FINAL TECHNICAL REPORT / RAPPORT TECHNIQUE FINAL

ENHACING AGRIBUSINESS ECONOMIC OPPORTUNITIES OF RURAL WOMEN AND GIRLS IN UGANDA

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IDRC Grant / Subvention du CRDI: 108808-001-Enhancing agribusiness economic opportunities of rural women and girls

Enhancing Agribusiness Economic Opportunities of Rural Women and Girls in Uganda

IDRC Grant Number: 108808-001

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Technical Report Submitted to IDRC

01/02/2021 to 30/06/2020

TABLE OF CONTENTS

SYNTHESIS

In 2018 the International Development Research Centre (IDRC) awarded Centre for Basic Research, a research grant to undertake a study entitled, '**Enhancing Agribusiness Economic Opportunities of Rural Women and Girls in Uganda**'. The study, which is to take three years, commenced on the 1st of July 2018. This document is the fourth Technical Report for the 6 months (Jan-June 2020) of the project as required by the grant regulations.

The study is a pilot in Soroti District, Eastern Uganda being implemented by Centre for Basic Research in collaboration with Awoja Riverside Farm and KiBO Foundation. This technical report reflects the set of activities that have been undertaken in the 6 months (Jan-June 2020) of the project.

The study objectives and scope remain essentially as they were presented in the project proposal.

GENERAL OBJECTIVE

The core objective of this proposed project is to enable applied skills enhancement through training. In doing so we seek to build a stronger and more integral training system targeting women and girls within the selected areas to underpin future policy analysis, design and implementation in small and medium agribusiness development.

2.1 Specific Objectives

The following specific objectives will be addressed:

a) Improve on the understanding of rural agribusiness sector growth and its drivers, sectorial composition, linkages and contribution to the economy;

b) Improve on the understanding of the potential (and challenges) of small scale agribusinesses sector to achieve more inclusive growth (that is, generating productive employment for the vulnerable group of the society such as women and girls);

c) Improve on the knowledge on the characteristics of private sector 'dynamic' (growth-oriented) entrepreneurs in the agribusiness sector, the environment they operate, the major constraints they face in their endeavor to create more and quality jobs and identify innovative best practices that favour women and girls;

d) Understand the effectiveness and outcomes of the various interventions and instruments (access to finance, skill development, business development service) instituted by the government and its partners in promoting entrepreneurship in agribusiness, nurturing dynamic entrepreneurs, generating decent and quality jobs and poverty reduction;

e) Provide training and comprehensive business advisory services to women and girls with the aim of providing knowledge, skills and change in attitudes towards agribusiness; and,

f) Recommend practical policy interventions based on success rates to support women and girls in agribusiness and training of trainers.

The project is on track to meet its objectives. All activities carried out in the first six months were part of the original work plan. The project kicked off with a methodology/inception workshop which took place on 24th October 2018 at Esella Country Resort in Wakiso District, Uganda (see Annex 1: Workshop Summary Report). At this workshop, we reviewed and discussed the research problem, objectives, literature sources, methodology and data sources as well as the instruments of data collection. We also undertook a review of the agribusiness subsector in Uganda. The aim of the workshop was to bring together the principal investigators and co-researchers, the resource person in charge of overseeing the direction of the project, the as well as officials from Ministries and Government Agencies engaged in the Agribusiness subsector in order to fully conceptualize the research project, agree on the approach and research tools.

Key Messages from the inception workshop

Commissioner Agribusiness, Ministry of Agriculture Animal Industry and Fisheries.

There is need to exploit the concept of network marketing in order to promote agribusiness. This should be undertaken through linking the farmer to the buyer or processor of the produce. In doing so, farmer produce will be guaranteed a ready market thereby abating market related problems. He argued that the media could be instrumental in linking farmers to processors. This he argued is one of the ways of increasing farm productivity as farmers would have a readymade market for their produce. He posed an intriguing question: How many farmers in Uganda are linked to the processors of their produce? How many processors in Uganda reach farmers with technical, financial and other assistance?

Mr. Kawuule Jooga, Uganda Small Scale Industries Association.

Consistent with the Commissioner Agribusiness, Ministry of Agriculture Animal Industry and Fisheries, Jooga argued that there is a need to explore for the relationship between maize processors and farmers. To do this, we need to ask the questions: 1) what are they doing right or good?; 2) what are they doing bad or wrong? 3) Has a farmer dealt with a

processor before, if not why?; 4) what challenges do farmers face in dealing with processors?; and 5) how the challenges in dealing with processors be addressed?

Mr. Augustine Mwendya, Executive Director, Uganda National Farmers Federation.

Farmer groups crumble day and night, why is this so? Augustine argued that there is a lack of confidence in farmer groups. As such in order to have sustainable farmer groups, it is imperative leaders are rotational for purposes of building confidence. This could be done through appointing a tentative secretary and or chairman for each group meeting.

Mr. Gideon Badagawa, Executive Director Private Sector Foundation. He argued for the need to encourage contract farming. For example, he asked the question: after a farmer has produced farm output, who do they sell to? He argues that the biggest hindrance to agribusiness is the market. Only if farmers engage in contract farming, then shall farm yield increase besides inducing the growth of the agribusiness subsector.

He argued that a better model to follow is that of the relationship between British American Tobacco (BAT) and farmers. BAT guarantees a market to farmers; however, it equally engages in providing inputs and ensuring that farmers engage in appropriate agronomical practices. He argued that both Uganda Breweries Limited and Nile Breweries Limited have taken on a similar model which has resulted in a sustainable of supply of sorghum to the two beer companies.

Gideon argued that there is a need to support the growth and development of farmers groups. This he argues has the potential of enabling farmers without collateral to access commercial bank credit. This could be done through the commercial banks exploiting the social capital dynamics. In essence the farmer group acts as guarantor for the farmer to access a loan.

Advisory Committee Meeting

Following the inception workshop, the advisory committee was constituted after the inception workshop. This committee includes: Chairman Budget Committee, Parliament of Uganda; Executive Director, SNV Netherlands Development Organization, Kampala, Uganda; PS Ministry of Agriculture, Ministry of Agriculture, Animal Industry and Fisheries ; District Production Officer, Serere District; The Executive Director, Enterprise Uganda; The Executive Director, Private Sector Foundation Uganda; Executive Director, Uganda National Farmers Federation; Executive Director, Agroways; Executive Director, aBi Trust; Executive Director, Uganda Cooperative Alliance; and Executive Director, Uganda Agribusiness Alliance.

Consequently the advisory committee was invited for a meeting the following day. At this meeting the roles and responsibilities of the advisory committee were defined. Most importantly, the advisory committee was informed that their role revolves around: 1) giving guidance to the activities of this research project; and 2) ensuring uptake of policy propositions that would have been identified. The advisory committee was informed that after the research project, they will be the owners of the policy propositions and would as such be expected to either individually in their own capacities and together market the policy propositions. The advisory committee agreed to perform their roles and responsibilities to the best of their abilities.

4. PROJECT IMPLEMENTATION AND MANAGEMENT

4.1 Project Implementation during the Period

The following table shows a list of activities performed in the first six months of the project as well as those that will be performed subsequently.

Table 1: Project Activities

Activities performed during the first six months of the Project	
	Inception: Finalisation of research teams, literature compilation & development of draft research instruments Identification of a co-researcher Identification of a master's student Identification of a Gender Specialist Literature compilation was undertaken in preparation for the questionnaire and background paper. List of topics and questions for developing research instruments during the methodology workshop Collaborative arrangements and procedures were made with KiBo Foundation and Awoja Riverside Farm. Deepened our understanding on the main challenges of the agribusiness thereby developing a background paper. We came up with a matrix detailing the stakeholders we need to reach during the study and how each objective was to be captured. We agreed that the data collected from the baseline will be key in answering the first three objectives. Awoja Riverside Farm agreed to identify farmer groups that were to be part of the study. We agreed that the data collected from the baseline will be key in answering the first three objectives.
	Inception workshop Workshop was held on **Wednesday 24th October, 2018 at Esella Country Club** Intended to bring key stakeholder including policy makers on board

	We presented the project's main thrust to the workshop participants and important feedback was generated. Representatives of various government ministries reiterated their commitment to integrate the key recommendations of the project into government's initiatives to improve livelihood among women and youths. Agreed to keep a close collaboration between the policy makers and the research team at the different stages of the project. The participants agreed to be called upon to the different dissemination workshops. Suggestions from the stakeholders were used to improve the questionnaire and background paper. During the consultative workshop, a project Advisory/Steering Committee was established including the following institutions a) Parliament of Uganda; b) SNV Netherlands Development Organization c) Ministry of Agriculture, Ministry of Agriculture, Animal Industry and Fisheries; d) District Production Officer, Serere District; e) Enterprise Uganda; f) Private Sector Foundation Uganda; g) Uganda National Farmers Federation; h) Agroways; i) aBi Trust; j) Uganda Cooperative Alliance; and k) Uganda Agribusiness Alliance
	Consultative workshop Workshop was held on **Thursday 25th October, 2018 at Esella Country Club** The project advisory committee agreed to work with the research team and agree on key outputs before a major dissemination workshop is done. The project advisory committee agreed to be called upon to the different dissemination workshops.

	The project advisory committee agreed to own the research output in order to act as our ambassadors post the research.
	The project also purchased equipment a laptop for the PI (Dell Core 7, 7th Gen inspiron 15 5000 series 15.6 Full HD Display) That matches the price of 3,600,000.
	Baseline Data Collection Process Training enumerators Pretesting baseline survey tool Data collection commenced on 29th October and the resources allowed us to cover only 15 days of field work.
	Baseline Data entry, cleaning and analysis of data This activity took place hand in hand with other activities of the project. This activity gave rise to improvements in the background paper titled: "Agribusiness Sector in Uganda: A Comprehensive Analysis**"**
	Baseline Data analysis and write-ups The analysis of the baseline has resulted in three reports. Below are the report summaries. The detailed reports are in the appendix. **"Gendered production constraints"** Agriculture remains one of the most important sectors in Uganda, accounting for the largest share of work and employment. Albeit its contribution, the sector is faced with a number of constraints most of which are believed to be gender sensitive. Upon this backdrop, the study examined gender specific production constraints in Uganda's agribusiness sector using data collected from two Soroti and Serere districts in eastern Uganda. Data was analyzed using both descriptive statistics and Ordinary Least Squares (OLS) technique. The results reveal gender differences in a number of aspects. For instance; male headed households are more likely to earn more off-farm income compared to their female counter parts; male cultivate on larger pieces of land compared to females; females are more likely to be tenants compared to males; males are more knowledgeable about herbicides compared to females; males are more knowledgeable about crop diseases compared to females; and males have an upper hand in accessing extension services. From the regression analysis, females specific constraints include; small size of agriculture land, the tenancy type of land ownership, limited use of

fertilizers, and limited use of improved seeds. On the other hand poor farming practices such as poor crop spacing may hinder agriculture productivity among male headed households. Therefore, further interventions in agriculture should be gender sensitive so as to bridge the gender gap in agriculture.

"Choice of Agribusiness Activities by the Youth. Do Sources of Finance Really Matter?"

This paper examines whether the source of finance matters in the choice of agribusiness activities by the youth in rural Uganda. We employ propensity score matching method to control for endogeneity. We use survey data collected from Soroti and Serere districts in Eastern Uganda. Our main result is that if the youth access finance through the sale of farm produce, their choice of agribusiness activities is more diverse than when they access funds through credit.

"On-farm crop earnings among youths in rural Eastern Uganda: what are their drivers"

This paper examines the drivers of crop earnings among rural youths in rural Eastern Uganda. The study utilizes cross-sectional data of 968 households, collected in 2018, from Soroti and Serere districts in Uganda. Using the Three Stage Least Squares (3SLS) methods, we find that youth crop earnings are positively associated with formal credit utilisation, land size, number of crops grown and whether a youth is a biological child of the household head. However, crop earnings were low for female youth as compared to male youth. Our results thus imply that efforts to enhance youth livelihood through improving crop earnings ought to: abate archaic cultural practices especially land fragmentation and enabling access to affordable formal credit. Furthermore, youths ought to be encouraged to grow more than one crop for purposes of income diversification as this has the potential hedging against the rainy days in the event one crop fails.

Training	
	Training took off in May 2019. At the moment training in horticulture, poultry and soft skills have been successfully been completed. However, while theoretical training on piggery has been completed, the practical lessons and implementation will be undertaken at the end August. Awoja Riverside Farm undertook the technical training while KiBO Foundation provide the soft skills training. At the moment the first phase of the training has been completed. Indeed, the KiBO Foundation training equipped participants with business and life skills in order for them to become productive and have sustainable Agri-enterprises, and also harness the existing opportunities around them. The first phase of training took place between May 6-23, 2019 and was carried out with the following: Moru Youth Development Group, Kikota, ArooEiner Ka Aswam Poultry Group, Atape Group, Kabos Youth Farmers Group & Opucet Multipurpose Youth Group; covering different modules such as Business Management Skills, Group dynamics, Self-Awareness, Book Keeping & Basic Stock, Financial Literacy and Presentation. It was an exciting time for the participants as the trainers engaged them in different forms of activities throughout the learning process. A total of 188 participants were trained in the 1st cohort: 93 Male and 95 Female. The evaluation from the training indicated that it had a great impact on the participants. *The second phase of the soft skills training by KiBO Foundation started on 29th of July 2019 and will end on the 30th of August 2019.*
	Mid line Owing to the need to understand the processes undertaken during training, we undertook a mid-line survey in October. This was done following the development of a mid-line survey instrument which was completed and tested in September. In December and January, we went ahead and wrote the midline report.
	End line data entry, cleaning and analysis of data June/July 2020 This exercise went on successfully albeit at a rather higher cost than was envisaged. This was partly because of the need to adhere to COVID-19 SOPs, the fear that study groups had especially given that were coming from Kampala that was at the time deemed to have a higher intensity of the virus compared to other regions.
	End line Data analysis and write-ups, July 2020-September 2020 Following the data collection, we undertook data cleaning towards data analysis. However, COVID-19 affected the agribusiness activities of the study group. The effect of which was that we were unable to development as many research papers as wished. Even then we were able to study the impact of agronomic skills, soft skills and information provision on agribusiness among women and youths in rural Uganda. (see appendix 11)

	International conferences. Owing to COVID-19 induced international travel restrictions, we were unable to attend any international conferences to present our study findings. As such we were left with only undertaking the national dissemination workshop.
	Expert Advisory Meeting to be held a head of the national Dissemination Workshop at Esella Country Club Hotel in Kampala in October 2020. Owing to cost overruns during the data collection exercise, this activity was not undertaken rather, our focus was out on the national dissemination workshop. Even then, the endline report was shared with the members of the advisory committee for purposes of getting their input. There comments were received and this incorporated in the report.
	Policy Brief Completed and presented at the Expert Advisory Meeting in October 2020 A draft policy brief was developed and shared with members of the advisory committee for their input. Upon receiving their inputs, comments are incorporated in the policy brief. Please note, we were advised to have policy brief to capture the policy messages.
	National Dissemination Workshop, March 2021 The national dissemination workshop took place on the 5th of March 2021.
	Revisions and incorporating comments from the Regional Dissemination workshop completed, April 2021 Comments were incorporated in the report ready for submission.
	Prepare and submit final report to IDRC Reported submitted in May 2021

4.2 Project Management

The project is on course, we have had no management challenges. Aforementioned, the project is being technically coordinated by the Centre for Basic Research in collaboration with KiBO Foundation and Awoja Riverside Farm. The project team has been in close contact to ensure smooth execution of the project this far.

5. PROJECT OUTPUTS AND DISSEMINATION

5.1 Project Outputs

Following the project completion, these are the outputs:

5.1.1 Stakeholder Consultative Workshop in Uganda (25th October 2018)

We undertook a stakeholder consultative workshop on the 25th October 2018. The purpose of this workshop was to make sure that before the commencement of the study key stakeholders (government policy makers, private sector, non-government organizations, civil society organizations and international organizations working are brought on Board and consulted concerning the issue of improving livelihood among youths through harnessing enhancing agribusiness opportunities. This was to make sure that the government and other stakeholders own the study and therefore be more willing to implement the key recommendations that would emerge from the study findings (see Annex 1, for the details).

5.1.2 Agribusiness sector in Uganda: A Comprehensive Analysis

Women and girls in Uganda make up a significant proportion of the population and largely depend on agriculture contributing almost 72 percent of labor force. However, within the agribusiness sector, women are disadvantaged compared to men and their participation in the sector is almost invisible since most of them are involved in subsistence agriculture. Women do most of the agricultural work, yet men reap the largest economic benefits. Value added per worker is lower in agribusiness enterprises managed by women. A key challenge is the marginalization of women and girls in skills development within the agribusiness sector. Differences in skill patterns between men and women have largely contributed to women's low productivity and thus low returns from the agribusiness sector. (see appendix 2)

This paper is currently under review at the Development Policy Review.

5.1.3 On-farm crop earnings among youths in rural Eastern Uganda: what are their drivers?

This paper examines the drivers of crop earnings among youths in rural Eastern Uganda. The study utilizes cross-sectional data of 968 households, collected in 2018, from Soroti and Serere districts in Uganda. Using the Three Stage Least Squares method, we find that youth crop earnings are positively associated with formal credit utilisation, land size, number of crops grown and a youth being a biological child of the household head. However, crop earnings were low for female youth as compared to male youth. Our results thus imply that efforts to enhance youth livelihood through improving crop earnings ought to: abate archaic cultural practices especially land fragmentation and enabling access to affordable formal credit.

Furthermore, youths ought to be encouraged to grow more than one crop for purposes of income diversification as this has the potential of hedging against rainy days in the event one crop fails. (see appendix 4).

This paper is currently under review at the Journal of African Economies

5.1.4 Choice of Agribusiness Activities by the Youth: do Sources of Finance Really Matter?

This paper examines whether the sources of finance influence the choice agribusiness activities by the youths in rural Uganda. We indicate for sources of finance with: 1) funds raised through the sale of farm produce and 2) funds raised through borrowing/credit. We apply propensity score matching method to control for endogeneity on survey data collected from Soroti and Serere districts in Eastern Uganda. Our main results demonstrate diversified investments in agribusiness activities when the youth are investing funds raised through the sale of their farm produce than when they are investing borrowed funds/credit. From a policy perspective, our results suggest that the design of the youth empowerment programs in rural areas requires: (1) increased investment in agricultural activities in as this seem to provide ample time for confidence building within the youth before venturing into new investment opportunities and (2) loosening the conditions that surround credit accessibility. (see appendix 6)

This paper is currently under review at the Food Policy journal.

5.1.5 Production constraints in Uganda's agribusiness sector: Gender perspective

Agriculture remains one of the most important sectors in Uganda, accounting for the largest share of work and employment. Albeit its contribution, the sector is faced with a number of constraints most of which are believed to be gender sensitive. Upon this backdrop, the study examined gender specific production constraints in Uganda's agribusiness sector using data collected from two Soroti and Serere districts in eastern Uganda. Data was analyzed using both descriptive statistics and Ordinary Least Squares (OLS) technique. The results reveal gender differences in a number of aspects. For instance; male headed households are more likely to earn more off-farm income compared to their female counter parts; male cultivate on larger pieces of land compared to females; females are more likely to be tenants compared to males; males are more knowledgeable about herbicides compared to females; males are more knowledgeable about crop diseases compared to females; and males have an upper hand in

accessing extension services. From the regression analysis, females specific constraints include; small size of agriculture land, the tenancy type of land ownership, limited use of fertilizers, and limited use of improved seeds. On the other hand poor farming practices such as poor crop spacing may hinder agriculture productivity among male headed households. Therefore, further interventions in agriculture should be gender sensitive so as to bridge the gender gap in agriculture. (see appendix 5).

This paper is currently a review at the Feminist Economics Journal

5.1.6 The impact of agronomic skills, soft skills and information provision on agribusiness among women and youths in rural Uganda.

This paper is focused on three key interventions that is soft skills, agronomic skills and information provision relating to activities and crops and their ability to enhance agribusiness potential among youths and women in rural Uganda. The training was conducted in conjunction with Awoja Riverside farm and KIBO foundation which are Non-Governmental Organisations (NGOs) aimed at encouraging for the formation of homogeneous youth self-help groups in both districts and empower them with skills transfer programs, food security projects, sanitation programs and market information. The key findings from the study reveal that training of women and youths in improved agronomic skills and soft skills increases their engagement in agribusiness enterprises and also increases their earnings from the sale of their farm produce. Furthermore, providing simple information about specific activities and crops that can provide agribusiness opportunities also increases their participation in such activities and crop growing. This far, we observe that the prosperity of agribusiness in Uganda lies on: 1) increased investment in training of farmers into improved farming and business practices; 2) increased investment in value addition practices as this will help to increase on the farmers' turnover; 3) increased information provision to farmers about activities and crops that can provide agribusiness opportunities in a changing world and 4) increased sensitization of the youths about the potential for agriculture beyong farming. (see appendix 11)

This paper is currently under review at the Journal of Development Studies

5.1.7 Baseline survey and baseline report

We undertook a baseline survey for purposes of understanding agribusiness potential in Soroti and Serere districts. The purpose of the baseline was to fine tune our training skills intervention to the needs of the youths and women in Soroti and Teso districts. Consequently, we development a baseline instrument (see Annex 3). Following the implementation of the baseline three research papers (see Annex 4, 5 and 6) were written that is:

a) On-farm crop earnings among youths in rural Eastern Uganda: what are their drivers?
b) Choice of Agribusiness Activities by the Youth: do Sources of Finance Really Matter?
c) Production constraints in Uganda's agribusiness sector: Gender perspective.

5.1.8 Training of women and youth in agribusiness skills

Following the implementation of the baseline and fairly understanding our study group, we proceeded to develop training materials for training purposes. Training was undertaken by both Awoja Riverside Farm and KiBO Foundation. This involved first undertaking a training needs assessment to establish the specific skill set gaps among youths and women. Thereafter both Awoja Riverside Farm and KiBO Foundation developed training materials that were customised to the training needs of the youths and women.

We had a total of 943 Women and youths from various self-help groups of which 411 were in the control group. 532 women and youths were in the first intervention which included training in soft skills and information provision on agricultural related activities and crops that can provide agribusiness potential. Furthermore, we had another intervention that is training in horticulture (watermelon, onions, green pepper which had 206 women and youths. Training in poultry had a total of 321 women and youths. While training in piggery farming had a total of 32 women and youths. We noticed from the data analysis that some 27 trainees crossed from their specialised training groups and also received some training in other agronomic fields e.g. crossing from piggery training group to say poultry training group. Annex 7 captures the training report for agronomic skills. Annex 8 captures the training report for agronomic skills.

5.1.9 Midline survey and report

Following the completion of the training, mid-line survey which was conducted in October, 2018 among the groups that were trained in technical and soft skills in Soroti and Serere districts of Uganda. The mid-line survey was intended to assess the extent to which rural

women and youths mastered the capacity building training content and also to acquire a better understanding of the organization of the trainings to guide the explanations of the impact evaluation results. The assessed trainings were conducted by both Awoja Riverside which trained the participants in the technical skills (piggery, horticulture and poultry keeping) and KiBO Foundation which trained the participants in soft skills. (see Appendix 9 and 10 for the midline survey instrument and report).

5.1.10 Data collection for project training impact evaluation.

Upon successfully undertaking the training and reviewing the training using the midline, we proceeded to develop the survey instrument for the end line (see Annex 12). This exercise was heavily affected by COVID-19 Standard Operating Procedures (SOPs) making data collection rather expensive in terms of time, transport costs and getting approval from the state agencies for the exercise to proceed. Even then, we persevered to throughout the project activity. Data collection exercise was indeed successful albeit longer than planned. We proceeded to write a paper to understand the impact of the training intervention on agribusiness among youths and women (see Annex 11).

5.1.11 Policy Brief: Agronomic Skills, Soft Skills, and Provision Enhance Agribusiness Enterprises among Women and Youth in Uganda

Following the completion of the impact evaluation report, we developed a policy brief targeting policy makers (see Annex 16 has the policy brief details.

5.2 Capacity Building

The Project enabled the purchase of three new items of equipment found necessary to implement the project. These are:

a) Laptop Computer-EON17-X10
b) Voice Recorders; and,
c) Three 500GB external hard drives.

The project this far has involved both KiBO Foundation and Awoja riverside farm to develop their research capacities. Indeed the two parties were involved right from project conceptualisation and now implementation. At moment both parties are involved in the analysis of the baseline data collected.

5.3 Dissemination

After implementing the skills training interventions, data collection, analysis, report writing and dissemination among the advisory committee and addressing comments from the advisory committee, we undertook a national dissemination on the 5th of March 2021. The meeting was attended by officials from the Ministry of Agriculture, Animal Husbandry and Industry, Private sector Foundation Uganda, Uganda Small Scale Industries Association, Enterprise Uganda, Uganda National Federation of Farmers, Grow Small Industries, Economic Policy Research Center and Academia among others. Below are the minutes from the dissemination workshop.

Minutes of the national dissemination meeting for the project Enhancing Agribusiness Economic Opportunities of Rural Women and Youths held on the 5th of March, 2021.

The meeting started at 8:30 with arrival and registration of membership for steering committee stakeholders and other invited guests that had been invited to attend physically.

