate in agricultural value chains. Drawing from the results, this study recommended photovoice to be adopted by rural farmer groups as a dissemination tool for agricultural knowledge and also be used along with other assessment methods to evaluate quality and safety along the value chain. Further studies could be conducted to evaluate the changes in knowledge, attitudes and practices in pre- and postharvest handling of produce among communities after exposure to photovoice in the long run.

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