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FARMERS' EDUCATION AND FOOD SECURITY AT THE HOUSEHOLD LEVEL IN LIRA CITY, NORTHERN UGANDA

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ABSTRACT

The study highlights the contribution of Farmers' Education to food security among selected households in one division of Lira City. The research questions addressed; the contribution of farmers' Education to food availability, the contribution of farmers' Education to food accessibility, and the effect of Farmers' Education on food utilization in Amuca Ward. A descriptive research design was adopted. The findings revealed that males dominated the study with a youthful population of 40% and were fairly literate though majority of the respondents (63%) were married, 16% were cohabiting, 9% were widows and 6% were divorced. 50.78% were farmers, followed by the business community (7.11%) and politicians were just 4.6% and civil servants were only 3.5%. It was revealed that the lead organizations that conducted farmers' education were government-aided (25%), followed by non-governmental organizations standing at 18%, while fellow farmers stood at 7% and private household arrangements at 27% and others (23%). This demographic made majority of the respondents to believe that continuous farmers education coupled with timely agri-inputs; and better government policies aimed to support food security interventions can guarantee household food security in Lira city. Basing on the findings, we recommended that Lira City partners with other stakeholders in funding farmer Education programs and consider extending the program to its peri-urban areas.

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INTRODUCTION

Globally, the rapid growth of farmers' education began during the late 19th century in 1862 with the United States congress which created the Department of Agriculture to gather and distribute agricultural information. The Morrill Act, which provided the land-grant schools became law that same technologies and this development led to the use of new developed modern farming method that required fewer farmworkers resulting in large, corporatized farmers and ranchers to ensure that no child was left behind right from elementary school to secondary Education Act of 2001. The Hatch Act of 1887 gave federal funds to establish agricultural experiment stations and the first dairy school in the United States was created at the university of Wisconsin-Madison in 1891. Agricultural science and Education expanded after 1900 in response to a need for more technical knowledge and skills in the use of newly developed agricultural practices. As stated by the National Association of Agricultural Educators (NAAE) (2020), farmers' education is an instruction, teaching and training surrounding agriculture as well as the management of land and natural resources that is frequently geared towards those preparing for careers in farming and agriculture (Nkandu, 2021-2022).

To them, farmers Education means teaching of agriculture, Natural resources and land management at higher levels, agricultural Education is primarily undertaken to prepare farmers for employment in the agricultural sector. Classes taught in farmers' education curriculum may include horticulture, land and management, turf grass management, agricultural science, small animal care, machine and shop classes, health and nutrition, livestock management and biology. And so, it is based on four pillars of food security that is food availability, food accessibility, food affordability and food utilization (Mwesigwa, 2016). In respect to above, farmer's education appears to mean training farmers on how to utilize the available resources like land, money, labor force in order to generate more yields from agricultural production. Food security refers to a situation when all people at all-time have physical and economic access to sufficient, safe and nutritious food that meets the dietary needs and food preferences for active and healthy life (Mwesigwa & Mubangizi, 2019). After that, the farmers' education was extended to several countries in Africa and Latin America. At the same time, it has shifted from a focus on a single, constraint of a single crop (IPM for rice-based system) to an emphasis on the multiple aspects of crop production and management, to cropping systems to non-crop (Livestock production) to natural resource management (soil fertility and water availability) and to socio-cultural dimensions of community life (food security and nutrition, savings, Health, HIV/AIDS, literacy