At 9:00am, the moderator called the meeting to order and welcomed the guests (those that attended physically and virtually). Thereafter, the moderator requested for the adaptation of the Agenda. This was indeed adopted without any modifications. The agenda is given below:

CENTRE for BASIC RESEARCH

IDRC · CRDI
International Development Research Centre
Centre de recherches pour le développement international

Canada

Dissemination Workshop

Enhancing Agribusiness Economic Opportunities of Rural Women and Youths

Venue: Centre for Basic Research

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PROGRAMME

TIME	ACTIVITY	RESPONSIBILITY
8:30-9:00am	Arrival & Registration of participants	CBR Staff

9:00-9:15am	Welcome Remarks from ED CBR	Dr. Frank Emmanuel Muhereza
9:15-9.30am	Remarks from IDRC representative	Dr. Paul Okwi
9.30-9:45am	**Presentation**: Characterisation of youths and women, matching of agronomical and soft skills training to the needs of youths and women to enhance agribusiness	Dr. Ibrahim M. Okumu
9:45-10.30am	**Presentation**: Impact of agronomical and soft skills on agribusiness.	Associate Professor Edward Bbaale
10:30-11:00am	HEALTH BREAK	CBR Service provider
11:00-12:00pm	**Discussion**	Moderator
12:00-12:15pm	Wrap up	PS Ministry MAAIF
12:15 -1:15pm	LUNCH/CLOSING REMARKS	CBR Service Provider

Upon, adopting the agenda, the moderator requested ED of CBR to give his welcoming remarks. The ED of CBR with utmost appreciation thanked IDRC for funding such ground breaking project that has a potential of improving livelihoods in Eastern Uganda.

The ED also noted that for purposes of project sustainability, it is imperative that IDRC partners with CBR to:

a) Implement the project intervention in other regions of the country. This would be helpful in scaling up the project nationwide.

b) Undertake a follow up review of the trained members and also to train the previous non-trained participants.

The ED further thanked Dr. Ibrahim Mike Okumu and Dr. Edward Bbaale for seeing this project successfully with utmost professionalism. This is especially so in relation to undertaking of the project in presence of Covid-19 pandemic.

The ED extended his thanks to Awoja Riverside Farm and KiBO Foundation for seeing through the training component of the project. The ED was especially appreciative to the training materials that were translated into the Iteso language (language widely spoken in the intervention districts).

The ED ended by again welcoming all participants (both virtue and physical)f to the national dissemination meeting for the project "Enhancing Agribusiness Economic Opportunities of Rural Women and Youths".

The ED of CBR was followed by Dr. Mulema Annet (IDRC Representative)

Dr. Mulema thanked CBR for coordinating the research arm of the project. She also thanked KiBO Foundation and Awoja Riverside Farm for coordinating the training component of the project.

After Dr. Mulema, Dr. Ibrahim Mike Okumu gave the first presentation of dissemination entitled "Characterization of youths and women, matching of agronomical and soft skills training to the needs of youths and women to enhance agribusiness". This presentation was aimed at providing an overview of the project (brief contents of the proposal, project design, baseline, training content and mid-line survey). See Annex 13 for the presentation.

Following Dr. Okumu's presentation, Prof. Edward Bbaale presented results relating to the impact of training on household behaviors. See Annex 14 for the presentation.

After the presentations, the moderator opened the floor for discussion

Discussion, a couple of questions were raised to test the strength of the research results. In the minutes, we capture the key questions and how they were addressed:

1) Question 1: Is it possible to capture the effect of each specific skills training (e.g. delegation or leadership) is driving the results?

Response: The training was a whole package as such it is not possible to disaggregate which particular skill was behind the project results.

2) Question 2: How were the choice of skill sets and enterprises for training identified?

Response: Both the skills sets and enterprises during training were identified following a baseline survey. At the baseline respondents were asked: Which crops do you normally grow? Which of these crops would you wish grow? For each crop identified, why didn't you grow it? For each crop identified, do you think training could be useful to enable you to grow the crop?

If Yes, what kind of training would you wish to have? Moreover, the research team also got some market information about crops and other activities for agribusiness potential. The aforementioned questions guided the choice of enterprises for training and the choice of skills sets for the participants.

3) Question 3: what controls did we have in place to ensure that the outcomes we reported are entirely attributed to the training intervention?

Response: We conducted balance checks using baseline data and the two groups (treatment group and control) showed no significant differences across many variable. This we do even in the technical report. With proper randomization and similarity of groups, we are confident that the project outcomes are entirely attributed to our interventions. Question 4: what policy uptake strategies are in place?

Response: the key line ministry i.e. the Ministry of Agriculture, Animal Husbandry, Industry and Fisheries (MAAIF) has been part of the steering committee. It was involved in the design, implementation and has been represented by the Permanent Secretary (PS). So, it also owns the project results which we hope will smoothen results uptake.

Why did the authors not use Difference in Difference (DID) empirical approach?

Response: DID could have been the optimal empirical strategy however, in the second best environment where the project was heavily affected by Covid-19 and the subsequent containment measures, the use of mean differences approach on end-line data was opted for.

After the discussion, the Permanent Secretary MAAIF was invited to give closing remarks. The following are some of the highlights from the warp up:

The Centre for Basic Research (CBR) through the funding of International Development Research Centre (IDRC) carried out a research to establish the setbacks of women and youths in agribusiness and also provide training and hands-on skills in developing profitable and sustainable agribusiness enterprises. It is noted that the key findings from this research are:

a) Training of women and youth in improved agronomic skills and soft skills increases their engagement in agribusiness enterprises and also increases their earnings from the sale of their farm produce.

b) Providing of simple information about specific activities and crops that can provide agribusiness opportunities also increases their participation in such activities and crop growing.

I would like to bring to your attention that these findings are in line with MAAIF vision and mission. The increased investment in training of farmers to get better knowledge in farming as

a business, increased investment in value addition for higher turnover is key in the agro-industrialization of the NDPIII.

As a Ministry, we are supposed to provide an enabling environment and policy guidance for the business community and the farming community in general to engage in production, value addition and marketing of Agriculture produce.

Possible Areas of Collaboration between MAAIF & Center for Basic Research (CBR)

a) Research

MDAs can cooperate with CBR in areas of research. The two can have areas which need to be researched on and the duo can partner that way.

b) Dissemination of Research:

The CBR may have researched areas and came up with findings that can be disseminated in the Ministry. At Ministry level this dissemination is possible through the Extension Department. The areas of research may include but not limited to issues like;

- Poverty, Food nutrition and security,
- Yield enhancing technologies to increase productivity,
- Participation of women, youth and marginalized groups in agricultural production
- Agricultural Value chain production
- Water for Agricultural production
- Post-harvest handling and marketing strategies
- Agricultural Mechanization
- Sustainable Land Management

c) MAAIF training institutions

MAAIF has institutions where training can be carried out. These include; Fisheries Training Institute, National Agricultural Research Laboratories (NaRL), Kawanda and National Farmers Leadership Centre (NFLC), Kampiringisa.

Exchange visits would be another opportunity to learn from by the Center for Basic Research (CBR).

d) Memorandum of Understanding

A Memorandum of Understanding between MAAIF and Centre for Basic Research can be set up for future collaboration.

The dissemination meeting was called off at 12pm.

6. IMPACT OF THE PROJECT

This project focused on three key interventions that is soft skills training, agronomic skills training and information provision relating to activities and crops that can provide agribusiness potential Serere and Soroti districts of Eastern rural Uganda. The training was conducted in conjunction with Awoja Riverside farm and KIBO foundation which are Non-Governmental Organisations (NGOs) aimed at encouraging for the formation of homogeneous youth self-help groups in both districts and empower them with skills transfer programs, food security projects, sanitation programs and market information. The key findings from the study reveal that training of women and youths in improved agronomic skills and soft skills increases their engagement in agribusiness enterprises and also increases their earnings from the sale of their farm produce. Furthermore, providing of simple information about specific activities and crops that can provide agribusiness opportunities also increases their participation in such activities and crop growing. This far, we observe that the prosperity of agribusiness in Uganda is hinged on: 1) increased investment in training of farmers in improved farming and business practices; 2) increased investment in value addition practices as this will help to increase household turnover; 3) increased information provision to farmers about activities and crops that can provide agribusiness opportunities in a changing world and 4) increased sensitization of the youths about the potential for agriculture beyond farming.

ANNEXES

Annex 1: Stakeholder Consultative Workshop in Uganda (25th October 2018) Report

1.0 BACKGROUND TO THE WORKSHOP

As a precursor to the Consultative Workshop, the co-Investigator, Prof. Edward Bbaale gave a general background to the research project. He mentioned that it is a pilot project to be undertake in Soroti district in Eastern Uganda with financing from IDRC. The project is to be implemented by CBR in conjunction with KiBO Foundation and Awoja Riverside Farm.

The purpose of this workshop was to make sure that before the commencement of the study key stakeholders (government policy makers, private sector, non-government organizations, civil society organizations and international organizations working are brought on Board and consulted concerning the issue of improving livelihood among youths through harnessing enhancing agribusiness opportunities. This was to make sure that the government and other stakeholders own the study and therefore be more willing to implement the key recommendations that would emerge from the study findings. It was noted that researchers often come up with good policies from research but these have more than often failed to work out because the stakeholders are not involved from the beginning.

The views and comments from the stakeholders will inform the proposed research gap from a practical perspective as well as the general direction of the research project. He added that many youths in Uganda have a great opportunity to exploit the opportunities in the through harnessing agribusiness opportunities. This would in turn improve livelihoods among youths and women.

The participants were further informed that the necessary requirements for carrying out the study in Uganda were in place and the implementing institutions in Uganda already had a certificate from Uganda National Council for Science and Technology (UNCST) to carry out the field work.

Figure 1: Participants during the Consultative workshop

At this point in time, Dr. Edward Bbaale invited the Principal Investigator; Dr. Ibrahim Mike Okumu to present the background to the research problem in order to solicit the views and comments of the stakeholders. More specifically, Dr. Ibrahim Mike Okumu presentation involved:

A brief background and the overall objective of the project were given, highlighting the need to enhance Agribusiness Economic Opportunities for Women and Girls in Uganda.

Why the project will mainly focus on women and girls with major reasons like high unemployment and poverty rates among women.

The project will be carried out in Eastern Uganda, specifically in the districts of Soroti and Serere since most of the households from that region are poverty-stricken.

The project will be implemented in phases, starting with a baseline study.

Information that will be sought at the baseline will mainly include; household characteristics (like education, household heads); farm acreage; engagement in value addition; whether farmers keep records; what are the major agronomic practices that account for farmers' yields; are there any existing agribusiness interventions; among others.

Such information from the baseline study will guide the researchers in identifying the specific training needs that farmers require and also, identify those people (that is, the women and girls) who need training.

Figure 2: Dr. Ibrahim Mike Okumu presenting one of the papers

Figure 3: Dr. Ibrahim Mike Okumu presenting one of the papers

The chair later invited the members of the steering committee to make comments.

Mr. Gideon Badagawa raised majored questions like;

What crop enterprises were being selected in the project that would get people out of poverty?

What markets had the project identified that could potentially benefit women and girls in agribusiness?

When it comes to contract farming for example among sugarcane farmers, is there a law to mediate farmers and processors?

Figure 4: Mr. Gideon Badagawa addresses the workshop

While raising major concerns regarding market driven production, Mr. Gideon further emphasized the following points;

That when it comes to market identification, farmers often don't understand the market dynamics hence the reason for high poverty in farming households;

Linkages between farmers and potential agribusiness markets are still weak.

Mr. Gideon concluded by making some suggestions for a successful project which included;

The need to identify what agribusiness markets are looking for. More specifically, he highlighted the need to train farmers on value addition for increased access to markets and sustainability in production. Here he gave a success story of how Mukwano group of industries links small holder palm oil farmers to markets right from inputs all through to the entire production process.

He also suggested organizing farmers in cooperatives as a way to reduce exploitation from middlemen.

Mr. Joseph Asutai

Mr. Asutai mainly applauded the project implementers for the choice of the sampled regions, which included Soroti and Serere districts.

He noted that these districts are among the top poorest district and therefore the agribusiness project intervention could perhaps help raise majority of the households out of poverty.

Mr. Asutai noted that the proximity of Soroti district to more lucrative markets could boost agribusiness within the region.

He further noted with concern that most of the crops/food sold in Soroti came from Bugisu region thus identified a gap in production and availability of ready market within Soroti district.

Mr. Asutai concluded by suggesting that agribusiness training in Soroti should focus on poultry farmers since it's the prominent economic activity within the region.

Dr. John Seruyange

Mr. John mentioned that one cannot enhance agribusiness without emphasizing the need for farmer groups.

He noted that farmer groups often end up failing and therefore suggested that one of the ways to improve their success is through implementing rotational leadership.

While commenting on the relationship between farmers and the potential buyers of their output, Mr. John raised the following questions;

Are there linkages between farmers and particular agricultural processors?
If not, why are such linkages not there?
What challenges restrict engagement of farmers with these processors?

Miss. Veronica Birungi

Ms. Veronica had major concerns on how best to influence people's attitudes towards the project. More specifically, on how to change their mindset that they could benefit from agribusiness.

She suggested the need for role model farmers since they are more influential and could act as immediate consultants.

Way forward.

After the consultative workshop, we are going to undertake the following project activities and update the project advisory committee accordingly:

Further improvements on the background paper. Complete a paper on the Critical Overview of the Agribusiness Sector in Uganda.

Revisions on the baseline survey instrument to incorporate suggestions from the inception workshop.

Concluding remarks were given by Mr. Gideon Badagawa and this is what he share
Mr. Gideon concluded the inception meeting by emphasizing the need for inclusive growth.

He posed a question to the audience of "why a country should report increased growth with increasing rates of unemployment? Where is this growth coming from yet people are poor? "

Mr. Gideon highlighted that farmers have been left alone.

He further noted that markets or processors are available in some areas but the agricultural output is being obtained from regions outside.

He also cautioned on the use of wrong models, for example Operation Wealth Creation.

1.2 Inception workshop Programme.

CENTRE FOR BASIC RESEARCH

Enhancing Agribusiness Economic Opportunities of Rural Women and Girls in Uganda

INCEPTION WORKSHOP

Date: Tuesday 25th October 2018

Venue: Esella Country Club

Time	Activity	Facilitator
8:30- 9.00 am	Registration of Participants	Secretariat
9.00 – 9.20 am	Ice breaker/Introductions	Members
9.20 – 10.00 am	Welcome Remarks	Dr. Edward Bbaale
10.00-11.00 am	Presentation of the project objectives	Dr. Ibrahim M. Okumu
11.00-11.30am	***Coffee Break***	***Members***
11.30-1.00pm	Discussion	Session Chair/Ministry of Agriculture Animal Industry and Fisheries
1.00pm-2.00pm	**Lunch Break**	***Members***
2pm-3.00 pm	Wrap-up/agree way forward	Dr. Edward Bbaale
3.00pm-4.00pm	Closing remarks	Mr. Gideon Badagawa

Annex 2: Background Paper on Enhancing Agribusiness Economic Opportunities of Rural Women and Girls in Uganda

Introduction

The Ugandan economy is inherently dependent on agriculture for its growth and development, where the sector accounts for about 23 percent of the Gross Domestic Product (GDP). More than 77 percent of Uganda's population relies on the agricultural sector as a primary source of livelihood and employment. The sector also significantly contributes to the country's export earnings with the agricultural export share amounting to 57.2 percent of the country's total exports (UBOS, 2015; World Bank, 2010).

Despite its importance, Uganda's agricultural sector has failed to fulfill its potential to substantially contribute to growth, poverty reduction and most importantly to rural development (IFC, 2016; FAO, 2011). Majority of the agricultural households focus mainly on producing food for their own consumption rather than on income generating agricultural activities. Most of the farms in Uganda are small with over 58 percent of the farmers cultivating less than one hectare (UBOS, 2010; Mugonola & Baliddawa, 2014). Furthermore, farmers are less educated, have limited access to finance and use outdated production technology. The sector is characterized by an ageing farming population. Evidence from literature indicates that the average age of farmers in Uganda is estimated to be as high as 60 years yet almost 75 percent of the population is under 30 years (AFDB, 2016; Bonaglia et al., 2007). Collectively, these challenges have led to low productivity output which has made the agriculture sector less competitive and rendered many engaged in agricultural activities trapped in a vicious cycle of poverty because of the negligible income obtained from agriculture (AFDB, 2016). Low productivity has led to a sluggish growth of the agricultural sector where, between the period of 2010 and 2012, agricultural sector growth declined from 2.6 percent to -0.2 percent respectively before recovering to 2.9 percent in 2014 (MAAIF, 2016; Babu et al., 2016). As a result, the sector's contribution to GDP within the same period is seen to decline from 25.4 percent to 23 percent.

Coping with the challenges facing the agricultural sector requires revitalizing the sector into systems that are welfare improving and call for inclusive and sustainable growth (Babu et al., 2016; Boto & Mofolo, 2014; Ogunniyi et al., 2017). Such systems will necessitate harnessing prospects for agribusiness development in Uganda. A vibrant and resilient agribusiness sector is important if the agricultural sector is to result in poverty reduction and increased economic growth (IFC, 2016; Tersoo, 2014; World Bank, 2013; Van Rooyen, 2014; Yumkella, 2011). Evidence shows that a productive and dynamic agricultural sector generates growth that is two to four times more effective in raising income especially among the poor people than any other sector since a larger share of the population is engaged in agriculture (Dalwai, 2012; Byerlee et al., 2009; Christiaensen et al., 2011). Therefore, enhancing agribusiness provides a key pathway from subsistence agriculture to improving productivity output in the agricultural sector tailored to raise the welfare of the vulnerable population engaged in agricultural activities. This is because agribusiness offers an opportunity of mitigating the obstacles within the agricultural sector thereby positioning it into a more competitive and comparative economic sector (IFC, 2016; FAO, 2017; Ikenwa et al., 2017). This would ultimately contribute to the attainment of the National Development Plan II (NDP II) goal of propelling Uganda towards middle income status by 2020. Through the NDP II, the government of Uganda targets to halve the number of people engaged in subsistence agriculture from 6 to 3 million through promoting commercial farming by increasing sustainable production and productivity; improving agricultural markets and value chains (MAAIF, 2016; Combaz, 2013).

Relevance of the agribusiness sector in Uganda

Agribusiness is a critical sector for improved economic growth in Uganda. Bairwa et al. (2014) note that agribusiness is crucial for developing countries to take advantage of the benefits of globalization and face new challenges in order to enhance economic growth. Existing literature indicates that there is a strong relationship between agribusiness and a decrease in poverty (Tersoo, 2014; Babu et al., 2016). Agribusiness is an engine of inclusive growth since it unlocks the potential of commercial farmers especially small-holders in rural areas thus reducing poverty and building wealth. World Bank (2013) highlights agribusiness as a vital source of safe, nutritious and affordable food. Agribusiness is envisaged to boost employment within the agricultural sector. It presents multiplier effects of employment since it allows full development

of agriculture value and supply chains- including; agricultural input supply, the production and transformation of agricultural output, and distribution to final consumers. Therefore, it is a major generator of both farm and non-farm agricultural related jobs (Tersoo, 2014; FAO, 2017; World Bank, 2011). Agribusiness is projected to create more jobs than the rest of the economy (FAO, 2015). Through various employment opportunities, agribusiness is important in lifting income of individuals involved specifically those in rural areas. A raise in income is linked to agricultural productivity gains since households have the capacity to acquire inputs and also adopt useful technology (Tersoo, 2014).

In addition, the agribusiness sector is essential for Uganda's revenue base diversification strategy and also in adjusting the balance of payment deficits through the agribusiness exports which are a major source of foreign exchange (Babu et al., 2016; Ikenwa et al., 2017). Haggblade (2011) argues that as the agribusiness share of GDP raises, productivity gains in agribusiness exhibit impactful mechanisms to raise income for a large labor force engaged in various agribusiness activities. The agribusiness sector provides major linkages between the agriculture and manufacturing sectors through the provision of raw material inputs (FAO, 2017). This catalyzes industrial development which in addition could lift majority of rural dwellers engaged in agriculture out of poverty by directly impacting on their levels of income and creating more sustainable jobs across the economy thus fueling economic growth (UNECA, 2014; Tersoo, 2014; Haggblade, 2011).

The potential for agribusiness in Uganda

Uganda presents a number of opportunities which can be capitalized on to harness the agribusiness sector. The country has a major advantage of a rapidly growing population which is estimated to be growing at 3 percent per year and characterized by a young and growing labor force (MAAIF, 2016). If such a young population is leveraged, it can provide a transformative impact from the agribusiness sector because it brings energy, vitality and innovation into the workforce essential for significant growth (Brooks et al., 2013). The country is also experiencing a surge in urbanization. Population growth and urbanization put together create new opportunities because they provide readily available consumer markets emerging from an increase in demand (Babu et al., 2016; Kaganzi et al., 2009; Boto & Mofolo, 2014).

The presence of regional markets like the EAC, COMESA and South Sudan as well as international markets especially in the European Union and Asia can also be exploited by the agribusiness sector in Uganda (Babu et al., 2016; Mayanja et al., 2012). Agribusiness markets in Africa are predicted to grow to USD 1000 billion by 2030 (World Bank, 2013). The agribusiness sector in Uganda can tap into this opportunity since currently agribusiness markets are dominated by foreign companies. In addition, the potential for agribusiness is huge in light of the several commodity-specific liberal policies developed by the government of Uganda that are tailored to improve the agribusiness sector in general by enhancing production, productivity, agro-processing, and agro input markets (MAAIF, 2016).

However, in the presence of the aforementioned opportunities, the potential for agribusiness in Uganda is far from being fully exploited. The sector is in its infancy and largely dominated by subsistence farmers, who produce a large proportion (between 75 to 80 percent) of marketed agricultural output. Commercial Farmers comprise of 0.5 percent of the farmers and account for only 2.3 percent of the marketed agricultural output. The sector is also largely characterized by small-scale agro-industries which offer a minimum of 12 to 15 percent of output (MAAIF, 2016). Men account for the largest share of participants who substantially contribute to commercial agriculture implying presence of gender disparities within the agribusiness sub-sector (UBOS, 2012). Existing literature indicates that such gender gaps are persistent barriers to growth, profitability, and sustainability of the agribusiness sector because they result in low quantity and poor quality of output, and also leads to fragmented and inefficient markets (IFC, 2016; Ransom & Bain, 2011).

Women and Girls in Agribusiness

Women and girls in Uganda make up a significant proportion (51 percent) of the population and largely work and depend on agriculture as their main economic activity since most of them are less likely to engage in non-farm wage employment (World Bank, 2007a; Forte et al., 2011). Likewise, agriculture largely depends on the work of women and girls because most men attach a negative attitude towards the sector believed to offer low returns and therefore opt for employment opportunities outside farms (FOWODE, 2012; Combaz, 2013; Burney & Nierenberg, 2013). As such, women and girls make an essential contribution to the agricultural sector. They comprise of 72 percent of the agricultural labor force and in rural areas, the labor

burden of women and girls exceeds that of men with over 90 percent of the women and girls working in agriculture this compared to only 53 percent of the men (Combaz, 2013; FOWODE, 2012; UBOS, 2013). Women play a fundamental role in all farm related activities from land preparation; crop and livestock production to post-harvest handling in addition to carrying out their domestic duties (IFC, 2016; FAO, 2011).

However, though women and girls play a crucial role within the agricultural sector, gender gaps still exist. Agricultural productivity differences between women and men are more apparent (Team & Doss, 2011; Croppenstedt et al., 2013; World Bank, 2014; Peterman et al., 2011). Within the agribusiness sector in general, women are increasingly disadvantaged compared to men and their participation in the sector is almost invisible since most of them are involved in subsistence agriculture (World Bank et al., 2009; Hovorka et al., 2009). This situation is even more pronounced in rural areas where women are continuously lagging behind men. They do most of the agricultural work, yet men reap the largest economic benefits (Villarrel, 2013; Mckenna, 2014; Rubin & Manfre, 2014). Empirical evidence from World Bank et al. (2009) indicates that sometimes men dominate production and marketing of women's agricultural output especially when it's financially lucrative to do so.

For those owning agribusiness enterprises, majority of them operate micro and informal agribusiness enterprises that are less productive and fetch low economic returns. They mostly generate low income from the sale of their food produce in local markets highly characterized by low prices (Rubin & Manfre, 2014; Mayanja et al., 2012). In fact a report by the World Bank (2014) indicates that value added per worker is lower in agribusiness enterprises managed by women than those managed by men. Furthermore, women and girls working for wages in agribusiness enterprises are more likely than men to hold low wage employment even when in possession of the same or higher qualifications (Bartolo, 2011; Butler, 2014; Burney & Nierenberg, 2013; IFC, 2016). As a result of the low wages received, Rubin and Manfre (2014) argue that women then have few incentives to invest their time and energy into improving production and processing practices, thus are often limited in their productivity.