training, livelihoods among others). African countries implementing the approach include Kenya, Uganda, Tanzania, Zimbabwe, Zambia, Malawi, Ethiopia, Ghana, Nigeria, Gambia, Egypt, Lesotho, Swaziland and Mozambique. Besides, farmers' education, in Africa, has a long history and it is believed that it started during colonial era of which European powers introduced Western-style of Agriculture and education to Africa which included establishment of agricultural schools and training. Consistent with Malthus (1789), populations grow exponentially; at some point, therefore, human population will not grow its ability to feed itself because the body of literature has demonstrated the interplay between technology and population. Further, the Malthusian theory was advanced by Neo-Malthusian theory which argues that rapid population growth results in over-cultivation, excessive use of fertilizers and deforestation (Scanlon 2000), with this, they argue that it may negatively affect food security. To Malthus, he made a number of assumptions: food is necessary for life, food production increases arithmetically, population on the other hand, increases geometrically, and the passion between men and women is necessary and will continue unchanged. Population is limited by food-population increases; since food increases, unless prevented by disasters. This theory was widely used in Europe during the 18th century as theorists were specifically concerned with England's rapidly rising population facilitated by poor legislations and that if it continued, it would mean disaster for the entire Nation. In Uganda, and in Soroti District specifically, farmers' education begun in 2008 with the success of innovative National agricultural advisory services (NAADS). Consequently, farmers gained strengths and became effective in demanding and organizing privatized extension services. Present research demonstrates a strong link between the success of NAADS program and the presence of farmer educators' alumni in the district as a large majority of farmers become involved in decision making processes proved to be members with strong negotiation and leadership skills.

The proportion of the food secure population declined from 83% in July 2016 to 69% in January 2017. An estimated 10.9million people (5%) are today in a crisis situation and these are found in central Uganda (0.58 million), Karamoja (0.12 million), Teso (0.2 million), East Central (0.38 million) and South Western (0.31 million). All the regions of Uganda have a combined food security stressed population of 9.3 million (approximately 26%) of which the worsening food security situation is attributed to the effect of the 2016 La Nina event which resulted into reduced crop and livestock production. Also, excessive sale of food is resulting into reduced household stocks and high food prices accompanied by resurgence of crop and livestock pests and diseases all contributing to reduction in food production. Both Karamoja and Teso sub-regions are being analyzed as the refugee hosting Districts, consecutively poor and below average in terms of seasonal food harvest and livestock production coupled with sharp increases in prices of food and essential non-food commodities caused by widespread food insecurity. Karamoja is being one of the regions, the impact of enduring average to below-average food and livestock production, over the last three years due to climate related impacts and endemic diseases coupled with the fragile security situation, are causing widespread food insecurity (as seen between April and August, 2023) which corresponds with the lean season of 2023. Each of the nine Districts in Karamoja were classified, in IPC phase 3 crisis, at 45% of the population analyzed (582,000 people) facing high level of food insecurity.

In Uganda, food insecurity remains stubbornly high; food insecurity measured by moderate and severe food insecurity indices were at very high levels of 45% and 11% respectively. This is slightly lower compared to Round 8 of (June/July 2022) and round 7 (October/November 2021). Region-wide, the highest level of food insecurity was observed in the poorest Eastern and Northern Regions. Generally, Lango sub-region adopted farmers' education in the name of farmer-field schools facilitated by Action Against Hunger (ACF). In Lango sub-region, the program was implemented from 1st January to 31st July 2008 with an Agreement the Food and Agriculture Organization of the United Nations (FAO) that provided the funds while at the same time offering applied learning opportunities to staff

participating as team members with performance analysis covering protection practices, increased production and capacity for asset generation and management (Mwesigwa, 2021). For now, short term accomplishments in the program have influenced the level of food security and livelihoods of participant groups and their individual households (Ogwal, Obici & Mwesigwa, 2022a).

Food insecurity continues to exist in Lango, as a whole, due to the fluctuating pattern in weather especially in the Districts of Otuke, Apac, Oyam, and Kwanja being in the frontline alongside Dokolo respectively. As stated by the Daily monitor (2023) of May 3rd, Wednesday, which is greatly associated with prolonged dry spells, crop and livestock pests and diseases, human disease especially Malaria and cholera, and the influx of Karamajong nomadic pastoralists searching for water and pasture for available livestock. Farmers' education is one of the strategies aimed to achieve household food security in Amuca ward, therefore, this report sought to find out more on how food security can be enhanced, among selected households, owing to the fact that several studies are now moving away from laboratory to the field to ensure a return on investment (World food program, 2023). In this study, two variables namely farmers' education and food security were interrogated. Consistent with the World Bank (2019), farmers' education refers to acquisition of knowledge, skills and practice that enable farmers to optimized their agricultural production, manage risk and adapt to changing circumstances. Further, it refers to the process of acquiring knowledge, skills and attitude necessary for efficient and effective farming practices (Aiyelari, 2024). To Bowa (2017), farmers' education involves development of knowledge, attitude and skills that enable farmers to make informed decisions about their farming practices, manage their resources effectively and adopt to changing environmental and market conditions. Therefore, farmers' education appears to refer to a systematic approach to learning that enables farmers to improve their agricultural productivity, income and the overall well-being. Food security exists when all people have access to culturally acceptable, nutritious food, and when the food system is just, equitable and sustainable (Campesina 2014). In their study, Oxfam (2011) maintained that food security is the state of being where all people have access to enough food to lead healthy and active life and where food system is resilience and sustainable. Thus, food security denotes availability, access, utilization and stability of food supplies to ensure that all individuals have sufficient and nutritious food for a healthy and active life (Ogwal, Obici & Mwesigwa, 2022b).