In addition, they mostly engage in low value chain nodes (that is; production and handling crops) of the agribusiness sector having lower economic returns (IFC, 2016; World Bank, 2014; Jones et al., 2012; Mayanja et al., 2012) and consequently remain operating on a small scale or

as agricultural laborers reaping low returns from their effort (Rubin & Manfre, 2014; Sagagi & Palina, 2013). A report by IFC (2016), notes that men are more likely to participate in export commodities, or in markets which are highly profitable. On the other hand, Njuki et al. (2011) argue that agricultural commodities generating lower revenue are more likely to be controlled by women. Such gender inequalities in the agribusiness sector constrain women from substantially contributing to the agricultural sector and also limit the achievement of broader economic and social goals like the millennium development goal on promoting gender equity and empowering women (FAO, 2011; Babu et al., 2016).

Evidence from existing literature points to a number of challenges that deter women and girls' ability to fully and successfully participate in the agribusiness sector. A key challenge is the marginalization of women and girls in skills development within the agribusiness sector. Without the necessary skills, women are deemed to be less productive and thus reap low returns from agribusiness than their male counterparts (White et al., 2015). Differences in skill patterns between men and women are partly due to gaps in access to information and training opportunities. Women and girls generally receive less extension training in agribusiness compared to men. A study by FAO (2011) found that women in developing countries receive only 5 percent of extension training services and in Africa, this proportion stands at only 10 percent (IFC, 2016).

Additionally, many of the available training programs like the NAADs are not gender streamlined and therefore marginalize women and girls mostly. Sometimes women and girls have to forego training opportunities because of conflicting household duties and other cultural reservations (Meizen-Disk et al., 2011). Also, women are less represented in extension training organizations than men. Evidence shows that this limits their participation and access to extension training programs (USAID, 2012; Tandon, 2010; IFC, 2016). According to USAID (2012), only 15 percent of extension workers are women globally. In addition to limited training opportunities in agribusiness, gender disparities in education are significant. Majority of the women and girls are less equipped with skills because they have lower levels of education than men. Even with great effort from the government of Uganda to increase girls' enrollment rates in school, only a third of the girls continue schooling to the age of 18 years compared to the boys (MoES, 2016). IFC (2016) confirms that low levels of education make agribusiness

training for women and girls more difficult hence making them benefit less from knowledge exchanges. Furthermore, gaps in information on relevant agribusiness issues often limits women and girls to effectively utilize available resources like rural credit; farm inputs such as fertilizers, seeds and adopting improved technologies (Babu et al., 2016; Mapila et al., 2011).

Other barriers to women and girls' involvement in agribusiness include; unequal access to productive agricultural resources like land where the current land tenure system in Uganda marginalizes women in terms of restrictions on land ownership; lack of access to labor-especially those from female-headed households who are assumed to have fewer men and have limited financial resources to hire non-family labor; disparities in access to finance and modern technology inputs (Quisumbing & Pandolfelli, 2010). Women have poor access to markets and trade networks that are similar to men (Hill & Vigneri, 2009; Combaz, 2013). They engage less in value addition; are more vulnerable to exploitative trading practices and have weak bargaining positions with buyers (Jones et al., 2012; Rubin & Manfre, 2014). In addition, majority of the women and girls are not active in decision making with regards to agribusiness. Most decisions especially those regarding when and how much agricultural produce should be sold are made by men (Alinyo & Leahy, 2012; FOWODE, 2012). Cultural-socio norms also limit women and girls to fully engage in agribusiness. This is evident from the common perception that women are entitled to feeding the family and therefore should be involved in subsistence agriculture while on the other hand; men are responsible for providing income making them more liable to agribusiness (Jones et al., 2012; Fischer & Qaim, 2012; Nelson, 2013).

From literature, it is argued that the increasing rates of poverty and gender inequalities are due to inadequate participation of women in income generating opportunities. Therefore, improving the economic status of women and girls depends on creating opportunities in sectors where women have a competitive advantage and as such, the agribusiness sector serves to fulfill this potential (Sagagi & Palina, 2013; FAO, 2017). Many women and girls primarily involved in subsistence production have the potential of becoming more entrepreneurial within the agricultural sector and also expand their agribusinesses into more lucrative value chain nodes of the agribusiness sector. Addressing barriers limiting women and girls to successfully engage in the agribusiness sector is crucial if the sector is to contribute to development and poverty

reduction (FOWODE, 2012; Hill & Vigneri, 2009). Closing such gender gaps would translate into welfare improvement for many women and girls most specifically in rural areas where majority are largely trapped in poverty and are highly vulnerable to food insecurity and low agricultural productivity levels. Enhancing agribusiness economic opportunities of rural women and girls positively impacts on their employment and wages for those employed in various agriculture value chains (FAO, 2011).

Through agribusiness, women are able to produce and process their agricultural output; contribute to sustainability in agricultural production; and are in position of making a living for themselves in addition to raising income for their families; especially those coming from female-headed households (White et al., 2015; Bryant & Miller, 2016). According to White et al. (2015), enhancing women's abilities within the agribusiness sector is closely linked to improved productivity and product quality; reduced management and coordination costs and also essential in building stronger product brands and widening access to premium markets. In addition, Sagagi and Palina (2013) confirm that women's active involvement in agribusiness increases their power and status within their communities and is also positively correlated with their quality and quantity of food produced.

Mitigating gender inequalities in the agribusiness sector would further result in broader social and economic benefits. This is because when women have increased control over income from agribusiness, they are in position to influence vital economic decisions regarding consumption, investment and production. With greater bargaining power over economic decisions among women, empirical literature indicates that families from which these women come from are able to allocate more income to education, health, food and on their children's nutrition (Maertens & Verhofstadt, 2013; FAO, 2011; Duflo, 2012). This implies a positive impact on the long-run human capital formation and an overall improvement in economic growth.

Agribusiness Sector Composition

The structure of Uganda's agribusiness sector reflects the overall agricultural production plus all the industries and services that are involved supply chain activities from production all through to processing, and wholesaling/retailing to the final consumers. The sector constitutes agricultural input suppliers, agro-processors, traders, exporters and retailers. Activities within

Uganda's agribusiness sector are decomposed into; the supply of agri-inputs; agricultural production; processing; marketing and distribution of agricultural products to retail outlets and final consumers.

The agribusiness component of farm inputs encompasses the supply of agricultural chemical inputs like pesticides, insecticide, herbicides and fertilizers; agricultural machinery and equipment like irrigation systems; improved planting seeds; and also the supply of agricultural credit and extension services to farmers. These inputs are mainly used to increase agricultural productivity. However, most of them are imported from abroad mainly from United Arab Emirates, China and India hence making them very expensive and almost inaccessible to farmers' specifically small holders (SARC, 2016). In addition, most of the agricultural inputs on market are characterized by a low quality mainly because of a number of suppliers offering counterfeit inputs.

The supply of agri-inputs is directly linked to the agricultural production component where an efficient supply of agricultural inputs is vital for improved farm-level production and productivity (Babu et al., 2016; Yumkella, 2011). Agricultural production in Uganda is divided into crop and livestock sub-sectors with the crop sub-sector further categorized into cash and foods crops. Cash crops are further divided into traditional crops like coffee, tea, tobacco, cotton and non-traditional cash crops including; sugarcane, vanilla, cocoa, oil palm and horticultural products (UBOS, 2015). Production is mainly at subsistence level with a few farmers engaged in commercialized agriculture. Noteworthy, commercial farming in crops is not only limited to cash crops but also on food crops like; bananas, maize, beans, groundnuts, cassava, sweet potatoes, millet, and sorghum which are frequently marketed to a considerable extent (World Bank, 2011).

Processing of agricultural products is another component within Uganda's agribusiness sector. This component presents forward and backward linkages between the agriculture and industry sector and also offers non-farm employment opportunities by employing surplus labor from the agricultural sector. It is through this component that agriculture acts as a catalyst to industrialization through increased food production, continuous supply of raw materials and provision of capital flow, and expanded market for the manufacturing industry (Tersoo, 2014; Yumkella, 2011). Existing literature argues that this segment of agribusiness has a great

potential to improve economic development within most of the agrarian African economies (Tersoo, 2014; Babu et al., 2016).

The processing segment of agribusiness entails the supply of agricultural inputs to firms within the agro-industry, which then engage in the processing/value addition through cooling, drying, extracting and packaging of agricultural products using improved technology in order to differentiate the final product from its original raw form. This segment of agribusiness consists of six groups as per the International Standard Industrial Classification (ISIC). These include; food and beverage; textile; paper and wood products; tobacco products; footwear and apparel; rubber products; and leather products. The food and beverage processing industries tend to dominate this component of the agribusiness sector and they are mainly characterized by the prevalence of small and medium scale firms with a few operating on a large scale. Examples of such firms include; manufacturers of drinks like fruit juice and coffee drinks; Tea processors; livestock processors like meat processing and dairy firms; firms engaging in food processing and packaging; fishing companies; coffee hauling firms; maize and rice milling firms.

Uganda's agribusiness sector also encompasses the marketing and distribution component. This segment is mainly involved with connecting individuals and firms engaged in agricultural production and processing to markets. It covers a whole range of supply chain activities including, the transportation of agricultural products; storage of produce through warehousing; and also the distribution and retailing of agricultural inputs.

There are two main marketing channels through which agricultural commodities are traded. First, direct sales where majority of farmers especially, those who cannot afford transport costs sell their agricultural output directly in the nearby markets or by the road side and most of the times from their gardens or households "*farm gate selling*" to those who approach them at home. The second channel is through agents or representatives "*the middlemen*" who directly sale to wholesale traders or retailers. These agents are engaged in buying and selling; coordinating; promoting; advertising; and even lobbying for agricultural products (Gandhi, 2014). This approach is common because a large proportion of those involved in agricultural production reside in rural remote areas where they are detached from potential consumers specifically those in urban areas. Some of the agricultural products are traded in markets across the Ugandan borders. From literature, it has been noted that wholesale traders play a major role

in intra and inter regional trade of agricultural products. They trade with retailers, final consumers and even sell to other wholesale traders.

Key Stakeholders in Uganda's Agribusiness sector

There are a number of stakeholders in Uganda who are involved in supporting the agribusiness value chain activities. These include; the private sector, government, Non-governmental organizations, and inter regional organizations. The concerted effort of all these stakeholders is fundamental in enhancing a competitive agribusiness sector and removing any bottlenecks to growth in this sector.

The private sector

The private sector which is composed of both domestic and foreign oriented companies plays a major role in the supply of inputs, processing and marketing value chain segments of agribusiness. Through provision of agricultural input supplies and credit facilities, the private sector is critical in expanding operations within the agribusiness sector because it increases opportunities for high value production and processing of agricultural products. Agribusinesses within the private sector domain work extensively with small-holder farmers who continuously provide then with raw agricultural inputs for further processing or value addition. This presents an opportunity to small holder farmers to enhance their productive economic capacities and also creates linkages to assured markets for their output.

In addition, the private sector is essential in the provision of extension services where relevant information on processing, marketing, agricultural and livestock production is exchanged with an aim of ensuring access to quality raw agricultural output. Such information allows accelerated technology transfer and capital flow. The information exchange may include; improved production methods; marketing information on prices and points of sale; and demonstration of innovations tailored to improve overall production.

Furthermore, the private sector plays a key role in agribusiness research essential for quality improvement of agricultural products at all value chains. This is done through funding research and development initiatives in the agribusiness sector. It also offers capacity building which may be in form of training and consultative services. This is critical for skills enhancement for

individuals engaging in different agribusiness value chains. Additionally, through the establishment of agro-based industries composed of various agri-business enterprises, the private sector offers better employment opportunities than those existing within the confines of traditional agriculture. From literature, it is noted that women benefit much more from such opportunities as compared to men (FAO, 2011; Combaz, 2013).

Non- Governmental and inter-regional organizations

Non- Governmental and inter-regional organizations are also key stake holders within Uganda's agribusiness sector. These provide technical support across different value chains of the agribusiness sector. More specifically, they offer financial support geared towards action research within the sector; play a major role in skills development for effective engagement in agribusiness through provision of training; and also create more evidence based awareness about the potential benefits of the agribusiness sector through ensuring knowledge and material agility for agribusiness research and development. Examples of inter-regional organizations within Uganda's agribusiness sector include; the Comprehensive Africa Agriculture Development Programme (CAADP) which emphasizes the fundamental role of agribusiness development in order to spur economic growth. The CAADP operationalizes through its agribusiness strategy and Flagship Programme which is the New Partnership for Africa's Development (NEPAD). NEPAD's agribusiness strategy has a main objective of developing a robust agribusiness sector as a means to creating a dynamic agribusiness sector that promotes employment growth and value addition in African agricultural production, (CAADP, 2012).

Some of the NGOs supporting the agribusiness sector in Uganda include; aBi Trust whose main strategy is to support market driven agribusiness enterprises dealing in maize, pulses, coffee, oil seeds, horticulture and dairy products; and the International Centre for Tropical Agriculture (CIAT) which aims at developing improved strategies to link agricultural producers to growth markets such as provision of training in market chain analysis.

The public sector

The government is another key stakeholder within the agribusiness sector. Through its different agencies and ministries, it has three major roles in advancing agribusiness including; provision of advisory services, ensuring an enabling environment for all activities in the agribusiness

sector, and regulation. Through the National Agricultural Advisory Services Organization (NAADS), the government of Uganda offers extension services mainly to rural poor farmers in order to address challenges and attain profitable agricultural production by ensuring access to agricultural information, knowledge and improved technology. Furthermore, the government is responsible for providing a stable and an enabling business environment that responds to the needs of all actors involved in various agribusiness value chains. For example an environment that encourages agribusiness investments, skills development, technological improvement, and overall, support the development and coordination of value chains within the agribusiness sector.

Such an enabling environment for the agribusiness sector entails government's provision of physical infrastructural facilities like good roads and electricity which mainly serve as a link to markets; provision of affordable loans/credits and subsidies to agribusiness value chain actors; and setting up bodies, organizations or schemes which support agribusinesses. For example, the Uganda Coffee Marketing board and the Commodity Based Approach which addresses the supply side constraints where the government through MAAIF has invested in mainly eleven priority commodities including; maize, beans, cassava, rice, coffee, tea, fish, market fruits (like pineapples, citrus and apples), and vegetables to ensure increased agricultural production and productivity (MoFPED, 2014). Research shows that an enabling business environment created by the government triggers opportunities for agribusiness growth by aiding higher productivity in all value chains of the agribusiness sector (White et al., 2015).

In addition, the government has a fundamental role of formulating and regulating policies that ensure maximum benefits from the agribusiness sector to all its stakeholders. Consequently, the government of Uganda has pursued various policies, strategies and programs in a bid to help strengthen the agribusiness sector and also sustain growth in the agricultural sector which anchors the Ugandan economy. These include; the National Agricultural Policy which is the overall national policy document for the entire agricultural sector and it focuses on enhancing sustainable agricultural productivity; promoting specialization in strategic, profitable and viable agribusinesses through value addition; providing employment opportunities across different agriculture value chains, and promoting domestic, regional and international trade in agricultural commodities. This policy document is implemented through a number of strategies

by the government -including; the Agriculture Sector Strategic Plan (2016) through which the government promotes agribusiness enterprises while focusing on improving access to agricultural markets and value addition. This objective is achieved by encouraging private sector investment in value addition through public-private partnerships and building capacities of agricultural producers, traders and processors in quality standards and market requirements of a few selected agricultural commodities.

In addition, the government relies on its other strategies like the Plan for Modernization of Agriculture (PMA), the Rural Development Strategy (RDS), Operation Wealth Creation (OWC), and the Agriculture Technology & Agribusiness Advisory Services (ATAAS) to enhance its agribusiness sector. The main objectives of these strategies include; developing agricultural research and technology, provision of agricultural advisory services, promoting agricultural education through various academic institutions, provision of rural financial services, and supporting agro-processing and agribusiness marketing linkages. Other agribusiness policy initiatives by the government include, the National Land Policy (2013) whose third vision attribute aims at reducing poverty and ensuring food security for a large proportion (65 percent) of peasant farmers by shifting them from subsistence into commercial agriculture while relying on land as a major input; the National Industrial Policy (2008) which aims at transforming Uganda into a modern and industrial country while focusing on value addition of agricultural products and also increasing exports of higher value products from agriculture; and the Trade Policy which recognizes agriculture as significant component of the economy with regards to its contribution and performance in trade. The trade policy aims at developing and nurturing private sector competitiveness, and supporting productive sectors of the economy including the agribusiness sector to trade in international and local markets.

However, it is worthy to note that many of the policies and strategies designed and implemented by the government exhibit gaps. More specifically, there exists inadequate policy measures aimed at addressing gender-specific challenges in the agribusiness sector. In this regard, most of the policies designed tend to exclude women and girls which limit their efficiency in the sector. For example, the land policy which excludes women and girls from owning land, a key factor of production within the agribusiness sector. Olomola (2013) argues that when the land tenure system limits women and girls who are mainly engaged in farming, then further negative

implications set in; such as: limited access to formal credit by women and lack of incentives to invest in land quality maintenance and improvement. Furthermore, there is no appropriate participation framework with regards to making the relevant agribusiness policy decisions. Gaps do exist in terms of those involved in decision making with women being under-represented possibly due to low literacy rates among women (Mckenna, 2014). Additionally, the linkages between government's agribusiness institutions involved in policy making and agribusiness value chain actors/stakeholders are weak hence limiting full implementation of relevant policies or strategies. For example: the Marketing and Agro-processing strategy (MAPS) which was drafted but failed at implementation (FAO, 2013).

Drivers of Agribusiness Sector Growth

The potential for the agribusiness sector to support growth in Uganda has not yet been fully exploited. Therefore, in order to substantially capture the benefits of the agribusiness sector and capitalize on them for sustainable growth, the sector's capacity must be strengthened. This requires building a combination of factors for harnessing the potential of the agribusiness sector into a competitive and dynamic one. A resilient agribusiness sector is closely linked to propelling factors such as; the quality of human capital; research and development; policy environment; public-private partnership; the nature of business climate; and well-functioning agribusiness markets.

The quality of human capital

The effectiveness and growth of the agribusiness sector is to a great extent influenced by the quality of human capital (Babu et al., 2016; Ikenwa et al., 2017; Odongo et al., 2017). In this case, quality of human capital entails the nature of education, training and an overall set of different skills development that corresponds to the needs of the agribusiness sector. Babu et al. (2016) argue that developing human capital necessary for the agribusiness sector growth requires combining traditional agribusiness education with practical applied training. This ensures increased efficiency and labor productivity of the agribusiness sector. In addition, they note that education institutions must be responsive to the ever changing agribusiness environment. The World Bank (2013) highlights that agribusiness enterprises need sufficiently

and appropriately trained human capital in order to spur growth and competitiveness of the agribusiness sector both at regional and international markets.

Skills development is also essential for agribusiness sector growth because with right skills, agribusiness stakeholders are able to meet standards that enable them to compete on domestic and international markets (Salami et al., 2010). Skills that match the demands of the agribusiness sector may entail technical skills of agricultural production, processing and marketing; managerial and entrepreneurial skills as well as soft skills like leadership, communication, organizational capabilities, and the ability to learn and adapt quickly (Eicher, 2012; Mabaya et al., 2010). These skills are mostly important to small holder farmers in expanding their agribusiness enterprises (Babu et al., 2016).

Presently in Uganda, education and training programs primarily focus on agricultural production and productivity with little attention given to other components of the agribusiness sector such as the marketing and processing components. In addition, there exists a low level of education, especially among female farmers which limits their ability to adopt existing technologies and management practices required for improved agribusiness practices. Babu et al. (2016) argue that low levels of education in Uganda among farmers limit their ability to comply with international agricultural standards of exports. This underscores the quality and dependability of agribusiness enterprises on market and also renders Uganda uncompetitive with other nations. Further gaps do exist in terms of partnerships between agribusiness departments of academic institutions and agribusiness enterprises at large. Absence of such partnerships or interactions renders the agribusiness curricula irrelevant and also widens the gaps between the demand and supply of skills in agribusiness sector (Babu et al., 2016). Education or training programs in agribusiness have continuously been underfunded. The government of Uganda has not accorded the agribusiness sector enough priority as may be evident from the decreasing budget allocations towards the agricultural sector.

Research and Development

Research and development is of critical importance to advancing productivity gains in the agribusiness sector which is essential if the sector is to remain competitive. Research and development encourages innovative capabilities within the agribusiness sector. Such

innovative capabilities are essential for advancing the technological frontiers of the agribusiness sector (Salami et al., 2010; AFDB, 2016; World Bank, 2011). For example, agricultural related technologies which may involve the transformation of agricultural materials like agricultural chemicals, seed varieties and other inputs into final outputs (IFC, 2018). Furthermore, research related to agribusiness permits the collection, store and expansion of relevant technical information like data on agricultural prices, available markets and improved agribusiness practices. Such information facilitates skill enhancement and knowledge transfers which may be beneficial in integrating small holder farmers to agribusiness value chains that offer higher prices for their output and in general enhance their productivity growth (Hilary et al., 2017). Knowledge transfers may encourage increased up take of the latest technological advancements by different agribusiness stakeholders. Moreover, information from research may be used by policy makers and other agribusiness stakeholders as a tool to benchmark the performance and adapt to best practices in the agribusiness sector and draw insights on how to further boost growth in the sector.

Despite its importance, research and development targeting the agribusiness sector has remained low in Uganda. This may be partly explained by inadequate funding sources required to develop vibrant research and development systems. Most of the existing agribusiness research institutions face financial deficits and therefore lack the capacity to formulate and drive their own research agendas (Otieno & Obamba, 2013). In addition, agribusiness related research by the government of Uganda has continuously been underfunded as it is evident from only 2 percent of the national budget and less than 10 percent of GDP allocated to agricultural research funding (CSBAG, 2014). Furthermore, there is a poor linkage between agribusiness research institutions and other stakeholders within the agribusiness value chains. This undermines knowledge exchange between various key players in the agribusiness sector especially the farmers thus making it difficult in ensuring sustainable productivity growth within the sector.

The nature of business environment

A favorable business environment is conducive for agribusiness sector growth. It provides incentives for various stakeholders engaged in agribusiness by easing the cost of doing business and also creates more economic opportunities within the sector (White et al., 2015; World

Bank, 2011; Yumkella, 2011). Such a favorable environment relates to; better infrastructure in form of good roads connecting remote rural areas to all other areas, reliable electricity, water supply, accessible warehouses or stores, and better processing and marketing facilities (FAO, 2013). It also entails available and accessible information and communication technologies; accessible and affordable financial markets; and sound macro-economic policies, specifically those targeting tax systems.

Though some progress has been made, Uganda's business environment still lies behind that of many other low income countries (Salami et al., 2010; FAO, 2013). This gap has constrained the competitiveness of Uganda's agribusiness sector. Many agribusiness enterprises face high transaction costs due to a weak business environment. For example, poor road infrastructure especially in rural areas inhibits progress for market access and other trade related activities among value chain actors in the agribusiness sector because it results in higher transport costs of getting agricultural output to markets. Unreliable electricity connections also act as obstacles in the production process of many firms within the agribusiness sector. In addition, financial and rural credit market institutions are weak and under developed, and almost inaccessible especially to the small holder farmers.

Existence of well-agribusiness markets

Agribusiness sector growth is to a great extent driven by the availability and accessibility of well-functioning markets that meet the needs of all agribusiness value chain actors (Kyomugisha et al., 2017; Devaux et al., 2009). The World Bank (2011) argues that efficient agribusiness markets should be in position of connecting farmers to input and output markets, and also enhance further linkages to better economic opportunities. These markets should be supported by an efficient flow of information and infrastructure development. Agribusiness market information should be up to date in order to reduce the risk in decision making for all agribusiness stakeholders. Through such markets, agribusiness firms should be able to locate and also be in position of knowing what consumers need and want. Likewise, such information is vital for farmers in negotiating with traders especially on prices of their products. Efficient infrastructure development for agribusiness markets may include storage facilities which are essential for minimizing post-harvest losses by ensuring improved stock and quality of agricultural output. In addition, improved transport infrastructure is also critical in efficient

agribusiness marketing. This should entail timeliness and cost minimization while allowing a smooth and uninterrupted flow of agribusiness products into the markets. Efficient agribusiness markets entails enhancing the capacity of farmers, traders and agribusiness processors in ensuring compliance to quality standards and market requirements.

Uganda's agribusiness marketing systems comprise of private enterprises and marketing boards. Marketing boards are mainly government agencies which serve the function of ensuring efficient and orderly markets. Major marketing challenges faced include poor prices for agricultural commodities, high post-harvest losses because of lack of storage facilities leading to smaller volumes and low quality supply of agricultural output; and lack of appropriate transport infrastructure because of the poor road networks mostly in rural areas which limit integration of markets and also results in high transportation costs (Mayanja et al., 2012; Kyomugisha et al., 2017). Furthermore, capacity gaps do exist especially, at the production level and also among supply chain agribusiness actors (Kaganzi et al., 2009; Mayanja et al., 2012). These may include the inability to gather and respond to market information and also lack of capacity among stakeholders involved in the agribusiness supply chain to identify opportunities for growth on the local, regional and global markets. This results in reduced profit margins especially among small-scale agribusiness enterprises. According to the World Bank (2011), agribusiness actors majorly those in the supply chain like the suppliers of agricultural inputs and buyers of produce often know little about small-holder farmers and vice versa.

Policy environment and institutions

A favorable policy environment provided by the government through its various agencies can create conditions for exponentially transforming or driving growth in the agribusiness sector (White et al., 2015; World Bank, 2011). This should entail agribusiness support policy institutions that have the capacity of integrating agribusiness stakeholders in all the value chains with an aim of achieving growth in the sector. For example, such institutions may involve policies that strengthen the linkages and coordination between farmers and enterprises offering agricultural inputs or even market for their output. In addition, policy institutions must provide subsidies and incentives for investing in the agribusiness sector, such as tax holidays and reduced import duties on agribusiness inputs (Ikenwa et al., 2017). Agribusiness policy institutions should be in position of identifying agribusiness development gaps and

opportunities. A favorable policy environment should call for a participatory process in order to encourage agribusiness stakeholders' participation in policy formulation and implementation while targeting growth in the sector. Likewise, a favorable policy environment for agribusiness sector growth should be one with clear and transparent guidelines which are easily understood by all agribusiness stakeholders.

It is argued in literature that the low performance of the agribusiness sector in Uganda is partly attributed to low institutional capacities for policy implementation and lack of a coherent policy framework for the agribusiness sector (Tersoo, 2014). This has either resulted in policy uncertainties or failure of major agribusiness development policies and strategies; for example, the Marketing and Agro-processing strategy (MAPS). A policy environment characterized by excessive bureaucracy restricts functioning of agribusiness enterprises.

Public- private partnerships

Public-private partnerships that bring together agribusiness enterprises, government, farmers and the civil society are a key driver for effective and sustainable agribusiness sector growth (Hall, 2007; Mutebi et al., 2018; Narrod et al., 2009). Such partnerships are used as mechanisms for mitigating risks involved in doing agribusinesses as well as pooling financial resources required for sustainable growth in the agribusiness sector. The public sector through its various policies and programs has a major role to play in shaping the environment and enhancing growth prospects for private sector agribusiness investment. Likewise, given the resource constraints faced by the government of Uganda, the private sector equally has a role to play in financing agribusiness investments in the country. Public-private partnerships are critical for improved profits and enhancing the competitiveness of the agribusiness sector at both local and international markets (FAO, 2013). This is because such collaborations support the growth and effectiveness of other agribusiness enabling factors such as agribusiness research and development, human capacity enhancement, adoption of quality technology, and may also help fill the gaps in agribusiness market infrastructure. In addition, synergies between the public-private sectors ensure efficient resource mobilization and allocation for investment in infrastructure and services deemed appropriate in boosting agribusiness sector growth. Furthermore, public-private partnerships in the agribusiness sector encourage more robust

policies and effective implementation which are vital for achieving growth in the sector (World Bank, 2011).

Conclusion

The agricultural sector remains fundamental for economic growth and poverty alleviation. It employs a large share of labor force in Uganda and therefore reviving growth in this sector is a prerequisite for achieving sustainable and inclusive growth. This calls for the transformation of small-holder farmers into viable commercial producers in order to achieve a high and sustainable increase in agricultural productivity. A successful transformation of the agricultural sector requires embracing agribusiness investments which from literature are seen to stimulate agricultural growth by providing new or expanding already existing markets for agricultural output and also offer improved agricultural inputs. A supportive agribusiness sector necessitates; first, the development of upstream activities like the supply of agricultural inputs; second, reinforcement of commercial farmers; third, development of downstream agribusiness activities such as value addition through agricultural processing; and lastly, supporting and integrating small-holder farmers and enterprises to productive and dynamic agribusiness value chains.

While promoting agribusiness sector growth, particular attention should be put on rural communities and small-holder farmers specifically, women and girls. These make up the largest proportion of the agricultural labor force yet majority are more vulnerable to poverty and hunger. Most of the women and girls in rural areas are economically and socially oppressed with very few opportunities for income generation to create sustainable livelihoods. Majority of them either operate on small pieces of land while engaging in production for own consumption or contribute as family workers without pay. Detrimental factors hindering women and girls involvement in agribusiness or market-oriented agriculture have been identified as but not limited to; insufficient access to knowledge, information and education, limited access to land, inadequate access to credit, and limited access to agricultural markets. Therefore, in order to enhance economic opportunities for women and girls in agribusiness, it is critical to identify strategies needed combat the aforementioned challenges.

Unfortunately, it is so striking that little research and policy attention has been directed towards women and girls in agribusiness. Capacity gaps among women and girls in Uganda's agribusiness sector remain unexplored. Therefore, effort is needed in identifying strategies of enhancing skills among women and girls that match the needs of the agribusiness sector. Strengthening agribusiness skills among women and girls involved in agriculture is envisioned to improve their ability of engaging in more lucrative and emerging agricultural markets.

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Annex 3: Baseline survey instrument.

CENTER FOR BASIC RESEARCH KAMPALA UGANDA
ENHANCING AGRIBUSINESS ECONOMICS OPPORTUNITIES OF RURAL WOMEN AND YOUTHS IN UGANDA
BASELINE QUESTIONNAIRE

Questionnaire Number |_ _|__|__|__|

IDENTIFICATION Code				
1	**District**			
2	**Sub-county**			
3	**Parish**			
4	**Village**			
5	**Household Number**			**|__|__|__|**
6	**Date of Interview**	**dd**	**Mm**	**yyyy**
7	**Time of interview**	**First visit Start: |_|_| : |_|_|**	**First visit End: |_|_| : |_|_|**	**Second visit Start |_|_| : |_|_| Second Visit End|_|_| : |_|_|**

Objective
The general objective of the study is to contribute to improving the technical capacity and economic status of vulnerable women and youth in rural areas by enhancing their opportunities for employment in agribusiness. The specific objectives are:- Examine agribusiness sector growth and its drivers, sectoral composition, policy environment, value chain and linkages with other sectors, and contribution to the economy; Identify, characterise and determine the potential and challenges of small scale agribusiness sector to generate productive employment for the women and youth; Build and enhance capacity of rural women and young entrepreneurs to sustain economic activities and find employment through villages skills development and apprenticeship training programs; and Identify and document innovative best practices that favor women and youths, recommend practical policy relevant results and directions on how to support and scale-up agribusiness development in Africa.

8. Enumerator's Name_____Signature_____Date_____

9. Supervisor's Name_____Signature_____Date_____

10. Verified by_____Signature_____Date_____

11. Data Entry Clerk_____Signature_____Date_____

CURRENT HOUSEHOLD DEMOGRAPHICS AND EDUCATION

Please tell me about all the people who normally live in this household, including both family members and non-family members such as residing servants. Start with yourself, then the head of the household (if it is not you), spouse and their children, then other family members and non-family members.

ID Code	1 Name	2 What is the relationship of [NAME] to the head? Code (a)	3 What is his/her age in years (and months if the child is under the age of 5)?		4 What is his/her sex? 1 Male 2 Female	5 Marital status Code (b) SKIP if AGE <7	6 Current primary occupation Code (c) SKIP if AGE <7	7 In what year did [NAME] enroll in school? SKIP if AGE >18 If never attended, write 99))	8 What year did [NAME] stop attending school? SKIP if AGE >18 Write 99 if currently enrolled.	9 Do you have to take [NAME] out of school at certain times of the year to help with farm activities or other household responsibilities? SKIP if AGE >18 If YES, for how many weeks per year. (Ignore school breaks.) If NO, write 0	10 Ask for all: What is the highest education or grade of schooling completed by [NAME] (so far)? If currently enrolled students, record highest grade completed, not current grade level. Code (d)	11 How many months has [NAME] been away from the household in the past 12 months? If none, write 0.
			YEAR	MONTH								
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

CODES FOR: CURRENT HOUSEHOLD DEMOGRAPHICS AND EDUCATION

Code (a), Relationship to Head		Code (b), Marital status		Code (c), Occupation		Code (d), Highest grade obtained
1 Head		1 Married, Single Spouse		1 Farmer or family farm worker		0 Did not complete any schooling
2 Head's Wife/ Partner		2 Married, More than one spouse		2 Herding		1 Some primary education
3 Head's Husband/Partner		3 Divorced		3 Manual worker (not in a factory)		2 Completed primary education
4 Son		4 Widowed		4 Manual factory worker		3 Some Ordinary Level Education
5 Daughter		5 Not together for any reason other than divorce or death		5 Skilled factory worker		4 Completed Ordinary Level Education
6 Father		6 Single				5 Some Advanced Level Education
7 Mother						6 Completed Advanced Level Education
8 Brother				6 Domestic work (Could be done by the domestic servant, or other not necessarily by the spouse or housewife)		7 Incomplete university education
9 Sister				7 Housewife (Spouse)		8 Completed university education (degree)
10 Niece				8 Tailor		9 Complete postgraduate education
11 Nephew				9 Weaver/Thatcher		8 Incomplete higher education (not university) including certificate
12 Uncle				10 Crafts worker/Potter		9 Completed higher education (not university) including certificate
13 Aunt				11 Blacksmith/mason		10 Adult literacy program participation only
14 Son -in-law				12 Food seller		11 Other literacy program only
15 Daughter-in-law				13 Trader		12 Some Church/Mosque School
16 Father-in-law				14 Driver/Mechanic		13 Other
17 Mother-in-law				15 Guard		
18 Brother -in-law				16 Teacher		
19 Sister-in-law				17 Health worker		
20 Grandfather				18 Part Official / Administrator / Clerical		
21 Grandmother				19 Civil servant		
22 Step son				20 Soldier/Policeman		

23 Step Daughter				21 Disabled		
24 Other relative of head or of his/her				22 Agribusiness		
25 Servant (farm worker, herder, maid,						
26 Other unrelated person						

HOUSING QUALITY

12. What materials have been used to construct the roof of the main house?	1. Thatched roof 2. Iron Sheets 3. Mud/sand/stone, etc 4. Plastic sheeting	
13. What materials have been used to construct the floor of the main house?	1. Earth 2. Cow dung or cow dung mixed with soil 3. Concrete/stone/cement 4. Tile/bricks	
14. What materials have been used to construct the walls?	1. Earth 2. Cow dung or cow dung mixed with soil 3. Concrete/stone/cement 4. Tile/bricks	
15. In the last one year, how much (UGX) did you spend on building a new house or improving your house and other buildings? (put zero if no improvements, put approximate value if labor or in kind investment)		
16. Does the house have access to electricity?	1=Yes 2=No	
17. What is the main drinking water source for this household? Record up to three sources if any	1. Piped water private 2. Piped water in common 3. Ground waster 4. Protected Spring 5. Unprotected spring 6. River water 7. Lake/pond 8 Other (Specify)	

18. What type of toilet facility does the household use?	1=Pit latrine (Private) 2=Pit latrine (Shared) 3=Flash toilet (Private) 4=Flash toilet (Shared) 5=Field/Forest 6=Containers (Household utensils) 7=Other (specify)	
19. Total number of rooms in the house		
20.Total number of outbuildings including kitchens but not including toilets		

FAMILY HISTORY

21. Were YOU born in this village? 1 YES 2 NO If YES, to Q.25				
22. If no, where were YOU born? (Code a)				
23. If YOU were not born in Village, how (or why) did you come to this village? (Code b)				
24. In what year did YOU move to this Village?				
25. In what Ugandan languages can YOU speak? That is, able to conduct transactions with others in this language. Allow up to four responses but list the most commonly used language first, second most used next, and so on (Code c)				
26. What is YOUR religion? (Code d)				
27. Do YOU belong to any organization in the Village? 1 YES 2 NO (If NO, SKIP to Q29.)				
28. In which organization do YOU belong? (Code e, Allow for up to four responses.)				
29. Is YOUR father still alive? 1 YES 2 Died 3 Do not know				
30. What is/was the highest level of education attained by YOUR father? (code f)				
31. What is/was the main occupation of your father? (code g)				
32. Does or did YOUR father belong to any organization in this Village? 1 YES 2 NO 3. Don't know				
33. In which organization did or does he belong? (Code e, Allow for up to four responses.)				
34. Is YOUR mother still alive? 1 YES 2 Died 3 Do not know				

35. What is/was the highest level of education attained by YOUR mother? (code f)	
36. What is/was the main occupation of your mother? (code g)	
37. Does or did YOUR mother belong to any organization in this Village? 1 YES 2 NO 3. Don't know	
38. In which organization did or does she belong? (Code e, Allow for up to four responses.)	
39. How many brothers do YOU have that are still alive? By brother, I mean only children born to either your father or mother or both.	
40. How many sisters do YOU have that are still alive? By sister, I mean only children born to either your father or mother or both.	
41. How many of YOUR family members, including extended families up to cousins uncles, aunts live in this Village (not including those in your household)?	
42. How many of YOUR family members live in this village, not including those living in this Village?	

CODES FOR FAMILY HISTORY

Code (a), Place of birth	Code (c), Language spoken	Code (e), Which organization	Code (f), Highest grade obtained	Code (g), Occupation
1 Other Village, same district	1 Ateso	1 Agribusiness NGO	0 Did not complete any schooling	1 Agribusiness
2 Other district in Teso Sub-region	2 Kumam	2 Village farming group	1 Some primary education	2 Farmer or family farm worker
3 Other region	3 Luo	3 Local Village government	2 Completed primary education	3 Herding
4 Outside of Uganda	4 Swahili	4 Village Food Security Task Force	3 Some Ordinary Level Education	4 Manual worker (not in a factory)
	5 Luganda	5 Community Food Security Task 6orce	4 Completed Ordinary Level Education	5 Manual factory worker

	6 Lugwere	7 Other government office	5 Some Advanced Level Education	6 Skilled factory worker
	7 Karamajong	8 Church/Mosque	6 Completed Advanced Level Education	7 Domestic work
	8 Gishu	9 SACCO	7 Incomplete university education	8 Housewife
	9 Lunyole	10 Nigina / Merry go around	8 Completed university education	9 Tailor
	10 English	11 Other NGO	9 Complete postgraduate education	10 Weaver/Thatcher
	11 Lusoga	12 Other local organisation	8 Incomplete higher education (not university) including certificate	11 Crafts worker/Potter
	12 Kenye	13 Other	9 Completed higher education (not university) including certificate	12 Blacksmith/mason
	13 Other		10 Adult literacy program participation only	13 Food seller
Code (b), Reasons for coming to Village			11 Other literacy program only	14 Trader
1 Came to live with spouse			12 Some Church/Mosque School	15 Driver/Mechanic
2 To look for employment	Code (d), Religion		13 Other	16 Guard
3 To be near place of employment	0 None			17 Teacher
4 To work on farm or other enterprise	1 Orthodox Christian			18 Health worker
5 To engage in Agribusiness	2 Catholic			19 Part Official / Administrator / Clerical
6 To engage in farming	3 Muslim			20 Civil servant
7 To look after other relatives	4 Protestant			21 Soldier/Police personnel
8 Sick, came to be looked after	5 Born Again/Pentecostal			22 Disabled
9 Old, came to be looked after	6 Other Christian			23 Student
10 Returned from army	7Traditional			24 Looking for work
11 To live with relatives	8 Other			25 Not in labour force (not looking f
12 Resettlement				26 Other
12 Expelled from resettlement				
13 Other				

Business and Wage Labour (including farm labour) Activities

43 Are there any household members who earned cash or in-kind income from farm business, non-farm business and wage labour including farm wage casual labour in the last 12 months? 1=Yes 2=No (go to next section)

Person name	Person ID	Activity name	Biz Code	How many years of experience on this activity?	Where does this person work? Location Code	If Constant monthly wage earner		If he or she earns seasonal earnings/sales, classify each month's gross earnings/sales from farm or non-farm business or seasonal labour employment as: 0= No Earning/Sales Month 1= Low Gross Earning/Sales Month 2= High Gross Earning/Sales Month												Low gross earnings/sales month**		High gross earnings/sales month**	
						Number of months worked in the last 12 months	Monthly wage in Shs	2017				2018								Gross earnings/ sales per month	Cost* per month	Gross earnings/ sales per month	Cost* per month
Name	ID	B Name	BIZ	B1	B2	B3	B4	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	B5	B6	B7	B8

Biz Code (BIZ):
1= Wage earner
2= Farm labour
3= Farm Business
4= Bicycle repair/mechanic
5= Boda Boda
6= Brewing
7= Brick making
8= Butcher
9= Carpentry
10= Charcoal burning
11=Clothes business (trading)
12=Construction
13=Driver
14=General-kiosk owner
15= Miller
16= Trading Fish
17= Trading Livestock
18= Trading Firewood
19= Trading Timber
20= Trading non-food goods
21= Taylor
22= Transport business
23= Trading farm produce
24= Other (Specify)

Location codes (B2)
1=Within LC1
2=Within Sub-county but outside of LC1
3=Within District but outside of sub-county
4=Kampala
5=Mbale
6=Jinja
7=Iganga
8=Other District (specify)
9=Outside the country

* The average monthly cost, including only operational costs (fuel, goods, hiring labours, etc) but excluding fixed costs or capital.
** Ask for typical month.

Non-labour Income, Remittance, Credit (self-help, ROSCA, etc) and Food Aid* Received

44. Did you or any member of this household receive non labour income, remittance, or credit in the past 12 months?

1=Yes 2=No (skip to next section)

If Type = Remittance, different sources (senders) should be reported in different row.

Type	Major source? Code below	If z1=Relatives, what is the relationship with household head? Code below	If Type = Remittance			Main purpose? Code below	Amount per month (Ush) If it is in-kind, evaluate it at market cost at that time.											
			Where does the sender live? Code below	What is the sender's main job? Code Below	Main channel of the money transfer? Code below		Sep 17	Oct 17	Nov 17	Dec 17	Jan 18	Feb 18	Mar 18	Apr 18	May 18	Jun 18	Jul 18	Aug 18
Type	Z1	Z2	Z3	Z4	Z5	Z6	Z7a	Z7b	Z7c	Z7d	Z7e	Z7f	Z7g	Z7h	Z7i	Z7j	Z7k	Z7l
1. Rent (farm land)																		
2. Rent (housing, shops)																		
3. Pension																		
4. ROSCA savings																		
5. Credit (money)																		
6. Institutional Food Aid																		
7. Remittance (source1)																		
7. Remittance (source2)																		
7. Remittance (source3)																		
7. Remittance (source4)																		
7. Remittance (source5)																		

Source codes (Z1)
1= Commercial Bank
2= Micro finance Institutions
3= NGO
4= Local organization (communal)
5= Private organizations (individual)
6= Self-help group
7 = Government
8= Friends
9= Relatives
10= Money lender
11=Tenant
12=SACCO
13=Other (specify)

Relation codes (Z2)
1=Spouse
2=Parent
3=Child
4=Grand child
5=Nephew/Niece
6=Son/daughter-in-law
7=Brother/Sister
8=Wife 2
9=Wife 3
10=Other relative

Location codes (Z3)
1=Within LC1
2=Within Sub-county but outside of LC1
3=Within District but outside of sub-county
4=Kampala
5=Mbale
6=Jinja
7=Iganga
9=Other District (specify)
10=(Outside the country)

Channel codes (Z5)
1=Mobile phone transfer (Zap, etc)
2=Send a person
3=Visit the source
4=Bank transfer
5=Source comes
6=other (specify)

Code for Purpose (Z6)
1= School fee
2= Medical fee
3= Funeral
4= Wedding
5= Input purchases/repay for input credit (seeds, fertilizers, etc.)
6= To purchase land/use rights, or to pay land rents
7=Consumption
8=Other (Specify)

Biz Code (BIZ) Z4:
1= Wage earner
2= Farm labour
3= Farm Business
4= Bicycle repair/mechanic
5= Boda Boda
6= Brewing
7= Brick making
8= Butcher
9= Carpentry
10= Charcoal burning
11=Clothes business (trading)
12=Construction
13=Driver
14=General-kiosk owner
15= Miller
16= Trading Fish
17= Trading Livestock
18= Trading Firewood
19= Trading Timber
20= Trading non-food goods
21= Taylor
22= Transport business
23= Trading farm produce
24= Other (Specify)

45. Land Tenure of the Parcels Accessible by the Household (Last 12 months)
Make sure to include all the parcels owned/operated (owned-and-operated, owned-but-not-operated, and not-owned-but-operated parcels) by the HH.

Parcel ID	If currently no access to this parcel, why? Code below [Skip to the next row]	Size of this parcel in acres?	Any change in size since 2017? 1=Yes 2=No	If L3=Yes, why? Code below	Year of Acquisition?	Tenancy See code below	Walking time in minutes on foot from home-stead?	Currently, do you (as a HH) have the following documents? 1=Yes 2=No			Do you as a household have a right to Sell this parcel? See Code below	If you were to buy/rent-in this parcel without homestead,	
								Title or Certificate	Transaction agreement endorsed by Local Council	Transaction agreement without Local Council's endorsement		How much are you willing to pay to buy?	How much are you willing to pay to rent in per season?
PID	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Code for L6:

1= Ownership without title deed
2= Squatter
3= Tenant
4= Freehold ownership
5= Customary ownership
6= Leasehold

Code for L1&L4:

1= Sold land
2= Sold use rights
3= Bequeathed
4= Gave away as gift
5= Returned to the owner
6= Borrowed-out for a long-term
7= Lost due to disputes
8= Taken away by the government
9= Taken away by the land owner (incl. Freehold owner)
10= Purchased (bought)
11= Inherited
12= Other (specify)

Code for L11:

1= No right to sell
2= With approval from Head's parents
3= With approval from Spouse's parents
4= With approval from Head's other relatives
5= With approval from Spouse's other relatives
6= With approval from Freehold owner
7= With approval from Seller
8= Can sell land without approvals
9= With approval from clan members
10= With approval from all household members
11= Other (specify)

Crop production and agribusiness

46. Which crops do you normally grow? USE ONLY CROPS LISTED IN A5

READ OUT. ACCEPT MULTIPLE ANSWERS.	
Wheat	1
Rice, paddy	2
Maize	3
Millet	4
Sorghum	5
Fonio	6
Potatoes	7
Sweet potatoes	8
Cassava	9
Cocoyam	10
Yams	11
Sugar cane	12
Cow peas	13
Pulses	14
Beans	15
Soybeans	16
Groundnuts	17
Choroko (Green gram)	19
Palm Oil	20
Shea nuts	21
Sesame seed	22
Watermelon	23
Seed cotton	24
Tomatoes	26
Cabbage	29
Onions	30
Cashew nut	31
Banana	32
Cotton	33
Tobacco	34
Pyrethrum	35
Coffee	36
Citrus	37
Pepper	38
Other 1 (specify) _____	39
Other 2 (specify) _____	40
Other 3 (specify) _____	41
None	42

47. Which of these crops would you wish grow?

READ OUT. ACCEPT MULTIPLE ANSWERS.	
Wheat	1
Rice, paddy	2
Maize	3
Millet	4
Sorghum	5
Fonio	6
Potatoes	7
Sweet potatoes	8
Cassava	9
Cocoyam)	10
Yams	11
Sugar cane	12
Cow peas	13
Pulses	14
Beans	15
Soybeans	16
Groundnuts	17
Choroko (Green Gram)	19
Palm Oil	20
Shea nuts	21
Sesame seed	22
Watermelon	23
Seed cotton	24
Tomatoes	26
Cabbage	29
Onions	30
Cashew nut	31
Banana	32
Cotton	33
Tobacco	34
Pyrethrum	35
Coffee	36
Citrus	37
Pepper	38
Other 1 (specify) _____	39
Other 2 (specify) _____	40
Other 3 (specify) _____	41
None	42

48. For each crop identified in Q47, why didn't you grow it? (More than one alternative is acceptable)

1=No extension workers 2=Lack of agronomical skills 3=Limited land 4=Lack of market 5=Crop does not suit the soil characteristics 6=Low profitability 7=High input costs 8=Absence of seedling 9=Unfavorable climatic conditions 10=Other (specify)

49. For each crop identified in Q47 do you think training could be useful to enable you to grow the crop?
1=Yes 2=No.

50. If Yes, what kind of training would you wish to have

1=Agronomical skills 2=Marketing skills 3=Soft skills 4=Packaging skills 5=Processing skills 6=Accounting skills

7=other (specify)

51. For the crops identified in Q46, which ones are you growing for agribusiness?

Crop				

52. When did you start growing crops for agribusiness?

Crop				
Year				

53. Is the crop being grown for agribusiness the same as that when you started agribusiness?

1=Yes 2=No.