Farmers' education refers to a deliberate program designed to provide agricultural knowledge and skills to individuals in farming or agricultural production (National Institute of food and Agriculture (NIFA, 2021). On the word of Giannakis and Van Bruggeman (2015), farmers' education entails training and instruction in agricultural techniques, best practices, environmental stewardship and entrepreneurship to support the success and sustainability of the farming business. Also, farmer's education focuses on courses such as crop management, livestock care and soil health, market trends and financial management aimed to enhance productivity and profitability of farming operations (Jin, Mjelde & Litzenberg, 2014); Walsh, Cullian & Flannery, 2018). The farmers-field school (FFS) approach is a participatory education method that brings together groups of small-scale food producers to solve production problems through sustainable agriculture (The food and agriculture organization, 2013). This approach focuses on three key pillars of SDGs, that is, zero hunger, quality education and life on land. The FFS approach offers space for group learning, enhancing skills for observation and critical analysis, and improving decision-making by local communities. The facilitator does not have to lecture the farmers but facilitate learning by asking questions and building on their experience and observations. SGD Goal number two focusing on ending hunger and all forms of malnutrition by 2030 thus, targeting farmers' education is an attempt to address the challenges of food insecurity, and promote policies that increase household food security. Ayalew (2017) observed that rural farmers, in Uganda, ought to have been secured basing on the fact that the USAID's Food security Initiatives of "Feed-the-Future" focuses on the three value-chain crops (maize, beans and coffee). Despite

several interventions, several households, in Uganda, suffer hardships of food insecurity with world food program Report (WFP, 2023), showing that about 16.4million Ugandans face insufficient food consumption. This proportion represents an increase of 1.2 million food insecure persons. The Ministry of agriculture, animal husbandry and fisheries report (2018) stated that about 35% Ugandans experienced chronic food insecurity and 65% of the households were not food secure throughout the year. Due to these, the researchers considered the contribution of farmers' education to household food security in Lira city though focusing on Amuca Ward. Specifically, three questions were targeted, namely: (a) What is the contribution of farmers' education to food availability among households in Amuca ward? (b) What contribution does farmers' education have on food accessibility among households in Amuca ward? And (c) What is the effect of farmers' education on food utilization among households in Amuca Ward?

RESEARCH METHODS

The study adopted a cross-sectional design. Both qualitative and quantitative methods of data collection were used to summarize the contribution of farmers' education to household food security among selected household in Amuca ward. The study was conducted in Amuca ward which is located in Lira city west division, in Northern Uganda and was conducted in the three cells of Aminyanga, Olago and Owiti respectively. According to Ngechu (2004), a study population is a defined set of people, households, service, elements or events under which the study was being investigated. Consequently, a population of 64 respondents, which constituted of one town agent, one city Agricultural officer, one community development officer, two local councilors, nine members of the cell leadership and 50 lead farmers. Ngechu (2004) underscores the importance of selecting representative samples; for this study, a sample size of 58 respondents was determined using the Krejcie and Morgan's (1970) sample size determination table. As stated by Creswell (2014), a sampling procedure refers to the steps for selecting members from a population, for this case, a simple random sampling was used for selecting the members from various categories. A self-administered structured questionnaire was used among the respondents. In addition, an interview guide was used to allow the researchers freedom to ask questions in whatever manner desired since it facilitates interaction between the researcher and the key informant. The researchers-maintained content validity of the research instruments by ensuring that the question or items in it is confirmed to the study objectives and purpose, wording and clarity of questions or items was evaluated by the researcher and supervisor. The instrument items were edited so that their validity is obtained. The said instrument was tested for reliability before the actual data collection. This method was worth because it is widely applied in the social science fields and it is easier for determining reliability coefficient since it doesn't consume a lot of time. The statistical package for social sciences (SPSS) was used to analyze quantitative data.