54. For the crops identified in Q46, which ones are you growing for food?

Crop				

55. What are the main challenges of undertaking agribusiness in soroti?

1=Lack of agronomical skills 2=Lack of marketing skills 3=Lack of soft skills 4=Lack of packaging skills 5=Lack of processing skills
6=Lack of accounting skills 7=Low profitability 8=High input costs 9=Shortage improved seed 10=Weather vagaries
11=Other (specify)

56a. Do you think that there are any opportunities for agribusiness in soroti?
1=YES 2=No

56b. Do you have any specific training in agri-business?
1=YES 2=NO

57. If yes in 56b, what kind of skills do you have?
1=Agronomical skills 2=Marketing skills 3=Soft skills 4=Packaging skills 5=Processing skills 6=Accounting skills
7=other (specify)

58. In which year did you undertake the skills training in agribusiness?

59. Where did you get these agribusiness skills from?

1=Government training institute 2=NGO training farm 3=Community based demonstration farm 4=Family 5=Friend
6=Other (specify)

60. Is your current agribusiness the same as that when you started?
1=YES 2=No

61. If No in Q60, why did you change?
1=Lack of agronomical skills 2=Lack of marketing skills 3=Lack of soft skills 4=Lack of packaging skills 5=Lack of processing skills
6=Lack of accounting skills 7=Low profitability 8=High input costs 9=Shortage improved seed 10=Lack of improved seed
11=Lack of market 12=Other (specify)

62. What is your source of seedling?
1=Operation Wealth Creation 2=Saved from previous harvest 3=Seedling shop 4=Some NGO 5=Other (specify)

63. Are you concerned about quality of seedling on the market?
1=YES 2=NO

64. If yes, would rather try another source?

1=Yes 2=No

65. Are you using fertilizers?
1=Yes 2=No

66. If no to Q64, why?

1=Not knowing how to use 2=Not profitable 3=Cannot afford to buy 4=Worried about quality sold by stockists 5=Soil is fertile enough
6=Fear that it would damage the soil structure 7=Other (specify)

67. In which year did you first use fertilizers in crop husbandry?

68. What is your source of fertilizer?

1=OWC 2=Saved from previous harvest 3=Fertilizer shop 4=Some NGO 5=Other (specify)

69. Is answer in Q.68 the same as that in Q.62?
1=YES 2=No.

70. If yes, what is the distance in kilometers to the nearest of fertilizer or seedling source?

71. What is the nature of the farming?
1= Individual 2= Contract farming 3= Joint family 4= Corporate farming 5=Other (specify)

Crop husbandry agronomical skill needs

72. For your main crop, are you concerned about the spacing between one crop to the other?
1=YES **2=NO**

73. If yes in Q.72, what is the approximate spacing between one crops to the other (in terms of feet)?

READ OUT. ACCEPT MULTIPLE ANSWERS.	Spacing
Wheat	
Rice, paddy	
Maize	
Millet	
Sorghum	
Fonio	
Potatoes	
Sweet potatoes	
Cassava	
Cocoyam)	
Yams	
Sugar cane	
Cow peas	
Pulses	
Beans	
Soybeans	
Groundnuts	
Choroko (Green Gram)	
Palm Oil	
Shea nuts	
Sesame seed	
Watermelon	
Seed cotton	
Tomatoes	
Cabbage	
Onions	
Cashew nut	
Banana	
Cotton	
Tobacco	
Pyrethrum	
Coffee	
Citrus	
Pepper	
Other 1 (specify) _____	
Other 2 (specify) _____	
Other 3 (specify) _____	
None	

74. How do you determine the spacing between one crop to the other?
1=Standard spacing 2=Extent of intercropping 3=Land size 4= Crop variety 5=Other(Specify)

75. Are you concerned about the actual beginning of a planting season? (If no, go to Q.78)
1=Yes 2=No

76. Why are you concerned about being late in planting?
1=Low yields 2=late market access 3= Risk of pests 4= Risk of weeds 5=Limited or no irrigation opportunity

77. How do you know the planting season has started?
1=Radio/Television 2=Relatives 3=Friends 4=Village farming group 5=Government farming institute 6=Actual observation of the rains 7=Other (specify)

78. If no, why are you not concerned about the beginning of the planting season?
1=Due to irrigation possibilities 2=Crop varieties are weather resistant 3= We plant throughout the year because our land is a wetland 4=Other (specify)

Weeding

79. Are you concerned about weeding? (If No, go to question 84)
1=Yes 2= No

80. Why are you concerned about weeding?
1=To improve crop yield 2=To have a clean farm 3= To avert pests risk 4=To preserve soil fertility 5= To preserve soil moisture 6= To eliminate competition between weeds and plants for nutrients

81. How do you engage in weeding?
1=Herbicides 2=Ploughing with hand hoe 3=Ploughing with a tractor 4=ploughing with oxen 5=slushing

82. What determines the weeding intervals?
1=Rainfall intensity 2=Land preparation 3=Fertility of the soils 4=whether the land swampy or dry

83. How many times do you typically weed per season?
Number of times per season…….

84. If No, why don't you engage in weeding?
1=It is not necessary 2=Have no information about its importance 3=Dry weather does not allow weeds to grow 4=Cold whether doesn't allow weeds to grow

85. Do you have any knowledge about herbicides? (If no, go to question 92)
1=YES 2=NO

86. If yes, do you have knowledge of the right type of herbicides to use?
1=YES 2=NO

87. How do you determine the nature of herbicide to use?
1=Disease type 2=stage of the crops 3=Soil type 4=Market specifications 7=Other (Specify)

88. What kind of herbicide are you aware of?
1=Biological 2=Insecticides 3=Rodenticides 4=Bactericides 5=Fungicides 6=Larvicides 7=Other (specify)

89. Do you have knowledge of how to make local herbicide? (If no, go to question 92)
1=YES 2=NO

90. Where did you get this knowledge?
1=Parents 2=Friends/relatives 3=Extension workers 4=Training at a local demonstration farm 5=Training in a government institute

91. How effective are the local herbicides?
1=Very effective 2=somewhat effect 3=Not effective

Crop diseases and pests

92. Do you have knowledge of the crop diseases? (If no, go to question 96)
1=YES 2=NO

93. Do you know the appropriate pesticide to combat a particular disease?
1=YES 2=NO

94. What types of diseases are you aware of?
1=Leaf Spot (Leaves infected with leaf spot will yellow and may drop prematurely)
2=Gray mold (Brown plant tissue, Blight bumps or cankers Fruit or bulb rot or end rot)
3=Powdery mildew (Typically white or gray and resides on the leaf surface. Sometimes when it first appears, it is mistaken for dust or dirt. When touched, some of the powder will rub off)
4=Rust (Typically brownish-yellow to bright orange spots that form on leaves. The spots are filled with a powdery substance. This substance
contains the spores that will spread to other plants if not treated).
5=Black Spot (resembles black splotches, which then develop leaf yellowing around the spots. Black spot typically occurs during moist, humid conditions and are usually wind-borne and rain splashed to newly emerging leaf tissue).
6=Other (Specify)

95. If, Yes where did you get this knowledge?
1=Parents 2=Friends/relatives 3=Extension workers 4=Training at a local demonstration farm 5=Training in a government institute

Fertiliser application

96. How do you regenerate soil fertility?

1=Leave land under fallow 2=Use Organic fertiliser 3=Chemical Fertiliser application

97. Do you have knowledge of when the soil nutrients need regeneration?
1=YES 2=NO

98. If, YES, how do you determine that the soil nutrients need regeneration?
1=Low yields 2=Soil has changed color 3=other (Specify)

99. If response to Q.65 is YES, what kind of chemical fertiliser are you are aware of?
1=Urea 2=NPK 3=DAP 4=CAN 5=Mixture 6=Other (Specify)

100. Do you have knowledge of which kind of chemical fertiliser is suitable for a particular crop?
1=YES 2=NO

101. 1f response to Q.100 is YES, how do you determine the kind of chemical fertiliser to use?
1=Crop type 2=Soil type 3=Soil has been overused 4=Other (Specify)

102. Do you have knowledge of scientific sequencing of fertiliser application?
1=YES 2=NO

103. If, Yes how do determine the sequencing of chemical fertiliser application?
1=Before planting 2=A few weeks after planting 3=Other (Specify)

104. Do you have knowledge of how to make organic fertiliser?
1=YES 2=NO

105. If YES, how do you make organic fertiliser?
1=Allow the plant remains to rot in the farm 2=Piling up animal waste 3=Other (specify)

106. Do you know how to apply organic fertiliser?
1=YES 1=NO

107. If yes, how do you apply organic fertiliser?
1=Random application 2=Applied to low yielding parcel areas 3=standard application 4=Other (Specify)

Fertilizer and Manure/Compost Expenditure (or Credit) Past 12 months

108 Did you obtain fertilizer or manure/compost in past 12 months?
1=Yes 2=No [skip to Sec 12]

*** Each transaction of each fertilizer type should be listed in different row. (e.g. when purchasing DAP and UREA in one time, use two different rows for DAP and UREA.)**

Fertilizer/Manure Type	Code Code Below	When did you obtain it?		How did you obtain it? 1= Purchased in cash 2= Obtained on credit 3= Produced on farm 4= Given free 5= Other (specify)	If obtained it on credit (FE2=2), from whom? See Code below	Quantity of fertilizer/ manure bought, obtained on credit, or given free?		How much (in Ush) in total did you pay (or will you pay)? (N.A. for FE2=3 or 4)	Did you pay for transportation of this fertilizer/ manure? 1= Yes 2= No	If FE7=Yes, how much (in Ush) in total did you pay for transportation?
		Month	Year			Quantity	Unit			
FCode	FE0	FE1m	FE1y	FE2	FE3	FE4	FE5	FE6	FE7	FE8

Fertilizer Type Code:
1=Animal Manure (Dry form)
2=Green Manure
3=Compost
4=DAP
5=UREA
6=NPK
7=CAN
8=MAP
9=TSP
10=SSP
11=ASN (26:0:0)
12=household refuse/crop residual
13=Other (Specify)

Unit codes:
1 =100 kg bag
11 =50 kg bag
2 =kgs
3 =litre
5 =numbers
9 =Gorogoro
10 =Tonnes
12 =debe
13 =grams
7 = 25 kg bag
8 = 10 kg bag
14=wheelbarrow
15=cart
16=canter
17=pickup
18 =2kg bag
19 =Donkey load
20 = Donkey cart load
21 = Hand cart load
22 = Head load
23 = Area in acres
24 = Other (specify)

Credit Source Code (FE3):
1= Government agencies
2= Traders
3= Farmer cooperatives
4= NGO/CBO
5= Large company
6= Relative
7= Fellow farmer
8=Other (specify)

109. Has this household ever used chemical fertilizer?
1=Yes 2=No

110. If No to 109, what are the reasons?
1=Not knowing how to use 2= Not profitable 3= Not afford to buy 4= Worried about quality sold by stockists 5= Soil fertile, so no need to use 6= Fear that it will damage soil 7=Safety of food 8= Other (specify)_____

111. If Yes to 110, in which year did you first use chemical fertilizer?
_____

112. Do you know where you can buy chemical fertilizer?
1=Yes 2=No (If No, skip to 117)

113. What is the name of the shop?
_____
114. Where is the shop located? (name of town)
_____

115. How far is the shop (in miles)?
_____ Miles

116. Are you concerned about the quality of inputs sold by this shop?
1=Very much concerned 2=Concerned but not very much 3=Not concerned at all

Seedlings

117. Do you have knowledge of the right type of seedling to use?
1=YES 2=NO

118. If, YES, how do you determine the right seedling to use?
1=High Yields 2=Fast growing 3=Soil type 4=Weather resistant 5=Pest Resistant 6=Market specifications 7=Other (Specify)

119. If response to Q117 is YES, what kind of seedling are you aware of?
1=Organic/traditional seedling 2=genetically modified 3=Improved seedling 4=Other (Specify)

120. Do you have knowledge of which kind of seedling is suitable for a particular place/region or soils?
1=YES 2=NO

121. Do you have knowledge of how to make improved seedlings?
1=YES 2=NO

122. If, Q.121=Yes where did you get this knowledge?
1=Parents 2=Friends/relatives 3=Extension workers 4=Training at a local demonstration farm 5=Training at a government institute

123. Has this household ever used improved seed?
1=Yes 2=No

124. If No to 123, what are the reasons?

1=Not knowing how to use 2=Not profitable 3=Cannot afford to buy 4=Worried about quality sold by stockists 5=Soil is fertile, so no need to use 6=Other (specify)_____

125. If Yes to 123, in which year did you first use improved crop seed? _____

126. If Yes to 123, what was the name of the seed variety?

127. Do you know the nearest place where you can buy improved seed?
1=Yes 2=No

128. If Yes to 127, what is the name of shop?
_____

129. If Yes to 127, where is the shop located? (name of town)
_____

130. If Yes to 127, how far is the shop (in miles)?
_____ Miles

131. Are you concerned about the quality of inputs sold by this shop?
1=Very much concerned 2=Concerned but not very much 3=Not concerned at all

132. If the shop were to sell a new variety of improved seed, would you buy and try it out?
1=Yes 2=No

Pesticide usage.

133. Do you have any knowledge about pesticides?
1=YES 2=NO

134. If yes, do you have knowledge of the right type of pesticides to use?
1=YES 2=NO

135. If, YES, how do you determine the right pesticide to use?
1=Disease type 2=Stage of the crops 3=Pest type 4=Soil type 5=Extensional worker recommendation 6=Other (Specify)

136. If response to 134 is YES, what kind of pesticide(s) are you aware of?
1=Biological 2=Insecticides 3=Rodenticides 4=Bactericides 5=Fungicides 6=Larvicides 7=Other (specify)

137. Do you have knowledge of how to make local pesticides?
1=YES 2=NO

138. If, Yes where did you get this knowledge?
1=Parents 2=Friends/relatives 3=Extension workers 4=Training at a local demonstration farm 5=Training in a government institute

140. If, 137=YES, how effective are the local pesticides
1=Very effective 2=somewhat effective 3=Not effective

141. Do you have knowledge of crop diseases?
1=YES 2=NO

142. If, YES, do you know the appropriate pesticide to combat a particular disease?
1=YES 2=NO

143. If response to 142 is YES, what types of diseases are you aware of?

1=Leaf Spot (Leaves infected with leaf spot will yellow and may drop prematurely)
2=Gray mold (Brown plant tissue, Blight bumps or cankers Fruit or bulb rot or end rot)
3=Powdery mildew (Typically white or gray and resides on the leaf surface. Sometimes when it first appears, it is mistaken for dust or dirt.
When touched, some of the powder will rub off)
4=Rust (Typically brownish-yellow to bright orange spots that form on leaves. The spots are filled with a powdery substance. This substance
contains the spores that will spread to other plants if not treated).
5=Black Spot (resembles black splotches, which then develop leaf yellowing around the spots. Black spot typically occurs during moist, humid conditions and are usually wind-borne and rain splashed to newly emerging leaf tissue).
6=Other (Specify)

144. If, 142=Yes where did you get this knowledge?
1=Parents 2=Friends/relatives 3=Extension workers 4=Training at a local demonstration farm 5=Training in a government institute

Postharvest handing of perishables
145. Do you have knowledge of the post-harvest handling of perishable commodities?
1=YES 2=NO

146. Do you have knowledge of the post-harvest handling of non-perishable commodities?
1=YES 2=NO

147. Have you ever received any extension messages on postharvest handling?
1=YES 2=No

148. If Q.147=YES, was the knowledge useful on the following yardsticks?
a. Storage /cold strorage
1=YES 2=No

b. Packaging
1=YES 2=No

c. Transportation
1=YES 2=No.

d. Processing
1=YES 2=No

e. Preservation
1=YES 2=No

f. Harvesting
1=YES 2=No

149. Please indicate which of the aspect of postharvest operations you require more information or training.

1=Processing (blanching, drying) 2=Sorting and packaging 3=Storage facilities or methods 4=Management of pests and diseases 5=Other (specify)

150. What safety measures do you practice during harvesting?
1=Wear gloves 2=Wear goggles 3=Wear aspirators 4=Wear face mask 5=Other (specify)

151. Where did you acquire the information about as safety measures?
1=Friends 2=Family 3=NGO 4=Extension workers 5=Other government agency 6=Others

Causes of postharvest losses

152. Do you suffer losses during handling of produce?
1=Yes 2=No

153. If yes, what is the extent of the loss?
1=Very big loss 2=Somewhat big loss 3=Small Loss 4=Negligible loss

154. Can you quantify the extent of losses?
1=Yes 2=No

155. If, yes what is the quantity of the loss (kilograms or bags)

156. Where do you sell the produce?
1=Market 2=Homes 3=Farm gate

157. What is the distance of market from the farm?
1=Very Far 2=Somewhat far 3=Near 4=Very Near

158. How do you transport your produce from the farm to the market?
1=By car 2=Bicycle 3=On foot 4=By water transport

159. Do you incur any losses during transport?
1=Yes 2=No

160. If yes, what is the extent of the loss?
1=Very big loss 2=Somewhat big loss 3=Small Loss 4=Negligible loss

161. How do you store your produce?
1=In sacks 2=In containers 3=Local silos 4=In baskets

162. Do you encounter any problems during storage?
1=Yes 2=No

163. If yes, what are the problems?
1=Lack of silos 2=Theft 3=Weigh loss 4=Pests 5=Quality degradation 6=Other(specify)

Effect of postharvest losses

164. What quantity of produce do you harvest each time in Kilograms or Bags?

165. What quantity of produce do you sell in Kilograms or Bags?

166. What is the appearance of the produce you sell, are the buyers impressed?

1=Very impressed 2=somewhat impressed 3=Not impressed 4=Make no comment

167. Is there any variation in the price of your produce and others on the market?
1=Yes 2=No

168. What is the price difference if any in UGX?

169. After selling do you meet your production cost?
1=Yes 2=No

170. How much profit or loss do you make in UGX?
Profit:……..

Loss:……..

171. Are you able to buy your basic needs from your production?
1=Yes 2=No

Measures of controlling postharvest losses

172. Do you package your produce before selling?
1=Yes 2=No

173. Do you have knowledge of product packaging?
1=Yes 2=No

174. If yes, where did you get the knowledge from?
1=Friends/family 2=Extension workers 3=Government Institution 4=Farming group 5=Other(Specify)

175. Do you process your produce?
1=Yes No=2.

176. Do you have knowledge of product processing?
1=Yes 2=No

177. If yes, where did you get the knowledge from?
1=Friends/family 2=Extension workers 3=Government Institution 4=Farming group 5=Other(Specify)

178. In what state do you sell your product?
1=Dried 2=Fresh 3=Processed 4=Other (specify)

179. If you dry it, where do you dry it
1=On tarpaulins 2=By the roadside 3=In a solar dryer 4=On the bare ground 5=Other (Specify)

180. What problems do you encounter during drying?
1=Scattering by animals 2=Contamination with animal feaces 3=Theft 4=Sudden rains wetting 5=Inability to determine the degree of dryness required by the buyer 6=Other(specify)

181.Are there any measures taken to control postharvest losses?
1=Yes 2=No

182. If yes, what are they
1=Using locally made silos 2=Storing at a community based silo 3=pesticide application 4=drying
5=Processing 6=Other specify

183. Do these measures give any improvement in controlling postharvest losses?
1=Yes 2=No

Cooperative engagement

184. Do you belong to a farmer's cooperative society or group?
1=Yes 2=No

185. What are the main advantages of engaging a farming cooperative group?
1=Better product price 2=Better input price 3=Large scale production 4=It is easy to access credit.
4=Easy to access training 5= Easy to be reached by extension workers

186. Animal husbandry and agribusiness 2017-2018 in the last 12 months

Livestock	Live-stock ID	Number owned 12 month ago	Total value (Shs) 12 month ago	Number Consumed at home in the last 12 months	Number bought during the last 12 months	Number sold during the last 12 months	Number lost during the last 12 months	Number Owned Now	Total value in Shs Now
LSNAME	LID	LR1	LR2	LR3	LR4	LR5	LR6	LR7	LR8
Cows – Local	1								
Bulls – Local	2								
Young bulls-Local	3								
Heifer –Local	4								
Calves –Local	5								
Cows – Improved	6								
Bulls – Improved	7								
Young Bulls - Improved	8								
Heifer –Improved	9								
Calves –Improved	10								
Goat – Local	11								
Goat – Improved	12								
Sheep	13								
Chicken – Local	14								
Chicken –Improved	15								
Pigs – Local	16								
Pigs – Improved	17								
Donkeys	18								
Ducks	19								
Turkey	20								
Guinea fowls	21								

187. Dairy Production and Expenditures on Cattle Management

		Season	Answer for a Typical Month in the Last 12 months			In the last 12 months What is the total expenditure in Shs spent on			
			How many milking cows did you have?	Number of milk production months	What was the total monthly milk production in liters?	Purchased feeds?	A.I. service	Bull service	Health service*
	MK0	Season	MK1	MK2	MK3	MK4	MK5	MK6	MK7
Local cows	1	Dry							
		Rainy							
Improved cows- Stall fed	2	Dry							
		Rainy							
Improved cows- Grazing	3	Dry							
		Rainy							
All local cattle**	4	Dry							
		Rainy							
All improved cattle**	5	Dry							
		Rainy							

* Veterinary, Medicine, and Vaccine ** Include all cattle except milking cows.

188. How much did you spend for hiring labour on stall-fed cattle in the last 12 months (sh). 189_____

189. How much did you spend for hiring labour on non-stall-fed cattle in the last 12 months (sh). 190_____

190. Did you sell any milk in the last 12 months? 1=Yes 2=No 191_____

191. If Yes to 190, what was the total monthly sales in liters? 191a (Dry season)_____liters 191b (Rainy season)_____liters

192. If Yes to 190, what was the average sales price in Ushs/liter? 192a (Dry season)_____(Ush/liter) 192b (Rainy season)_____ (Ush/liter)

193 What is the nature of the farming?

1= Individual 2= Contract farming 3= Joint family 4= Corporate farming 5=Other (specify)

Other Livestock Products Production 2017-2018

194. Did you have any other livestock production, besides cow-milk, in the past 12 months on your farm?
1=Yes 2=No (skip this section)

Livestock Product		Number of production months in the past 12 months	Average production per month during production months		Amount sold per month (use the same unit in LP2)	Price received per unit (the same unit as in LP2) on the largest sale **	How much in Shs did you earn in total in the past 12 months?
			Quantity	Unit of Prod. Kgs Litres 3 Trays 4 Numbers			
	LP0	LP1	LP2	LP3	LP4	LP5	LP6
Eggs	1						
Honey	2						
Ghee	3						
Goat milk	4						
Hides and skin	5						
Meat	6						
Other* ( )	7						

*Only when this product incurs significant amount of the income, report (e.g. fish cultivation)
** Even when households did not sell, ask the hypothetical price (how much it would be if households sold the products)

195. What is the nature of the farming?
1= Individual 2= Contract farming 3= Joint family 4= Corporate farming 5=Other (specify)

196. Have you ever received training on how to conduct livestock business?
1=YES 2=NO

197. If YES to Q.196, Who provided the training?

1=Government 2=NGO 3=Village farming group 4=Village demonstration farm 5=Friends/Relatives 6=Other (specify)

198. If YES to Q.196, what kind of training did you receive?
1=Cattle keeping 2=Poultry 3=Piggery 4=Bee Keeping 5=Other(Specify)

199. Did the training result in an increase in your turnover?
1=YES 2=No

200. If yes, how much did your turnover change in Shs?

201. If No, do you any further training could be relevant?
1=YES 2=No

202. Which livestock business is most viable in your village?
1=Poultry (Eggs) 2=Cows for meat 3=Cows for Milk 4=Turkey 5=Ducks 6=Poultry (Meat) 7=other (specify)

203. Do you have knowledge of the type of diseases affecting your livestock?
1=YES 2=NO

204. If YES to Q.203, Where did you get the knowledge?
1=Government 2=NGO 3=Village farming group 4=Village demonstration farm 5=Friends/Relatives 6=Other (specify)

205. Do you have knowledge of the drugs and/or pesticides to use?
1=YES 2=NO

206. If YES to Q.205, Where did you get the knowledge?
1=Government 2=NGO 3=Village farming group 4=Village demonstration farm 5=Friends/Relatives 6=Other (specify)

207. Do you have access to veterinary officers?
1=YES 2=NO

208. If YES to Q.207, Where do they come from?
1=Government/District 2= Government/subcounty 3=NGO 4=Village demonstration farm 5=Friends/Relatives 6=Other (specify)

209. Have they been useful in your livestock business?
1=YES 2=NO

210. Where do you sell your livestock products?
1=Village market 2=Sub county market 3=District market 4=Market outside Soroti but in the East 5=Kampala 6=Other (specify)

211. Do you undertake any processing in order to add value?
1=YES 2=NO

212. If YES, Where did you get the knowledge?
1=Government 2=NGO 3=Village farming group 4=Village demonstration farm 5=Friends/Relatives 6=Other (specify)

213. If, keeping cattle, how is the cattle fed
1=Zero grazing 2=free range 3=Strip grazing

214. If free range or zero grazing do you feed the cattle on improved pasture?
1=YES 2=No

215. Do you know that pasture for cattle can be grown?
1=YES 2=No

216. If, yes do you wish to learn the growing of pasture for cattle?
1=YES 2=No

217. If respondent is a poultry farmer, is the poultry yield as expected?
1=YES 1=No

218. If, No do you think training in poultry management could be useful to enhance your farm yield?
1=YES 2=No

219. In which areas of poultry farming do you need skilling?
1=Production for meat 2=Production for eggs 3=Marketing 4=Value addition 5=Other (Specify).

220. Would you consider a new breed of local chicken?
1=YES 2=No

221. If keeping local birds, do you have chicken house?
1=YES 2=No

222. If keeping local birds, are they for business?
1=YES 2=No.

223. Do you think local birds can be used for eggs business?
1=YES 2=No

224. If No, do you wish to learn how to make money from local eggs as a business?
1=YES 2=No

225. Do you think local birds can be specifically raised for commercial purposes like broilers or layers?
1=YES 2=No

226. If No, do you wish to learn how to make local birds a commercial enterprise?
1=YES 2=No

227. What is your view of piggery as an enterprise?
1=No go zone (religious reasons) 2=Never contemplated about it 3=Have no knowledge about it 4=I am doing it now

228. If respondent says 2 and/or 3, if trained about piggery as an enterprise would you consider undertaking it?
1=YES 2=NO

229. If, respondent says 4, do you think the turnover from your piggery is as expected?
1=YES 2=NO.

230. If No, do you think training in piggery production, marketing and value addition could be useful to enhance your turnover?

231. Specifically, what kind of training would you need in piggery?
1=Production 2=Marketing 3=Value addition 4=Other (Specify)

232. How do you practice piggery?
1=Under a standard piggery house 2=Under some shed (could be a tree) 3=Free range 4=Other (specify)

233. Do you vaccinate the pigs?
1=YES 2=No

234. If YES, who does the vaccination?
1=Self 2=Vet officer 3=Friend/Relative 4=Other(Specify)

235. Do you think improved feeding can result in improved piggery yield?
1=YES 2=No

236. Do you think training in improved feeding methods can result in improved piggery yield?
1=YES 2=No

237. Which of the following factors pose the <u>most significant</u> risk to your agricultural activities?

READ OUT A SINGLE ANSWER	
Weather-related event (drought, floods, late rains)	1
Power failure/shortage	2
Market price volatility	3
Lack of market	4
Lack of seeds/poor quality seeds	5
Pests and diseases	6
Contracts not being honored	7
Crops or livelihood not being sold	8
Perils and accidents (e.g. fire) or theft	9
Health (your own, your family's or your workers')	10
Land tenure system not favourable/ informal ownership	11
Land fragmentation	12
Breakdown of equipment	13
Input quality	14
Fuel prices or availability	15
Other (specify)	16
Lack of skills/training in agronomy	17
Lack of marketing/customer care skills	18
Lack of fertilizers/pestcides	19
Lack of Extension workers	20
Don't know)	98

238. Have your agricultural activities been seriously affected by any of the following events in the past three years?

READ OUT. SINGLE ANSWER PER ROW.	1=Yes 2=No	
Weather-related event (drought, floods, late rains)		
Pests / diseases		
Accident (e.g. fire) or theft		
Unexpected price fluctuation in the market		
Unexpected price fluctuation of inputs (such as seeds, fertilizer, or pesticides)		
Contracts not being honored		
Market downturn / crops or livestock not able to be sold		
Breakdown of equipment		
Health (your own, your family's, or your workers')-related event		
Death in the family		
Political unrest or war		
Don't know		SKIP TO H16

239. How did you mainly cope when this happened?

READ OUT ANSWERS FROM A61. SINGLE ANSWER PER ROW.	1=Temporary job 2=Took a loan 3=Borrowed 4=Sold livestock/crops 5=Sold asset 6=Used savings 7=Was covered by insurance
Weather-related event (drought, floods, late rains)	
Pests / diseases	
Accident (e.g. fire) or theft	
Unexpected price fluctuation in the market	
Unexpected price fluctuation of inputs (such as seeds, fertilizer, or	
Contracts not being honored	
Market downturn / crops or livestock not able to be sold	
Breakdown of equipment	
Health (your own, your family's, or your workers')-related event	
Death in the family	
Political unrest or war	

240. Given the agriculture shocks you faced, what kind of skills do you think might be helpful to enable you cope better?
1=Marketing skills 2=Value addition skills 3=Preservation skills 4=Animal Production skills 5=Pest and disease management skills
6=Response to climate change 7=Agronomical practice skills 8=Others(specify)

Extension and Training in <u>Last Two Years</u>

241. Has any member of this household received training or had contact with extension agents since August 2017?

1=Yes 2=No (skip this section)

NAME of household member/ main contact member	Person ID	Training or extension 1=Training 2=Extension	Provider of training/ extension See Code below	Type/Areas of training/ extension See Code below Choose all e.g. 2, 3	Number of days of training/ number of visits of extension <u>since August 2007</u>	Have you applied what you learned in practice? 1=YES 2=NO	Will you apply what you learned again next season? 1=YES 2=NO	Did you pay fee? 1=YES 2=NO	If ET6=Yes, how much did you pay (Ush)?
NAME	ID	ET0	ET1	ET2	ET3	ET4	ET5	ET6	ET7
Training									
		1							
		1							
		1							
		1							
		1							
		1							
Extension									
		2							
		2							
		2							
		2							

Code for ET1:
1=Agric extension agents
2= NGO
3=Local Organizations
4=Companies
5= Fellow farmers
6= Other (specify)

Code for ET2:
1=Organic fertilizer use/making compost
2=Inorganic fertilizer use
3=Crop production
4=Agroforestry
5= Improved Cows related (zero grazing)
6= Improved poultry
7=Other livestock related
8= Soil/water conservation
9=Agribusiness
10= Other (specify)

242. Consumption and Expenditure on Major Items (Non-Durable Goods) in the Past 12 Months

Consumed/Purchased Products			Quantity consumed	Quantity purchased (out of consumed)	Price per unit (Ush)*	Consumed/Purchased Products			Total expenditure (sh)**
--During the last 7 days--	EX0	unit	EX1	EX2	EX3	---During the last 30 days---	EX0	unit	EX4
Staples						Sugar	21		
Maize grain	1	kg				Salt	22		
Maize meal/flour	2	kg				Cooking oil/Ghee	23		
Millet/Sorghum	3	kg				Coffee/Tea: powder	24		
Wheat flour	4	kg				Drinks: cups	25		
Rice	5	kg				Tobacco/Cigarettes	26		
Cassava (Fresh form)	6	kg				Restaurant Expense	27		
Cassava (Processed)	7	kg				--During the last 365 days--			
Sweet potatoes	8	kg				School fee, textbooks, etc	28		
Irish potatoes	9	kg				Medical care	29		
Matoke	10	kg				Transportation	30		
Other staples (any)	11	kg				Clothing/Shoes	31		
Chicken	12	kg				Cooking/Lighting fuel	32		
Meats (any)	13	kg				Soap/washing products	33		
Fish	14	kg				Contributions			

Beans	15	kg				ROSCAs	34		
G.nuts	16	kg				Remittances to relatives	35		
Peas	17	kg				Churches/Mosques	36		
Vegetable/Fruits (any)	18	kg				Credit repayments	37		
Eggs (#number)	19	no.				Mutual support group (funeral)	38		
Milk: liquid (litre)	40	Lit				Mutual support group (nonfuneral)	39		
Other dairy products	20	kg				Other local organizations	40		

***If the household does not purchase the item, ask how much the household would pay for the item per kg. ** EX0=21 – 39, ask only <u>total expenditure</u>.**

243. Household Assets

Asset		Number of items currently owned	Total value (Shs)	Number of items purchased in the past 12 months	Asset		Number of items currently owned	Total value (Shs)	Number of items purchased in the past 12 months
ITEM	A0	A1	A2	A3	ITEM	A0	A1	A2	A3
Farm Equipment					Other Items				
Plough sets	1				Bicycle	12			
Carts	2				Radio	13			
Wheelbarrows	3				(Car) Batteries	14			
Borehole	4				TV	15			
Spraypumps	5				Mobile Phones	16			
Diesel pumps	6				Chair	17			
Water tanks	7				Tables	18			
Beehives	8				Beds	19			
Trailers	9				Mosquito nets	20			
Grinders	10				Motorcycle	21			
Hand hoe	11				Vehicles	22			

Storage facility (building)	50				Tractor	23			

244. ACCESS TO CREDIT

a. Do you keep any records regarding your production?	1=YES 2=No					
b. Have you ever applied for a loan?	1=YES 2=NO					
c. IN THE LAST 12 MONTHS, have you or anyone in the household taken out a loan of at least UGX 100,000 in Cash or in Kind	1=YES 2=No					
d. After submission of application, how many days required for loan sanctioning process?	1= 8 days 2=15 days 3=1 month 4= more than 1 month					
	Loan #1	Loan #2	Loan #3	Loan #4	Loan #5	Loan #6
e. What is the household ID# of the person who received this loan?						
f. What was the total value of this loan when it was taken out in UGX?						
g. What was the month and year in which the household received this loan? mm/yy						
h. Did you have to prepare a proposal for this loan? 1. YES 2. NO						
i. What was the original due date (month and year) of this loan for full repayment? mm/yy						
j. What was the interest rate on this loan when it began?						
k. What was the month and year when repayment for this loan was supposed to begin?						
l. Have you begun to repay this loan? 1. YES 2 NO If No go to r						
m. If yes, What is the total amount paid back on this loan as of today? (put zero if nothing)						
n. Is this loan fully repaid? 1 YES 2. NO If No=r						
o. What is the mode of repayment? 1=Yearly 2=End of plant season 3=Half Yearly 4=Monthly						
q. If the loan is fully repaid, what was the month and year (use EC) in which it was repaid? mm/yy						
r. If no, why have you not begun to repay this loan? Codes: 1. Still in grace period 2. Poor harvest - environmental reasons/ drought 3. Poor harvest because of market prices 4. Animal disease or death 5. Using loan for other purposes 6. Loan duration is short 7. Have not sold livestock; animal kept for farming 8. Loan forgiven 9. Borrower migrated 10. Borrower deceased 11. Paying other loans 12. Other						
s. Was the loan amount sufficient as per project / estimation? 1=Yes 2=No						

t. If No, Why? 1=Less amount sanctioned 2=Less mortgage 3=Not submitted last three years audited statement.						
u. What property you have mortgaged for loan? Codes 1=Land 2=Livestock 3=Crop yield 4=Vehicle 5=Other (specify)						
v. Did the household member borrow this money as part of a group? 1. YES 2. NO						
w. Was this a loan from the Food Security Program? 1. YES 2 NO						
x. From what source was the money borrowed? Codes (a)						
y. What was the money from this loan mainly used for? Read choices: 1= Crops 2= Livestock 3= Invest in natural resource management 4= Health emergency 5= Other emergency 6= Other specify						
Z. Was the loan amount used entirely for the purpose applied for? 1=For the same purpose 2=Other purpose						
Z1. What is the mode of repayment? 1=Yearly 2=End of plant season 3=Half Yearly 4=Monthly 5=Other(Specify)						
Z2. What is the duration for repayment of loan? 1=Number of Years…… 2=At the end of the crop season						
Z3. When the household member received this loan, if s/he could have borrowed more money with the same interest rate and repayment period, how much more in UGX would s/he have borrowed? Record in UGX, code 0 if they did not want to borrow more						
Z4. Sometimes the person who gets the loan and the person who decides how to use it are different. For this loan, who in the household made/makes decisions on how the loan was spent? List up to two ID#s						

Codes (a)

Family, Local 2. Family, Non-local 3. Neighbor/ Village Member 4. Individual outside the village 5. Food security Program Loan 6. Other loan from Government 7. Loan from Agency, Non-government 8. Commercial Bank 9. Microfinance 10. Money lender

245. SAVINGS

a. Does any member of the household have a bank account or an account with MFI? 1. YES 2. NO (If no, skip to e)			
b. If Yes, List ID codes of up to 3 members of the household who have a bank account or an account with MFI.			
c. If respondent has a bank account or account with MFI, is it a joint account? 1. YES 2. NO			
d. If respondent has a bank account or account with MFI, what is the quantity of savings in the account? (UGX)			
e. Does the household have any cash savings in an institution other than an MFI? 1. YES 2. NO (IF no, skip to i)			
f. If Yes, List ID codes of up to 3 members of the household who have cash savings in another institution.			
g. If respondent has cash savings in another institution, is it a joint account? 1. YES 2. NO			
h. If respondent has cash savings in another institution, what is the quantity of savings in the account? (UGX)			
i. Are you and/or members of your household a member of a Rural Savings and Credit Cooperative? 1. YES 2. NO If No Skip to l			
j. If Yes, List ID codes of up to 3 members of the household who are members of a Rural Savings and Credit			
k. If respondent is a member of a Rural Savings and Credit Cooperative, what is the quantity of savings in the account? (UGX)			
l. Have you or any member of the household received training on credit management? 1. YES 2. NO			
m. Do you have crop insurance? 1= Yes 2= No			

GROUP PARTICIPATION

I would like to ask you about the groups you participate in within your community.

246. Do you participate in any groups for example, farming groups, credit groups, church groups, women's groups? 1 Yes 2 No								
a. List the name of each group that the respondent belongs to on a separate line	b. What type of group is it? Code (a)	c. How many members are in the group?	d. How many members are female?	e. What is your level of participation in the group? 1 = very active 2 = somewhat active 3 = not active	f. How many hours per month do you spend on activities with his group?	g. Was the group formed based on community initiative or was it organized by the government, a church, or other organization? 1 = community initiation 2 = government 3 church 4 NGO 5 other organization	h. What is your role in the group? 1 = Chairperson 2 = Secretary 3 = Treasurer 4 = Founder 5= Member 6= Other, specify	h. How often do you typically meet with this group? 1 = daily 2 = weekly 3 = every two weeks 4 = monthly 5 = every three months 6 = every six months 7 = annually 8 = never

247. GROUP PARTICIPATION CONT'D

a. Did you contribute anything (in cash or kind) to this group during the past 12 months? Write the total amount contributed (in UGX) Write '0' if there is no contribution	b. If someone in the group asked to borrow 50,000 UGX and you had the money, would you loan the group member the money? 1. Yes 2. No	c. Do you think people in your group generally cooperate well, or do you think there are some conflicts or many conflicts among members? 1 = Cooperate well 2 = Some conflicts 3 = Many conflicts	d. How many people in the group did you know before the group formed?	e. Do group members live up to their responsibilities in this group? 1 = always 2 = most of the time 3 = sometimes 4 = never

CODES FOR GROUP PARTICIPATION

Code (a), Types of Groups
1 Savings and microcredit cooperative
2 Credit association
3 Women's group (excluding farmer group and income
4 Women's income generating group
5 Male only farmer's group
6 Female only farmer's group
7 Male and female mixed farmer's group
8 Youth farmer's group
9 Agricultural cooperative
10 Religious group
11 Water users association
12 Other youth group (not youth farmer's group)
13 Other

NETWORKS

248. Within your village (but outside of your household) how many people (excluding DAs) do you talk to share or exchange information about agricultural matters?

249. Now I would like to ask about the five people you exchange the most information with: (if number above is less than 5 put that number of people)

a. Who do you speak with the most about farming or livestock outside of your household but in your village? Please tell me this person's first and last name. Record the names of the people first, and then proceed to the other questions If no communication put "0"	b. How do you know this person? Code (a)	c. Is this person a male or female? 1= Male 2= Female	d. Is this person married? 1=Yes 2= No	e. What is the age of this person	f. What is this person's occupation? Code (b) Occupation	g. What is this person's level of education? Code (c)	h. Where does s/he live in this Village? (please ask for a landmark or key characteristic that would help find this person) (free text)	i. How many minutes away does this person live in walking minutes?	j. Is this person's land allocated next to yours? 1= Yes 2= No	k. How often do you typically see this person? 1 = daily 2 = weekly 3 = every two weeks 4 = monthly 5 = every three months 6 = every six months 7 = annually 8 = never 9 = other, please specify	l. What is the size of the land owned by this person? 1= Bigger than mine 2= Same as mine, 3= Smaller than mine 4. Don't know	m. How do you rate the usefulness of advice from this farmer? 1= Not useful 2= Somewhat useful 3= Useful 4= Very useful	n. Was the advice effective in solving your problem? 1= Yes 2= No

Code (a), Relationship Code	Code (b), Occupation	Code (c), Highest grade obt
1 Male friend	1. Farmer	0 Did not complete any sch
2 Female friend	2 Herding (Livestock keeping)	1 Some primary education
3 Male neighbor	3 Manual worker (not in a factory)	2 Completed primary educa
4 Female neighbor	4 Manual factory worker	3 Some Ordinary Level Edu
5 Son	5 Skilled factory worker	4 Completed Ordinary Leve
6 Daughter	6 Domestic work (Housewife)	5 Some Advanced Level Ed
7 Brother	7 FOOD-FOR-WORK/cash for work	6 Completed Advanced Lev
8 Sister	8. Driver/Mechanic	7 Incomplete university edu
9 Niece	9. Guard	8 Incomplete higher edu certificate
10 Nephew	10. Teacher	9 Completed higher edu certificate
11 Uncle	11. Health worker	10 Adult literacy program p
12 Aunt	12. Part Official / Administrator / Clerical	11 Other literacy program o
13 Son -in-law	13. Civil servant	12 Some Church/Mosque S
14 Daughter-in-law	14. Soldier	13 Other
15 Father-in-law	15. Disabled	
16 Mother-in-law	16. Student	
17 Brother -in-law	17. Productive Safety Net Program (PSNP)	
18 Sister-in-law	19. Domestic Servant	
19 Grandfather	20. Other, please specify	
20 Grandmother		
21 Other relative of yours or of your spouse		
22 Servant (farm worker, herder, maid, etc.)		
23 Other unrelated person		

Section: Marketing

249. Do you produce for the market?
1=YES 2=NO

250. How much of your produce is sold (in Kgs or bags?

251. Who do you sell to?

1=Cooperative 2=Local Market 3=Middlemen 4=Processor 5=Neighbor 6=Other (specify)……..

252. How do you determine the price at which you sell to the market?
1=Announcement by Government 2= Announcement by Cooperative 3= Announcement by local farmer group
4=Middlemen 5=Processor 6=Family/friends 7=Other (specify)……..

If you sell to a Processor in Question 251, do you have a contract?
1=YES 2=NO

If YES, how is the price agreed upon in the contract?
1=YES 2=NO

Do you wish to sell to someone other than the processor you have a contract with?
1=YES 2=NO

Are you comfortable with the price that the processor offers?
1=Yes 2=NO

Do you does processor support you in anyway?
1=YES 2=NO

If yes, in which way
1=Farm inputs 2=Harvesting 3=Post-Harvest Management 4=Agronomical Skills 5=Others Specify

If you do not have a contract with a processor, do you still receive support from the processor?
1=YES 2=NO

If yes, in which way
1=Farm inputs 2=Harvesting 3=Post-Harvest Management 4=Agronomical Skills 5=Others Specify

Are you comfortable with the price that the processor offers?
1=YES 2=NO

253. Do you think skilling could be useful in enhancing your ability to improve the marketing potential?
1=YES 2=NO

Section: Value addition

254. Do you think you would earn more if you added value to your produce?

1=YES 2=NO

255. Do you add value to your produce?

1=YES 2=NO

256. How much would you have lost had you not added value (estimate in UGX)?

257. What kind of value addition do you engage in?
1=Processing 2=Manufacturing 3=Other (specify)……

258. Do you think skilling can improve your ability to add value?
1=YES 2=NO

259. Local Farmer Training Center		
A	Do you know of any local Farmer Training Center (FTC)?	1 = Yes 2 = No
B	How far is your local FTC in walking minutes?	Record the answer in minutes.
C	Have you ever been to your local Farmer Training Center (FTC)?	1=Yes 2=No
D	If no, why?	1 = FTC is too far 2 = FTC is not useful 3 = I have too much to do to take the ti 4 = I am not interested 5 = I attended before and don't think it 6 = I don't feel comfortable because I a 7 = Not invited 8= other (specify)___
E	How often did you go to your local Farmer Training Center (FTC) in the past 6 months?	Enter the number of visits
F	Are you a member of the FTC management committee?	1=Yes 2=No
G	Have you ever participated in the activities (e.g. training) of your FTC?	1=Yes 2=No
H	Have you ever made a contribution (labor/money/tools) to your local FTC?	1=Yes 2=No
I	If yes, what was the estimated value in UGX of the contribution made to your local FTC?	

Annex 4: On-farm crop earnings among youths in rural Eastern Uganda: what are their drivers?

Abstract

This paper examines the drivers of crop earnings among rural youths in rural Eastern Uganda. The study utilizes cross-sectional data of 968 households, collected in 2018, from Soroti and Serere districts in Uganda. Using the Three Stage Least Squares (3SLS) methods, we find that youth crop earnings are positively associated with formal credit utilisation, land size, number of crops grown and whether a youth is a biological child of the household head. However, crop earnings were low for female youth as compared to male youth. Our results thus imply that efforts to enhance youth livelihood through improving crop earnings ought to: abate archaic cultural practices especially land fragmentation and enabling access to affordable formal credit. Furthermore, youths ought to be encouraged to grow more than one crop for purposes of income diversification as this has the potential hedging against the rainy days in the event one crop fails.

Introduction

Income poverty in Uganda has generally been declining. Income poverty reduced from 38 percent in 2002/03 to 19.7 percent in 2012/13 although it increased to 21.4 percent in 2016/17 (Uganda Bureau of Statistics, UBOS 2018). The 2016/17 Uganda National Household Survey indicates that 2.6 percent, 2.7 percent, 12.7 percent, 35.7 percent and 32.5 percent and 11.4 percent of households in Kampala, Wakiso, Central, Eastern, Northern and Western respectively are income poor. Strikingly the Eastern region is now the poorest region in Uganda as opposed to Northern region[1] (UBOS 2018). In terms of poverty disaggregation by source of income, 30 percent, 32 percent and 17 percent of households whose main source of income is small scale crop farming, subsistence farming, small scale livestock farming are income poor respectively (UBOS 2018). Also, 34.8 percent and 10.2 percent of households who are in paid employment as casual and non-casual labourers in agriculture are income poor (UBOS 2018).

Evidently, to further reduce poverty in Uganda targeting the agriculture sector could offer low hanging fruits. Indeed, De Janvry & Sadoulet (2000) argue that the agricultural sector is one of the pathways of alleviating rural poverty. This is because in countries like Uganda, agriculture is characterised by largely small-scale, low productivity, low external input usage and family labor oriented enterprises (FAO, 2015; World Bank, 2008). Furthermore, agriculture is largely practiced by persons in rural areas who spend the largest fraction of their budget on food therefore increasing food production and agricultural earnings would facilitate the reduction in poverty (Mwabu & Thorbecke, 2004).

However, recent empirical studies have generally attempted to address the rural poverty question through targeting non-farm income. For example Winters et al. (2009) advocate for alleviating rural poverty through promoting human capital development especially among children from poor households. Furthermore, other studies have advocated for abating rural poverty through identification and implementation of policies that enhance non-agricultural income. For example efforts to improve nonfarm agricultural income ought to improve education, roads and access to credit (Berdegue et al., 2001). Haggblade et al (2010) on other hand advocate for smoothening labour markets so as to ensure seamless transition of the rural poor to growing non-farm

[1] Since the Northern Region is still recovering from war. The war that started in 1987 only seized in 2006.

opportunities. Also, Senadza (2012) advocates for strategies that can enhance rural households to maximize non-farm income. Ellis (2000) advocates for policy to support rural livelihood diversification as a mechanism of abating vulnerability. Tsiboe et al (2016) advocate for adoption of gender sensitive policies to facilitate the development and growth of non-farm income generating opportunities. Abdulai & CroleRees (2001) and Tsiboe et al. (2016) advocate for building of infrastructure to make them accessible to rural households.

The aforementioned studies offer no solution(s) for addressing rural poverty through enhancing agricultural earnings. This article however seeks to contribute to addressing the rural poverty question by attempting to identify mechanisms through which agricultural sector earnings can be enhanced. Specifically, this article attempts to explore the drivers of on-farm crop earnings using a cross-sectional dataset from Eastern Uganda. This paper is similar to Tschirley & Weber (1994) who used data from Mozambique to explain the determinants of aggregate household income among rural households; however, our paper specifically explains the drivers of crop earnings among rural youths at the household level. Our paper is also similar to Arouri et al. (2017) who looked at how urbanization abates rural poverty through giving households alternatives to farm income with the aid Vietnamese dataset. However, our point of departure our article sought to identify mechanisms of how crop earnings could be enhanced by exploring the drivers of crop earnings at household level. Our article is also similar to Yamano & Kijima (2010) who used a panel dataset of 894 households from rural Uganda to explore how soil fertility, distance to markets and quality of roads relate with crop income. While our article cannot measure the quality of road network and soil fertility as drivers of crop income, we however look beyond household demographics (like in Yamano & Kijima 2010) to extension services consumption, engagement in value addition, mechanization (proxied by use an ox plough), skilling in post-harvest handling attributes which are key to crop earnings yet not captured in Yamano & Kijima (2010).

Literature review.

While this section does not offer a survey of empirical literature regarding the drivers of crop earnings among youths, even then our focus is to emphasise the article's contribution.

Rural earnings are positively associated with urban development. With the aid of a sample of Indian data set, Cali & Menon (2012) showed that rural areas in proximity of urban areas with

large populations were associated with a reduction in income poverty. The income poverty reducing effect of urbanisation is attributed to among others increased demand for local agricultural products (Cali & Menon 2012). Similarly, Vandercasteelen et al. (2018) used data from a large-scale survey of teff producers in Ethiopia and showed that labor productivity as well as profitability improved with urban proximity. Suggesting farmers in proximity to urban centres are more likely to receive higher teff output prices thus higher teff incomes (Vandercasteelen et al., 2018).

Also connectivity of crop production zones to markets is important in enhancing household earnings. For example, from the 1995/6 Nepal Living Standards Survey Jacoby (2000) showed that extensive road networks to access markets on average had substantial benefits to households more so poor households. Similarly, Yamano & Kijima (2010) used a panel dataset of 894 households from rural Uganda in which they found that the total road distance to the nearest urban center and the proportions of poor quality roads are negatively associated with crop income. Also, Fan and Zhang (2008) used district level data for Uganda which showed that government spending on rural roads especially feeder roads had a substantial marginal impact on rural poverty reduction through enhancing productivity and therefore earnings. On the contrary, World Bank (1994, p. 80) argues that infrastructure development especially in rural areas is rather `a blunt instrument for intervening directly on behalf of the poor' to suggest that improving rural roads may not necessarily alleviate poverty through increasing for example earnings. Indeed, Fan and Zhang (2008) showed that murram and tarmac roads had no significant impact on agricultural productivity and therefore earnings in rural Uganda.