RESULTS AND DISCUSSION

This study was focusing on the contribution of farmer's education among Households Food Security of Amuca Ward, Lira city West division. Demographically, majority of respondents reached (40) were male and 24 were female. Most of the participants were married (63%), followed by 16% of the participants who were cohabiting. 9% of the participants were widows while the divorced and the single participants were only 6% each. The study realized that majority of participants were lower secondary leavers followed by primary and tertiary institution leavers, the Advanced level drop-outs and Diploma graduates were third and fourth respectively. Those who did not attend school and the graduates were fewest. The study realized that majority of the households were leaving with 6 to 8 members followed by 3 to 5 members and those households with less than 3 members and those above 8 members were few. A number of participants were farmers (50.78%), followed by business persons (7.11%) and politicians (4.6%) while civil servants were the fewest (3.5%).

Farmer-to-farmer education

This approach involved experienced farmers stating and training younger or less-experienced farmers. It provided farmers with practical knowledge and experience as well as opportunities to learn from colleagues in the community. It was developed during the 1940s and 1950s at a time of significant agricultural advancement known as 'the green revolution', which was led by Dr. Norman E. Borlaug and other scientists and researchers. This era aimed to increase food production as a way of reducing hunger in developing countries besides increasing the use of fertilizers and pesticides. Dr. Borlaug's works on developing high-yielding, disease-resistant wheat varieties were a key part of this effort. The farmer-to-farmer education approach was developed as a way to disseminate knowledge and improved farming practices among small-scale farmers in the global south. The approach was perceived to be more effective and sustainable than traditional top-down approaches to agricultural extension since empowered farmers tend to take ownership of the learning and development.

Strengths of farmer-to-farmer education

During the study, it was stated that farmer-to-farmer is significant in a number of ways, viz.;

- a) Improved knowledge and skills by facilitating farmers in Lira city to acquire new knowledge, techniques and practices that can improve their farming methods and increase productivity. This suggests that knowledge can aid Lira city farmers to make informed decisions and adopt more efficient and sustainable farming practices leading to improved food security (Ogwal, Obici & Mwesigwa, 2022a). Also, by improving their knowledge and skills, farmers can produce more food, cut post-harvest losses and enhance their resilience to climate change and other environmental challenges. This can improve food security and reduce hunger in both rural and urban areas.
- b) Enhancement of livelihoods by facilitating farmers in Lira city to increase their incomes and improve their livelihoods through teaching them how to grow higher-value crops, adopt more efficient farming methods as well as gain access to available markets. This reduces poverty and improves the overall well-being of farming communities.
- c) Better resource management by aiding Lira city farmers learn on how to manage their agri-resources more effectively such as water, land and agri-inputs. This leads to reduced depletion, increased profitability and, on the overall, a more sustainable agricultural industry.
- d) Promotes environmental sustainability given that farmers' education obliges sustainable farming practices, for example, organic farming, agri-forestry and conservation agriculture. This helps to reduce the environmental impact on agriculture and promotes a more sustainable future for Lira city.
- e) Community development since Farmer's education helps foster community development by bringing farmers in Lira city together with a view to share knowledge, resources and best practices.

Farmer-to-farmer education has led to stronger, more resilient communities and improved food security (Ogwal, Obici & Mwesigwa, 2022c). In summary, farmers' education is essential for improving farming practices, increasing productivity, enhancing food safety, better management of resources, improving livelihoods, promoting environmental sustainability and fostering community development, however, there are challenges that Lira city farmers face in adopting to farmer-to-farmer education.

Challenges in adopting farmer-to-farmer education

From the study, those whose households experienced prolonged food shortage or famine over one month in the past two years were 50%

while those who did not experience were 14%. It was realized that the major cause of food insecurity was poor harvest in the preceding season. This was followed by selling all the processed farm harvest and few participants were able to report external factors interrupting farming activities as a cause to food insecurity in Lira city. The results indicated that the main challenge faced in undertaking farmers' education was poverty and this was followed by bad cultural practices, few farmers' educators, a negative personal lifestyle, practices and habits. Few participants reported low funding towards farmers' education and the least participants reported natural calamities. A number of challenges to farmer-to-farmer education were identified as:

- a) Time constraints since farmers, in Lira city, often had limited time available to attend training sessions or workshops due to demand of their daily work, this made it difficult for them to learn new techniques or adopt new technologies as stressed by Lang (2017).
- b) Limited access to agri-resources given that many farmers in Lira city had limited access to agri-resources such as internet connectivity, transportation or educational materials. This made it difficult for them to access vital information and trainings they needed to improve their farming practices.
- c) Traditional farming practices as a section of farmers resisted adopting to new farming practices or technologies due to their traditional methods which had been passed down through generations. This resistance made it difficult for them to embrace new techniques or adopt new technologies (Robert, 2014).
- d) Financial constraints since adopting new technology was expensive and some farmers never had the financial resources to invest in this improvement. This made it difficult for them to adopt farmers' education and improve their farming practices.
- e) Limited access to education given that several farmers in Lira city lived in the peri-urban areas with limited access to formal education institutions. This made it difficult for them to receive formal training or certification in agriculture as highlighted by old-wage Theron (2016).
- f) Peri-urban farmers working on small pieces of land could be attributed to conditions such as lack of adequate credit, lack of access to product market, and dearth of adequate extension contacts (Godfrey, *et al.*, 2015).

Food security

As stated by FAO (2017, p.107), food security refers to a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and new nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security is an old concern that motivated international organization such food and Agricultural Organization, United nations (2021) defined it with the following four dimensions or pillars: Availability, accessibility, affordability and utilization where food security is part of the sustainable development goals since it is in line with this goal of number two (Zero hunger) (Ogwal, Obici & Mwesigwa, 2022b). The significance of food availability was found to be significant as in Lira city:

- a) It ensures survival for basic human needs and their sustenance is met because of existence of variety of food stuffs which were in place throughout the year.
- b) Support economic growth as it enabled members to engage in productive activities since many food crops were transforming into cash-crop, for example, maize (Swaminashan, 2022).
- c) Promotes health and wellbeing as access to nutritious food promoted health and wellbeing as individuals consumed a variety of foodstuffs with every food value (per pinstrup-Anderson 2009).
- d) Supports sustainable development seeing its essence for achieving sustainable development goal, number two, which stresses Zero hunger as a national agenda for development.
- e) Poverty reduction because when food is available people can use money to purchase other items to support life rather than

spending on food budgeting (FAO, 1996; Cummins & Macinty, 2023; Smith & Haddad 2018; Pinstrup- Anderson, 2009; Lang & Heasman 2015; Dowler, 2021).

Effect of farmers' education on food utilization

Food utilization refers to the ways through which our bodies use food energy intake which comprises number of food factors such as cultural practices in food preparation, feeding practices as well as Household allocation of food (United Nations, 2016). Following the determined effects of 2007-2018 food crisis was the increased in numbers of undernourished people especially in sub-Saharan Africa. It was revealed that the pillars of food utilization which appeared to matter more in Lira city are:

- a) Food storage seeing that the way in which food was stored, processed and prepared included quality of water, cooking fuel, available hygiene practices both manufacturer and household levels (FAO report, 2023).
- b) Feeding since these practices involved individual with special needs like young children, elderly, sick and pregnant and lactating mothers, for instance, some specific foods were preserved for men while others were reserved for other population segments or specific food were considered appropriate or not for pregnant women (Lama, 2017).
- c) Food sharing, which involved sharing of food within households and the extent to which this corresponded to individuals' nutritional needs intra-household food division growth or pregnancy and lactation (Robert, 2024).