Soil fertility and land size are also important for crop earnings. Yamano & Kijima (2010) with the aid of data from rural Uganda showed that crop earnings are positively associated with both soil fertility and land size. Increasing land size by one 1.41 acres (1 hectare) is associated with a 7.7 percent increase in crop earnings (Yamano & Kijima 2010). Similar findings were posited by Adamse (1995) for cash crop farmers in rural Pakistan. Also, a percentage increase in soil organic matter is associated with an increase in crop earnings albeit at a diminishing rate (Yamano & Kijima 2010).

Furthermore, soil organic matter compliments the ability of fertilizer application to enhance crop earnings. Marenya & Barrett (2009) used a data set of rural farmers from Western Kenya which indicated that when the soil organic matter is low, fertilizer application is not likely to enhance maize earnings through undermining productivity. Also, Yamano (2008) used a panel data set of dairy and banana farmers of rural households from Uganda to show that one ton of the organic fertilizer per hectare increases the banana yield by 10 percent, and a one percentage point increase in the soil organic matter (SOM) increases the banana yield by 7 percent. Yamano (2008) thus imply that the use of organic fertilizer increases the likelihood of enhancing crop earnings through the productivity channel.

The relations between education and crop earnings is rather mixed. For example Singh & Santiago (1997) used farm earnings data from Mexico which indicated that rural household head schooling is associated with a 25 percent rate of return. Such a high rate of return to rural farming households is in spite of the low levels of education of farm operators in Mexico. To the extent that 14 percent and 23 percent of husbands and wives respectively in the sample never attended school. Worse still, 40 percent and 46 percent of wives and husbands respectively among those that attended school in the sample did not complete six years of schooling. Other studies that find a positive relationship between education attainment and farm earnings are Jolliffe (2004) for incomes in Ghana, Taylor & Yunez-Naude (2000) for positive returns from school among staple-crop farming households in Mexico and Jacoby (1991) for own farm earnings in Peru. However, studies argue that farmers benefit more from learning farming skills than from learning reading, writing, and arithmetic skills which is what variables like educational attainment and numbers of years of school seek to measure for example Robertson (1984) for Ghana and Adams (1993) for aggregate household incomes excluding remittances in Egypt.

The uniqueness of our article is that our target group is a sub-sample of the household that is youths from rural Eastern Uganda. Also beyond returns to education by relating the number of years a youth spent in school, following Robertson (1984) we equally relate crop earnings with training in agricultural practices for example post-harvest handling. Furthermore, this article also seeks to establish whether earnings from a crop can be enhanced when a youth engages in value addition as opposed to selling raw produce.

Theoretical framework.

We follow Taylor & Yunez-Naude (2000) to conceptualise how various factors influence rural youth crop earnings. Taylor & Yunez-Naude (2000) are concerned with total household earnings to suggest that incomes are derived from various sources. To the extent that their theoretical framework assumes that households make investment decisions over the various sources of income given among others land and labour endowment. In our article however, without any loss of generality we are not interested in a youth choosing between various investment choices rather he or she seeks to maximize crop earnings CE^i given endowments such as land and labour. Where i indexes a youth. Crop earnings are a function of demographic characteristics, business environment characteristics such as access to electricity, government policy such as access to crop farming extension services, household assets, and entrepreneurial characteristics such as value addition denoted by S, B, E, D, and V respectively. Given a youth's crop investment and resource endowment, denoted as, I^i and $\bar{I}^i$ respectively, we assume that $I^i \leq \bar{I}^i$. Therefore, a youth's crop earnings can be represented as:

$$CE^i = CE^i\left[I^i; S^i, B^i, E^i, V^i, D^i, Z^i, P^i\right] \qquad (1)$$

Where, P is a vector of input and output prices. Z is the production variable. We assume that the crop earnings function is concave and twice differentiable that is $CE_I^i > 0$ and $CE_{II}^i < 0$. If the resource constraint holds then first order condition is given as;

$$\frac{dCE^i}{dI^i} = CE_I^i\left[I^i; S^i, B^i, E^i, V^i, D^i, Z^i, P^i\right] = 0 \quad (2)$$

Solving the first order condition (2) for the optimal level of crop farming investment $\left[CE^{i*}\right]$ as a function of demographic characteristics, business environment characteristics, government policy and entrepreneurial characteristics variables which influence production $[Z]$, and substituting the expression of for CE^{i*} into equation (1), the reduced form youth's crop earnings can be represented as

$$CE^i = CE^i\left[S^i, B^i, E^i, V^i, D^i, Z^i, P^i\right] \qquad (3)$$

Equation (3) is the basis of our econometric analysis.

Estimation strategy

Since we are estimating a youth earnings model, we adopt the Mincerian approach following Taylor & Yunez-Naude (2000), Strauss & Thomas (1995), Willis (1986) and Griliches (1997) which is typically used for estimating returns to education. However, we extend the Mincerian approach to establish the other drivers of youth earnings in rural Uganda. As such besides the education attainment variable, we also capture other variables as credit access, distance to the market, post-harvest handling training, access to electricity, value addition, marital status and relationship with household head among others. In addition to model (3), other models including models for access to credit, proportion of produce sold, and training in agribusiness skills were added to form a structural equation system. These equations were fitted using iterative three-stage least squares in Stata v14.

Data Source

The study used data from a baseline survey of a project aimed at improving agribusiness skills of the youth through training and mentorship in Serere and Soroti districts in rural Uganda. Youth from target communities for the project were encouraged to form youth groups of 25-30 members, to be trained in managing group dynamics and agribusiness skills in addition to improved farming techniques. Several groups were formed of which some were selected for the trainings. Details of the trainings are published elsewhere. All the 30 groups selected for project were visited and a semi-structure questionnaire administered to each of their members. A total of 968 youth from 28 rural communities were interviewed.

Data and descriptive statistics.

Variable	Number of Observations	Mean	Min	Max
Earnings (Uganda Shillings)	968	439,531.6	0	17,100,000
Relationship				
Household head	968	0.286157	0	1
Spouse	968	0.202479	0	1
Son/Daughter	968	0.463843	0	1
Other relative	968	0.047521	0	1

Electricity (1=YES)	968	0.028926	0	1
Extension services (1=YES)	968	0.015496	0	1
Household size	968	6.650826	1	21
Gender (1=Female)	968	0.481405	0	1
Education attainment				
None	968	0.036157	0	1
Some primary	968	0.473141	0	1
Completed primary	968	0.129132	0	1
Some secondary	968	0.203512	0	1
Completed secondary	968	0.158058	0	1
Land size	968	4.14553	0.125	132
Ox plough (1=YES)	968	0.399793	0	1
Credit				
No credit	968	0.891529	0	1
Family/friends loan	968	0.075413	0	1
Loan from SACCO	968	0.033058	0	1
Network (1=Yes)	968	0.416322	0	1
Distance	809	2.875808	1	5
Trained in value addition (1=YES)	940	0.096809	0	1
Marital status				
Single	963	0.447314	0	1
Married/cohabiting	968	0.525826	0	1
Divorced/separated	968	0.02686	0	1
Post-harvest training (1=YES)	912	0.06579	0	1
Age	968	22.41632	16	35
Proportion of produce sold	968	0.510829	0	1
Number of crops	968	2.461777	0	13

Earnings is measured as the total income that a respond received from the crops grown. On average respondents received Uganda Shillings (UGX) 439,531. 25.3 percent of the youths earned '0' income while two respondents earned in the north of UGX 10,000,000. In the estimation however we consider the natural log of earnings so as to deal with extreme income values.

In terms of household demographic characteristics, Relationship captures the nature of the relationship of a responded with the household head. We have four categories that is household head, spouse son/daughter and other relative. 28.6%, 20.2% 46.4%, 4.7% of respondents are household heads, spouses of the household head, son/daughter of the household head and other relative of the household head respectively. Household size captures the number of people that

normally live a respondent's household including the respondent. The average size of households is 6.6 members. Marital status captures the nature of relationship a respondent is involved with respect to marriage. 44.7 percent of respondents are single. On the other hand 52.6% and 2.7% of respondents are married/cohabiting and divorced/separated respectively. Age captures the age of the respondent. The respondents are on average 22.4 years old. The oldest and youngest respondent(s) are 35 years and 16 years respectively. Gender captures the sex of the respondent. Gender takes a value of '1' if the respondent is female otherwise '0'. 48% of the respondents are of the female gender.

With regard to household assets, Education attainment captures the highest education level attained by a respondent. 3.6%, 47.3%, 13%, 20.4% and 15.8% of respondents had none, some primary, completed primary, some secondary and completed secondary education respectively. Land size captures the size of the land accessible to the respondent for farming. In the sample, the respondents reported access to an average of 4 acres of land for crop farming. Ox plough is a proxy for mechanization. It takes a value '1' if a respondent owns an ox plough otherwise '0'. 40% of respondents own an ox plough.

In terms of household entrepreneurial characteristics, Credit captures a respondent's main source of credit. 89.2% of respondents did not use any credit. On other hand 7.5% and 3.3% of respondents had access to credit from family/friends and SACCOs respectively. Implying that access to credit is not only informal but even within informality it not accessibility is really low. Network captures whether a respondent participates in any groups for example farming groups and credit groups. It takes a value '1' if yes otherwise '0'. 41.6% of households belong to a network. Value addition captures whether a respondent adds value to their produce. It takes a value '1' if yes otherwise '0'. 9.7 percent of respondents add value to their produce. Number of crops grown captures the number of crop enterprises that a respondent engaged in. On average a respondent engaged in 3 kinds of crops.

With respect to business environment characteristics, Electricity captures whether a household has access to electricity. It takes a value of '1' if yes otherwise '0'. Our inclusion of electricity is because it could facilitate the possibility of micro-scale value addition leading to higher crop earnings. Distance captures the how far a household is from the market. The average distance to

the market is 2.9 kilometers. The furthest and closest market is 5 kilometers and 1 kilometer from a household respectively.

Finally public policy which proxied by extension services and training on post-harvest handling. Extension services captures whether a respondent has ever received training or contact with extension agents since August 2017. It takes a value '1' if yes otherwise '0'. 1.5 percent of respondents received training or had contact with extension agents. Post-harvest training captures whether a respondent has ever received extension messages on postharvest handling. It a value '1' if yes otherwise '0'. 6.6% of respondents have ever received extension services in post-harvest handling.

Discussion of results

Our results indicate that crop earnings are neutral to post-harvest handling training (Table 2, Model 2). Youths that that had training on post-harvest handling may not different income to those that were not subjected to a similar training. Our result is inconsistent with the World Bank (2011) which indicates that post-harvest losses are commonplace in SSA where for example USD 4 billion worth of grains per year is lost due to post-harvest handling per losses year (World Bank, 2011). Implying grain farmers in SSA potentially loose income to the tune of US$ 4 billion per year. The World Bank (2011) finding suggests that minimizing post-harvest losses is key to enabling youths increase crop earnings. The contradiction between our result and the World Bank (2011) finding could signal the inability of you post-harvest training to induce behavioral change as regards post-harvest handling practices among youths in Eastern Uganda.

Furthermore, also indicates that crop earnings are neutral to educational attainment (Table 2, Model 2). Our results indicate that by a youth not having any education their crop earnings are not significantly different if they had some primary education, completed primary education, some secondary education and completing secondary education. Specifically, completing primary education and having some secondary education is associated with an increase in youth crop earnings in comparison to not having an education although the relationship is insignificant. This result is consistent with Sidhu (1976) who with the aid of traditional and Mexican wheat varieties

farmers from the Punjab region of India found that farm earnings are positively associated with education although the relationship is insignificant. Also, having some primary education and completing secondary education is associated with reduction in crop earnings in comparison to not having an education although the relationship is insignificant. Our results are consistent with Moock (1973) who with the aid of data of Maize farmers from Vihiga region of Kenya showed that having 4 or more years of education negatively affected agriculture productivity and by extension earnings although the relationship was insignificant. Our results are however in contradiction with Li & Zhang (1998), Singh & Santiago (1997) and Psacharapoulos (1993) who show that rural earnings are positively associated with educational attainment. Note however, Psacharapoulos (1993) rural earnings includes both household agricultural and non-agricultural earnings while the rural earnings in this article refers to youth crop earnings. With regard to Li & Zhang (1998) and Singh & Santiago (1997) rural earnings means farm earnings without a distinction between crop and animal husbandry earnings; this article is however concerned with youth crop earnings.

Also youth earnings are positively associated with formal credit (Table2, Model 2). Specifically, a youth that accessed credit from a SACCO is likely to experience a 36 percent increase in crop earnings in comparison to a youth that did not access credit. This finding is consistent with Nadolnyak et al. (2017) who with the data from farming households in the USA showed that a positive association between formal credit and farm income. The importance of agricultural credit is that it enhances timely and optimal input utilisation resulting in a potentially higher farm yield compared to credit constrained farmers. Indeed, Briggeman et al. (2009) argue yield of production credit unconstrained farmers is 3% higher than that of credit constrained farmers. Similarly, Mukasa et al. (2017) show that alleviating credit constraints among smallholder farmers in Ethiopia has the potential to induce productivity gains of around 60%. Our results also indicate that the positive relationship between credit and youth earnings is amongst household heads (Table 2, Model 4) otherwise the relationship is inverse among daughters (Table 2, Model 6).

Crop earnings is positively associated with the number of crops grown by a youth. Table 2, Model 2, indicates that when a rural youth grows an additional crop, crop earnings increase by 27.6 percent other factors held constant. Our results also indicate that irrespective of a whether a youth is a son or daughter, crop earnings are higher when a youth engages in crop farming of more than

one crop (Table 2, Models 6 and 8). The positive relationship between number of crops grown and crop earnings could be explained by diversification attributes associated with growing more than one crop. Implying where another earnings from one crop decline, a youth crops earnings could be compensated by earnings from alternative crop(s). Crop diversification is particularly important in today's rather unpredictable climatic conditions given that smallholder farmers can hardly engage in agriculture practices that are robust enough to climate change. In that regard, the only feasible youth crop earnings insurance strategy is crop diversification otherwise crops earnings would be rendered volatile.

Female youths are worse off than male youths in terms of crop earnings. Crop earnings attributed to a female youth are 24 percent lower than those of a male youth. This could be attributed to socio-cultural orientation where the for instance is commonplace that men usually use female labour for commercial crop production and the reverse may not be true (Francis 1998). Furthermore, cultural women engage more in crop production aimed at providing food for the household which competes with commercial crop production (Francis 1998). Under such circumstances, men are more likely to earn higher crop income compared to women which this study is alluding to. Besides where the women do not engage in the price bargaining process, the man the does so would only reveal the certain fraction of crop sale proceeds thereby undermining the crop income accruing to the female youth.

Finally, crop earnings are associated with bigger land size irrespective of whether the youth is household head, daughter or son of the household head (Table 2, Models 2, 4, 6 and 8). Our results suggests that land fragmentation which is culturally engrained in the Uganda society could undermine efforts to improve youth livelihood through enhancing crop earnings. In Uganda, upon the death of a household head it is usually the case that farmland is divided amongst the deceased household head's children. The effect of which is to reduce the economies of scale associated with larger land holdings thereby compromising crop earnings.

Conclusion.

This article suggests that education per se is not important to enhance rural livelihood through improving crop earnings. Rather education that is tied to agribusiness is more relevant than academic education. Indeed, our findings indicate that abating archaic cultural practices that support land fragmentation is pertinent in enhancing youth crop earnings. While crop earnings are neutral to educational attainment. Implying that to improving rural youth incomes is hinged on identifying agribusiness skills gaps and ensuring that the appropriate curriculum is developed and delivered.

Credit is key in enhancing crop earnings. Therefore enhancing credit access has the potential to improve rural livelihood among youths. While the only source of formal credit in our sample was loans from SACCO generating positive crop earnings this implies that with larger credit options through for example micro finance institutions and commercial bank agricultural loans there is potential to improve rural youth livelihoods.

Finally, government ought to demystify the archaic and anti-development culture that favour land fragmentation especially in areas suitable for agriculture. However, this ought to be supported by a policy that gazettes Uganda as a planning area. The effect of which is that what comes through as agriculture land in the planning area cannot be subjected to land fragmentation.

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Table 2: Drivers of youth crop earnings

	(1) OLS	(2) 3SLS	(3) OLS Household head	(4) 3SLS Household head	(5) OLS Daughter	(6) 3SLS Daughter	(7) OLS Son	(8) 3SLS Son
Relationship (Base=household head)								
Spouse	0.0652	0.142						
	(0.139)	(0.150)						
Son/Daughter	0.355**	0.391**						
	(0.177)	(0.188)						
Other relative	-0.00910	-0.121						
	(0.260)	(0.280)						
Electricity (1=YES)	-0.00273	0.0195	-0.246	-0.345	-0.123	-0.261	0.476	0.499
	(0.230)	(0.247)	(0.366)	(0.401)	(0.492)	(1.032)	(0.419)	(0.414)
Household size	-0.00267	0.000600	0.0288	0.0197	-0.0476	-0.0365	0.0232	0.0175
	(0.0157)	(0.0162)	(0.0295)	(0.0307)	(0.0314)	(0.0300)	(0.0259)	(0.0250)
Gender (1=Female)	-0.206**	-0.287***	-0.165	-0.177				
	(0.0991)	(0.106)	(0.121)	(0.133)				
Education (Base=No education)								
Some primary	-0.136	-0.0234	-0.172	-0.188			0.209	0.650
	(0.332)	(0.358)	(0.384)	(0.423)			(0.729)	(0.710)
Completed primary	-0.0335	-0.0561	-0.200	-0.446	0.529*	0.481	0.310	0.766
	(0.343)	(0.370)	(0.400)	(0.441)	(0.286)	(0.581)	(0.763)	(0.743)
Some secondary	0.109	0.218	0.236	0.276	0.313	0.618	0.160	0.570
	(0.339)	(0.365)	(0.396)	(0.437)	(0.239)	(0.505)	(0.737)	(0.719)
Completed secondary	-0.266	-0.209	-0.242	-0.311	0.193	0.720	-0.178	0.246
	(0.341)	(0.367)	(0.405)	(0.447)	(0.250)	(0.504)	(0.748)	(0.730)
Land size	0.0203***	0.0232***	0.0250	0.0215	0.0196	0.00376	0.0222**	0.0233**
	(0.00680)	(0.00724)	(0.0154)	(0.0162)	(0.0147)	(0.0294)	(0.00935)	(0.00922)
Ox plough (1=YES)	0.0890		0.231		0.140		-0.269	
	(0.0918)		(0.144)		(0.208)		(0.164)	
Credit (Base=No credit)								
Family/Friends loan	0.151	0.593***	0.367*	0.966***	0.140	-3.586***	0.0755	0.0360
	(0.134)	(0.141)	(0.206)	(0.219)	(0.288)	(0.289)	(0.261)	(0.256)
Loan from SACCO	0.467**	1.234***	0.293	1.231***	0.864**	-6.842***	0.928	0.853
	(0.227)	(0.239)	(0.360)	(0.381)	(0.430)	(0.425)	(0.592)	(0.583)
Network (1=YES)	-0.117	-0.128	-0.119	-0.108	-0.164	-0.0659	-0.118	-0.102
	(0.0841)	(0.0906)	(0.120)	(0.132)	(0.192)	(0.397)	(0.171)	(0.169)
Distance to market	0.135***	0.148***	0.104*	0.0837	0.237**	0.0540	0.121	0.154**
	(0.0388)	(0.0418)	(0.0567)	(0.0626)	(0.0909)	(0.189)	(0.0758)	(0.0742)
Marital status (Base=Single)								
Married/Cohabiting	0.0886	-0.0159	-0.306	-0.517				
	(0.158)	(0.170)	(0.363)	(0.400)				
Divorced/Separated	-0.324	-0.386	-0.793	-1.048*				
	(0.257)	(0.276)	(0.516)	(0.568)				
Post-harvest training (1=YES)	0.268*	0.225	0.360*	0.194	0.0101	0.306	0.115	0.160
	(0.155)	(0.167)	(0.206)	(0.226)	(0.511)	(0.977)	(0.302)	(0.298)
Age squared	0.000763***	0.000949***	0.000631**	0.000985***	-0.000241	-0.000523	0.00163**	0.00183***
	(0.000239)	(0.000251)	(0.000302)	(0.000320)	(0.000725)	(0.000710)	(0.000657)	(0.000645)

Proportion of produce sold	1.712***		1.979***		1.343***		1.173***	
	(0.172)		(0.250)		(0.368)		(0.359)	
Number of crops grown	0.319***	0.298***	0.289***	0.273***	0.351***	0.344***	0.370***	0.353***
	(0.0180)	(0.0187)	(0.0253)	(0.0270)	(0.0407)	(0.0455)	(0.0381)	(0.0372)
Constant	9.365***	10.37***	9.631***	11.13***	9.785***	12.08***	9.449***	9.585***
	(0.420)	(0.433)	(0.592)	(0.614)	(0.556)	(0.750)	(0.795)	(0.775)
Number of observations	685	685	352	352	145	145	167	167
R^2	0.422	0.305	0.427	0.259	0.480	-1.623	0.453	0.406
adj. R^2	0.403		0.394		0.420		0.395	

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Annex 5: Production constraints in Uganda's agribusiness sector: Gender perspective

Abstract

Agriculture remains one of the most important sectors in Uganda, accounting for the largest share of work and employment. Albeit its contribution, the sector is faced with a number of constraints most of which are believed to be gender sensitive. Upon this backdrop, the study examined gender specific production constraints in Uganda's agribusiness sector using data collected from two Soroti and Serere districts in eastern Uganda. Data was analyzed using both descriptive statistics and Ordinary Least Squares (OLS) technique. The results reveal gender differences in a number of aspects. For instance; male headed households are more likely to earn more off-farm income compared to their female counter parts; male cultivate on larger pieces of land compared to females; females are more likely to be tenants compared to males; males are more knowledgeable about herbicides compared to females; males are more knowledgeable about crop diseases compared to females; and males have an upper hand in accessing extension services. From the regression analysis, females specific constraints include; small size of agriculture land, the tenancy type of land ownership, limited use of fertilizers, and limited use of improved seeds. On the other hand poor farming practices such as poor crop spacing may hinder agriculture productivity among male headed households. Therefore, further interventions in agriculture should be gender sensitive so as to bridge the gender gap in agriculture.

Key words: Agribusiness, Gender, and Constraints

1. Introduction

A growing population in Uganda which is highly dependent on agriculture coupled with increased urbanization calls for the need to harness agribusiness economic opportunities (Haggblade, 2011; Gandhi, 2014). There is consensus in literature that a well-developed and functioning agribusiness sector is critical for employment creation especially among the dominant youthful population (Koira, 2014). The agribusiness sector presents one of the potential pathways out of poverty specifically among the rural poor households who mainly derive a livelihood from agriculture. This is through increased incomes from agricultural productivity gains. Overall, a competitive agribusiness sector offers multiplier effects on economic growth with evidence from literature showing agribusiness contributing more to GDP than just pure agricultural production (Wilkinson & Rocha, 2009; Adenle, 2016; Haggblade, 2011).

Uganda's agribusiness sector constitutes activities such as the supply of agri-inputs; agricultural production; processing; marketing and distribution of agricultural products to retail outlets and final consumers. However, of keen interest in this paper is the agricultural production segment. This is of critical importance because it provides major linkages between the agricultural and industrial sector through agro-processing (Tersoo, 2014; Yumkella, 2011). Besides, majority of the rural poor (about 77 percent) are reliant on agricultural production. Evidence from the World Bank (2013) projects an emergence of urban agribusiness markets resulting from an increase in the demand for processed and packaged agricultural products.

Despite its importance, the production segment of agribusiness has continuously deteriorated in terms of its performance as shown by the low levels of productivity. The low productivity in agriculture could inhibit the prospects of fully maximizing this potential of agribusiness in Uganda and perhaps the reason behind the largely informal and primarily small sized agribusiness enterprises that lack coordination and are less profitable (World Bank, 2008; Salami et al., 2010; Adenle, 2016; Yumkella, 2011). A large body of existing literature attributes low agricultural productivity in Uganda to small-scale farming systems with majority of the individuals producing on a subsistence scale. As a result, low yields of agricultural output characterized by poor and inconsistent quality is realized which eventually undermines existence of a competitive agribusiness sector.

The other underlying challenge in agri-business is the gender productivity gap. In Uganda, the gender gap in agricultural productivity is estimated at 13 percent (UN Women, 2015). In addition, women are found to mainly engage in subsistence rather than commercial production (UBOS, 2012; Team & Doss, 2011; Croppenstedt et al., 2013; World Bank, 2013; Peterman et al., 2011). As a result, women are often marginalized when it comes to diversifying into lucrative and emerging agribusiness markets. Estimates indicate that narrowing the gender gap in agriculture production would significantly contribute improvement in agriculture production, improve overall

GDP and contribute to poverty eradication. According to a report from UN Women (2015), closing the gap would increase crop production by 2.8%, increase agricultural GDP by $58 million (annually), increase total GDP by $67 million (annually), and lift 119,000 people out of poverty, all of which are necessary conditions for a flourishing agribusiness sector. In spite of the above, less attention is paid to the existing gender disparities in production which is believed to exacerbate deficiencies in agricultural productivity (FAO, IFAD, and World Bank, 2008).