Significance of food security

- a) Increased access to quality nutritious food which was described to be fundamental for human existence and promoted positive impact ranging from economic growth and job creation, poverty reduction, trade opportunities, and improving health care (NIFA report 2023).
- b) It helped improve agricultural education and distribution mechanisms, city food security which could help many households to achieve significant growth (Godfrey J et al (2015).
- c) It incorporated measure of resilience to future disruption or unavailability of critical food supply due to various risk factors including drought, shipping disruption, fuel shortages, economic instability and wars (Old Wage Theorone, 2019).
- d) Food security, promoted social justice and equity in Lira city by addressing food inequalities among community members that could be done through various farmers programs, for example, through the Northern Uganda Social Action Fund (NUSAF), which aimed to reduce poverty by improving livelihoods (Ogwal, Amot & Mwesigwa, 2020).
- e) Ensuring environmentally sustainable food system and protection aimed at food production processing, distribution and seeing that consumption was environmentally-friendly, socially-responsive and economically-viable which prioritised some approaches such as conservation of natural resources (water, soil, biodiversity, reduction of greenhouse gas emissions and climate changes) through sustainable agricultural practices such as agroforestry.
- f) Ensuring food availability and access for all through prompting methods that maintained soil health, conserved water, reduced synthetic inputs, and food shortages to reduce food loss in Lira city (Mwesigwa & Mubangizi, 2019).

Contribution of farmers' education to food availability

Those who had heard about farmers' education were 43 members and 21 did not know about farmers' education. A number of participants knew about farmers' education through radio messages, this followed by farmers' educators and others knew about through their friends. Fewer participants knew farmers' education from newspapers whereas fewest knew about this through local political leaders. It was realized that the lead organizations giving farmers' education were; the

Government, farmer educators and NGOs. It was also realized that farmers were giving farmers' education and fewer participants were getting this education through private household arrangements. The commonly received form of farmers' education was training of farmers on farming techniques followed by advisory services and demonstrations on farming. Further, money in cash, agri-inputs were received by the farmers and few participants received marketing aids. The main contribution of farmers' education was;

- a) Increased yields followed by improving quality, diversification of products and may also link the households to the market and few participants reported that farmers' education does not change their production.
- b) The other contribution of farmers' education on household food accessibility was the increased yield followed by post-harvest handling and better storage of food, improvement in the quality of products and may also link the households to the market and few participants reported that farmers' education does not change their production.
- c) The other contribution was on household food accessibility post-harvest handling and better storage contribution of farmers' education on household food accessibility linking the household to the market contribution of farmers' education on household food accessibility do not change my production level.
- d) Farmers' education contributed to food utilization mostly in changing cultural practices and making sufficient supply in time.
- e) Farmers' education also known as Farmer capacity building plays crucial role in boosting agricultural capacity, increasing food availability, improving rural livelihood and prompting agriculture as an engine for pro-poor economic growth (Frasier, 2022).
- f) Education provided a critical support service for Lira city agri-producers to be able to counter the new challenges facing agriculture and transformation in food and agricultural system including growing importance of standards labels and food safety, growth in non-farm employment and agribusiness, constraints imposed by HIV/AIDs and other health challenges that affected the city population and deterioration of natural of natural resources base and climate change.

Thus, farmer education, in Lira city, incorporated elements such as technology transfer, knowledge and information in a linear manner, using farmers as experts as well as sources of advice in relation to specific problems faced by farmers and facilitation as a model to help them identify their own problems and develop their own solutions as soon as possible within their mean of resources which are available.

CONCLUSION

This study focused on the contribution of farmers' education to household food security in Lira city. It was inferred that using farmers to conduct farmers' education is key to transforming the household food situation in Lira city. Further, farmers' education is central in transforming households as it leads to diversification of products and the households to the market. This comes when farmers are knowledgeable on how to produce diverse products which also attracts market. Farmer's education is key to post-harvest handling and better storage of food as farmers are well acquainted with the knowledge of proper handling and storage of harvested food products and this makes food accessible.

Recommendations

From the conclusions, it is encouraged that:

- a) Farmers' education program on food security be continued.
- b) Farmers' education program be extended to the rural areas.
- c) Farmers should change their attitudes towards this program.
- d) Local leaders and lead farmers should be incorporated in this program so that it is easy for farmers to get this training.

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