From literature, key among the constraints contributing to persistent gender productivity differences has been identified as unequal access to agricultural inputs (and other productive resources (Doss, 2018; Mulema & Damtew, 2016; UN Women, 2015). In this case, men dominate in the access, control, and ownership of such key resources like land, modern production equipment and technology as well as financial credit services. The other factor is inequalities in access to extension services where evidence shows that most of these services have been directed towards male agricultural producers as compared to women. This undermines women's ability to enhance their knowledge and skills which can prove vital in increasing agricultural production (Ragasa et al., 2013; Mehra & Rojas, 2008; FAO, 2011; IFC, 2016).

Socio-cultural norms also impose restrictions on women from optimizing agricultural production enhancing opportunities. For example, household duties and responsibilities which contribute to mobility problems of women hindering them from accessing input and output agricultural markets (Larson et al., 2015; Bergman et al., 2012). In addition, women are less likely to participate in decision making processes regarding what and how much to produce and how to use the agricultural output because men dominate this role (Okonya & Kroschel, 2014; Croppenstedt et al., 2013; FOWODE, 2012).

Notwithstanding the above arguments, empirical literature is largely polarized as different factors have been found to be responsible for gender gap in different countries and regions. For instance, Kumase et al (2010) finds inequality in access to extension services and marketing and control of proceeds not to matter as regards agriculture productivity. In Uganda no study has been devoted to examining gender specific constraints to agriculture production. Available studies have concentrated on estimating the gender- productivity gap (De La O Campos et al, 2016; Ali et al, 2015) and the explanation for the observed gap has inferred intuitively with no empirical evidence. The study therefore contributes to literature by providing evidence of the gender specific constraints in agriculture production in Uganda. The main assumption is that men and women face different constraints in production which contribute to the persistent gender gaps in agricultural productivity. Understanding these constraints is therefore a key factor in identifying gender streamlined plausible interventions

critical for closing existing agricultural productivity gaps a necessary condition for an inclusive and growing agribusiness sector.

Results of preliminary analysis indeed confirm gender inequalities in access to agriculture land and extension services. regression analysis shows that, overall agriculture production is hampered by; limited access to production land, limited use of modern production inputs (such as fertilizers, improved seeds, and hand hoes), poor farming methods characterized by poor crop spacing, and limited group participation. Constraints specific to female headed households include; small size of agriculture land, the tenancy type of land ownership, limited use of fertilizers, limited use of improved seeds, and pests and disease attack. On the other hand poor farming practices such as poor crop spacing may hinder agriculture productivity among male headed households.

The rest of this paper is organized as follows. Section 2 reviews literature on gender gaps in agricultural production and also explores the underlying evidence on the constraints that explain these existing differences between men and women. Section 3 provides the theoretical frame work explaining gender productivity gap in agriculture. Section 4 lays out the empirical strategy employed in the analysis. Section 5 details the characteristics of the data to be utilized in the paper. Section 6 presents and discusses results from the analysis while section 7 gives a conclusion and recommendations.

2. Reviewed Literature

With the exception of a few studies that fail to observe any agricultural productivity gaps between men and women (Doss et al., 2018; Kumase et al., 2010), there is consensus from a plethora of literature that illustrates existence of gender gaps in agricultural production. These attest that women are less productive than men. For example; Larson et al. (2015) argue that this gender gap in agricultural productivity ranges from 4 to 40 percent in a number of Sub-Saharan African countries. De La O Campos et al. (2016) while using nationally representative survey data for Uganda find a 10 percent gender gap in agricultural productivity. The authors attribute low output levels on female plots to be a result of factors such as old age status of females, high child dependency ratio which constrains women from allocating labor to their plots.

Similar to De La O Campos et al, Ali et al. (2015) use the Uganda National Panel survey data and estimate this gender gap to be at 17.5 percent. Ali et al. (2015) argue that gender agricultural productivity differences is an outcome of inequalities in access to extension services and other inputs between men and women. They argue that gaps in the access to resources are mainly driven by child dependency ratio which limits women from accessing input and output markets.In addition, Peterman et al. (2011); Kilic et al. (2015); Slavchevska (2015); Oseni et al.

(2014); and Palacios-Lopez & Lopez (2015) find consistent evidence that female-managed plots on average experience a lower agricultural output compared to male-managed plots.

Croppenstedt et al. (2013) account for these gaps to be an outcome of gender differences in access to inputs (like fertilizers), resources (such as land and credit); extension services and social norms. Indeed, Okonya and Kroschel (2014) while examining gender differences in access and use of selected productive resources among sweet potato farmers in Uganda equally report that more female-headed households lack access to credit than their male counterparts. They further argue that none of the female-headed households in their sample had received extension information from either government or non-government agents. This could potentially be due to more male-headed households having more members belonging to farmer organizations as compared to female-headed households.

Findings from Fisher and Carr (2015) who apply a multinomial logit model on data from Uganda to investigate how gendered roles and responsibilities influence agricultural technology adoption indicate that women have a much lower adoption rate of new technology (in this case a drought tolerant maize type) compared to men. They account for this low adoption rate among women to be a result of differences in resource access such as extension information, land, and credit. Furthermore, Hill and Vigneri (2014) while investigating gender specific constraints on the production of cash crops note that women rarely have similar access to assets and markets as compared to men. They assert that unlike men, women often cultivate smaller pieces of land; have limited access to labor, their formal education is lower; have lower access to credit because of socio norms and lack collateral security; and also have limited access to information and trade networks.

In addition, Larson et al. (2015) while investigating whether women in Uganda are less productive than men find a productivity gap and argue that this gap is a result of female headed households being less likely to purchase fertilizers required in boosting yields than their male counterparts. They further note that it's specifically the gender roles which make it difficult for women to engage with market agents and also limits their ability to receive extension information hence the less likelihood for them purchasing fertilizers. Moreover, Peterman et al. (2011) use Ugandan data to examine gender differences in agricultural production. While using multivariate Tobit models, they argue that productivity gender gaps are a consequence of socio-economic variables, agricultural inputs, and crop choices between male and females.

Empirical evidence from studies outside Uganda is not any different. For example, Slavchevska (2015) while using nationally representative panel data for Tanzania argues that existing gender output differentials are a result of inequalities in access of major factors of production that is; land and family labor as well as unequal returns to these resources. Slavchevska contends that women secure lower returns to inputs such as pesticides and fertilizers

mainly because they lack access to extension information. Likewise, Kinkingninhoun-Mêdagbé et al. (2010) while using a case study of rice farmers in Benin posit that women are marginalized (mainly because of the existing socio-cultural norms) when it comes to farmer group membership, access to land and equipment leading to negative production outcomes as compared men women. Though Kumase et al. (2010) failed to find any agricultural output differences among cocoa producers in Cameroon, although they argue that women experience more difficulties in accessing land; are less educated and that they are at a disadvantage regarding access to extension services and marketing. On the other hand, Palacios-Lopez & Lopez (2015) find empirical evidence that market imperfections account for the existing gender gaps in agricultural labor productivity. More specifically Palacios-Lopez & Lopez argue that gendered production barriers are a function of liquidity constraints, labor market discrimination and off-farm work time believed to differ between men and women.

The above literature therefore posits an increasing consensus on the existence of gender gaps in agricultural production. Among the factor though to be responsible for the gender gap include; inequality in access to production resources such as land, credit; inequality in access to extension services; differences in off-farm responsibilities; labour market imperfections. However as indicated earlier, most of these argument are merely inferred and no empirical evidence exists in their support, the gap that this study seeks to fill.

3. Theoretical framework

To motivate the empirical analysis, we present a simple theoretical framework that explains the gender productivity gap in agriculture. We follow the framework by Palacios-López & López (2015) where households seek to maximize utility from three sources: income earned off-farm, income earned from the farm and leisure. In line with Eswaran & Kotwal (1986), we assume households have an additive utility function which is increasing in the present value of earnings and leisure.

In line with Palacios-López & López (2015), we assume that households only use family labour and that their time endowment is divided into leisure, off-farm and farm work. Due to difference in off-farm activities between men and women, off-farm work time may vary by gender. Female-headed households may incur a higher off-farm time due to household care responsibilities that are culturally assigned to women (child care, cooking, fatching water, and so forth). Therefore the time on farm labour supply is given by;

$$L_f = N - l - (\eta_0 + \eta_1 L_0) \qquad (1)$$

Where L_f is on-farm labour supply (time), N is the total time endowment for the household head, $\eta_0 + \eta_1 L_0$ is off-farm time, η_0 is the fixed time incurred when the household participates in off-farm activities, which is the

same for both female and male headed households, $\eta_1 \geq 1$ represents the portion that is determined by the degree of household care activities. Following Palacios-López & López (2015), we assume η_1 is different for male headed and female headed households and that $\eta_1^F > \eta_1^M$.

On-farm production requires the use of two variable inputs: labour (L_f) and non-labour inputs (X). Exogenous farm characteristics may also have a significant role to play in production process. Accordingly they also enter the production function through vector Z. Following the standard cob-Douglas specification, the production function is given by;

$$f(X, L_f, Z) = X^{\phi}[N - l - (\eta_0 + \eta_1 L_0)]^{\psi} Z^{\beta} \qquad \phi + \psi + \beta = 1 \qquad (2)$$

In the production process, household faces a working capital (liquidity) constraint which is financed by borrowing and income from off-farm activities, that is

$$rX \leq B + \omega L_0 \qquad (3)$$

The household maximizes its utility by allocating labour between on-farm, off-farm work, and deciding how much non-labour input they will use in the production process. The household therefore solves the following maximization problem

$$\max_{L_0 L_f, X} V = \omega L_0 + p\, f(X, L_f, Z) - rX + \lambda\left[N - L_f - (\eta_0 + \eta_1 L_0)\right] \qquad (4)$$

Subject to working capital (liquidity) constraint

From equation (3) and (4) we specify the lagrangean function as;

$$V = \omega L_0 + p\, f(X, L_f, Z) - rX + \lambda\left[N - L_f - (\eta_0 + \eta_1 L_0)\right] + \mu(B + \omega L_0 - rX) \qquad (5)$$

Where λ and μ are the shadow prices of time and credit, respectively. Assuming that working capital constraint will be binding, the first order conditions are given by;

$$\frac{\partial V}{\partial L_0} = \omega - \lambda\eta_1 + \mu\omega \leq 0 \qquad (6)$$

$$\frac{\partial V}{\partial L_f} = pMPL_f - \lambda \leq 0 \qquad (7)$$

$$\frac{\partial V}{\partial X} = pMPX - r - \mu r \leq 0 \qquad (8)$$

$$\frac{\partial V}{\partial \mu} = B + \omega L_0 - rX \leq 0 \qquad (9)$$

Combining equation 6 and 7 we obtain;

$$\frac{\omega(1+\mu)}{\eta_1} = pMPL_f \quad (10)$$

Since η_1 is different for male headed and female headed households, marginal products with respect to on-farm labour is also different for female headed and male headed households. Following Palacios-López & López (2015), we assume that wage paid for off-farm activities for male and female and that the shadow price of the working capital constraint differs for male-headed and female-headed households. Accordingly, the marginal products for female and male headed households are given by;

$$\frac{\omega^F(1+\mu^F)}{\eta_1^F} = pMPL_f^F \quad (11)$$

$$\frac{\omega^M(1+\mu^M)}{\eta_1^M} = pMPL_f^M \quad (12)$$

Dividing equation 12 by 11, we obtain the gender gap in agriculture productivity as;

$$\frac{pMPL_f^M}{pMPL_f^F} = \left(\frac{\omega^M}{\omega^F}\right)\left(\frac{\eta_1^F}{\eta_1^M}\right)\left(\frac{1+\mu^M}{1+\mu^F}\right) \quad (13)$$

Equation 13 indicates that the gender productivity gap in agriculture is explained by; difference in the level of off-farm wages, difference in the time spent on off-farm activities, and differences in the liquidity constraints faced by male and female headed households. In this study, we expound the model and seek to find more gender specific agricultural constraints. For instance Doss (2018), Mulema & Damtew (2016), and UN Women (2015) report argue that unequal access to agricultural inputs and other productive resources such as land, modern production equipment and technology. Ragasa et al (2013), Mehra & Rojas (2008), and FAO (2011) highlight the role of inequality in access to credit on productivity gap. However no empirical evidence exists to this effect particularly for the case of Uganda.

4. Empirical strategy

Empirical analysis for the study is carried along three lines. We first estimation a general model that depicts the general constraints to agriculture production, then two separate models in which we isolate the constraints faced by female headed households and male headed households. In all the three models, we control for household demographic factors such as household size, age, education level, region religion, and marital status. The empirical models are thus given as;

$$lnY_{ij} = \alpha + \Theta' X_{ij} + \Psi' K_{ij} + \Phi' Z_{ij} + \Omega' P_{ij} + \vartheta' S_{ij} + \varepsilon_{ij} \quad (14)$$

$$lnY_{ij}^{F} = \alpha + \Theta' X_{ij}^{F} + \Psi' K_{ij}^{F} + \Phi' Z_{ij}^{F} + \Omega' P_{ij}^{F} + \vartheta' S_{ij}^{F} + \varepsilon_{ij} \quad (15)$$

$$lnY_{ij}^{M} = \alpha + \Theta' X_{ij}^{M} + \Psi' K_{ij}^{M} + \Phi' Z_{ij}^{M} + \Omega' P_{ij}^{M} + \vartheta' S_{ij}^{M} + \varepsilon_{ij} \quad (16)$$

Where; Y is farm output in kilograms. We express it in logarithms to avoid the effect of extreme values in biasing our findings. Y^F and Y^M represent output on female and male managed plots respectively. $i = 1, 2, \dots, N$ is the index for an individual and $j = 1, 2, \dots, Q$ is the index for a household

$\boldsymbol{X}$ is a vector for inputs, equipment and facilities and this comprises of; use of fertilizers, use of improved seeds, owning ox-plough, owning spray pump, owning hand hoes, owning storage facilities. All these variables are defined as dummies taking "1" for "Yes" and "0" otherwise.

K is a vector for farming practices and knowledge variables. Such variables include; practice crop spacing, practice weed management, application of manure, use of irrigation, knowledge of herbicides, knowledge of crop diseases, and access to extension training. All the variables are measured in a categorical fashion taking "1" for "Yes", "0" otherwise

$\boldsymbol{Z}$ is a vector for household specific characteristics which include; household size (continuous variable measured as the number of people in the household); income earned off-farm which is measured as a dummy variable taking "1" if the firm earns off-farm income and "0" otherwise; marital status, also measured as a dummy variable taking "1" for "Married" and "0" for "not married"; education level, measured as a categorical variable with 6 categories (No formal education, some primary education, completed primary, some 'O' level, completed 'O' level; post 'O' level); age which is measured in years and transformed into four cohorts (16-19 20-24, 25-29, 30-35); religion which is also measured using four categories (Catholics, Protestants, Muslims and others); participation in group and belonging to a cooperative which are all dummy variables taking "1" for "Yes", "0" otherwise.

$\boldsymbol{P}$ is a vector for plot characteristics. These include; plot size which is a continuous variable measured in acres; plot ownership which is measured as a categorical variable with four categories; own land, tenant, freehold, and customary. The other variable among plot characteristic is plot distance from household residence which we proxy using walking time in minutes.

$\boldsymbol{S}$ is a vector for shocks. In the study we capture two types of shocks; weather shocks which a dummy variable is taking the value "1" if the household experienced the shock and "0" otherwise; pest and disease attack which is

also a dummy taking "1" if the household experienced pest and disease attack, "0" otherwise. The models represented in equation 14 to 16 are initially estimated with the technique of Ordinary Least Squares (OLS).

5. Data

The study used data from a baseline survey of a project aimed at improving agribusiness skills of the youth through training and mentorship in Serere and Soroti districts in rural Uganda. Youth from target communities for the project were encouraged to form youth groups of 25-30 members, to be trained in managing group dynamics and agribusiness skills in addition to improved farming techniques. Several groups were formed of which some were selected for the trainings. Details of the trainings are published elsewhere. All the 30 groups selected for project were visited and a semi-structure questionnaire administered to each of their members. A total of 968 youth from 28 rural communities were interviewed.

Information gathered covered details on; household demographics and education; housing quality and assets; business and wage labor activities; land tenure of parcels accessible by households; crop production and agribusiness; agronomic skill needs (post-harvest handling, fertilizer application, extension and training); animal husbandry and agribusiness; access to credit; savings; group participation and networks; marketing and value addition. This dataset made it suitable for us to extract the possible constraints in agriculture (crop) production. Preliminary analysis was done on the data collected and results presented in table 1 and 2 where table 1 presents a comparative analysis of the average output among male and female headed households for major selected crops and table 2 presents sex disaggregated factors affecting agricultural production in the region.

Results in table 1 indicate that maize is the most cultivated crop with 588 farmer followed by sorghum with 315 farmers. Rice and cowpeas are the least cultivated crops with 43 and 47 farmers respectively. This could possibly be due to the fact that maize and sorghum are easy to grow as they require less labor input in terms of weeding and so on. The mean values in table 1 show that there exists gender differences in the average output produced for major crop enterprises grown in Eastern region of Uganda. On average for example, male farmers receive 288.122kgs of maize higher than that of females. Still regarding other crops such as rice, millet, sorghum and groundnuts; male farmers receive higher output in kilograms (that is; 84.5kgs, 283.8kgs, 43kg, and 24.6kg respectively) as compared to their female counterparts. On the other hand, the results in table 1 show that for crop enterprises like beans, cow peas, soybeans, green gram, sweet potatoes, cassava, cotton, tomatoes and sesame seeds (Sim-Sim); women receive higher output as compared to male farmers. A potential explanation for this outcome could be that males have a preference for high revenue generating cash crop enterprises (such as maize, rice and groundnuts) sold out on market while women mostly control food crops which are mainly grown for susbsistence and hence fetch lower revenue (Njuki et al., 2011; Hill & Vigneri, 2014).

This observed gender differences in output crop production therefore requires an understanding of factors underlying this gap. In this regard, table 2 attempts to provide descriptive statistics of a sub-sample mean comparison test for a number of these factors which have been disaggregated by gender of the household head. The findings reveal a significant difference between male and female headed households in terms of selected characteristics (table 2).

There is a statistically significant difference in the household sizes between female and male headed households. Findings in table 2 show that the overall average household size is 7 members. Although the mean difference for household size is statistically significant, the respective average house sizes are not different as both are close to 7. Overall, a small proportions of farmers either earn an off-farm income (24 percent) or receive income in form of remittances (4 percent). In line with Palacios-López & López (2015), the proportion of male heads earning off-farm income (27 percent) is relatively higher than that of female household head (21 percent) and this difference is statistically significant. However, results reveal that more female headed households (5 percent) receive income in form of remittances as compared to male headed households (3 percent) and this difference is also statistically significant. Additional evidence indicates that on average, households in our sample cultivate on approximately 4.3 acres with a statistically significant difference between male and female household heads. Male household heads have more acres of land (5 acres) for farming as compared to female household heads with 4 acres of land. Regarding land ownership status, the results show a statistically significant difference between male and female respondents renting land for farming. Specifically, more female household heads (8 percent) tend to rent their land used for farming as compared to male head households (4 percent).

Furthermore, results in table 2 highlight a statistically significant difference in the use of improved seeds during planting. Overall on average, 17 percent of households use improved seeds though the proportion is higher among male headed households (20 percent) as compared to female headed households (13 percent). There is also a statistically significant difference between males and females regarding having knowledge of herbicides and of crop diseases. Findings in table 2 show that male household heads have more knowledge of herbicides and of crop diseases (9 percent and 35 percent respectively) as compared to female headed households (4 percent and 23 percent respectively). Still, there is a statistically significant difference between males and females regarding access to extension training.

The results further show that the proportion of male household heads having access to extension training (61 percent) is higher than that of female headed households (54 percent). Table 2 further shows that majority of the households owned hand hoes (91 percent) though the proportion was higher among male headed households (93 percent) as compared to female headed households (90 percent). In addition, majority of households had either

experienced weather shocks (78 percent) or pests and disease attack (79 percent). However, the proportion is higher among male headed household (81percent and 82 percent respectively) as compared to female headed households (76 percent and 77 percent respectively).

In reference to the level of education, evidence in table 2 shows that the highest fraction of respondents had attained some primary as their highest level of education (48 percent) majority of these being female respondent (56 percent) while male respondents only accounted for 41 percent. Moreover, a higher proportion of male respondents reported to have their highest level of education as some O-level, completed O-level, and those of post O-level (24 percent, 14 percent and 5 percent respectively) this compared to female respondents at 17 percent, 10 percent and 2 percent respectively.

To check for any possibility of multicollinearity in the regression, we computed the pair wise correlation for the variables under consideration (results are presented in tables 3 to 7). The correlation matrix shows the extent of linear relationship between any two variables in the study. From the correlation matrix, there seem not be possibility of multicollinearity since all the correlation coefficients are found to be less than 0.8 (in absolute terms). As such, we proceed to estimate our linear empirical models using Ordinary Least Squares (OLS) technique.

6. Results and Discussion

Empirical models specified in equation (14) to (16) were estimated with OLS and the results presented table 8. Model 1 presents results for equation (14), model 2 presents results for equation (2) while model 3 presents results for equation (3). The dependent variable is output (kg) expressed in logarithms. For robustness purposes, we also re-estimate the models using the top three most cultivated crops (Maize, Millet, and Sorghum) and present the results in the table 9 in the appendix

Results in table 8 show that off-farm income (that is, income earned outside farming or received remittances) has a statistically significant impact on the overall output from agriculture. Output for households that earn off-farm income is likely to be 63.2 percent lower than that of households that do not earn off-farm income. Comparing male and females, the impact is higher among females at 58.8 percent particularly those growing maize, sorghum and millet. This suggests that off-farm income substitutes farm income instead of complementing. Diir (2013) also argues that off-farm opportunities may undermine productivity gains albeit inducing increased use of improved seed. On the other hand, Kinuthia et al (2019) find off-farm participation not to affect agriculture production even after controlling for gender while Nehring & Fernandez-Cornejo (2005) find off-farm income to boosts scale and technical efficiency of smaller operations.

On the contrary, results reveal a positive relationship between agricultural output and received income implying that households that receive income in form of remittances realize more agricultural output as compared to those without any remittances. This effect is much stronger and statistically significant among female headed households, specifically those engaged in maize growing (See table 9 in appendix) as compared to those male headed households.

From table 8, the results reveal a positive and statistically significant relationship between the size of land for farming and the quantity of agriculture output. An increase in the land size by one acre results in an increase in agricultural output by 22 percent. This effect is even much significant on female headed households (18 percent), specifically those involved in maize growing (See table 9 in appendix). Additional evidence indicates a statistically significant relationship between status of land ownership and the quantity of agricultural output. Specifically, findings show that households owning land on a freehold tenure realize higher output as compared to those households owning land without deeds. Unlike male headed households, the relationship between the status of land ownership and output is found to be strongly positive and statistically significant for female headed households.

Furthermore, the results indicate that households practicing crop spacing experience 46.1 percent higher quantities of agriculture output compared to their counterparts. This relationship is statistically significant especially among male headed households particularly those engaged in sorghum production. The results further show a positive and statistically significant relationship between the use of fertilizers and agriculture output. Households that use fertilizers realize 88.9 percent more output as compared to those who do not apply fertilizers in their farm lands. This effect is mostly significant among female headed households involved in maize and sorghum production as well as male headed households engaged in millet production. Such results indeed conform to the findings by Yousaf et al (2017) and Ainan et al (2018) who find fertilizer application to be very instrumental for agriculture production.

More findings indicate that households adopting improved seeds increases agriculture production by 39.6 percent. Meughoyi (2018), who find farmers in Cameroon that use improved maize seeds to produce 1.42 times more than their counter parts. The relationship is found to pronounced among female headed households as compared to male headed households (though weakly significant).

In addition, evidence in table 8 shows a positive and statistically significant relationship between group participation and the quantity of agriculture output. Specifically, households participating in farm groups realize 66.1 percent higher agriculture output as compared to their counterparts. However, the effect is much stronger among male headed households involved in sorghum and millet production as compared to female headed

households. Similarly, households that own hand hoes experience higher agriculture output as compared to those without such equipment. As compared to female headed households, this effect is much stronger among male headed households specifically those engaged in millet production.

Regarding different age groups, the results in table 8 reveal a positive and statistically significant relationship with the quantity of agriculture output. More agriculture output is realized among older individuals (those in age brackets of 25-29 and 20-24 years) as compared to younger individuals within the age bracket of 16-19 years. While comparing across gender types and age, male headed households within the age brackets of 25-29, 20-24 and 30-35 years are found to experience higher agricultural output than their female headed counterparts within the same age brackets. In addition, findings show a positive and statistically significant relationship between the regions where samples were taken and agriculture output. More specifically, households in Kabulabul and Kadungulu sub-county experience higher output as compared to those households in Asuret sub-county.

7. Conclusion

Given the dominant role played by agriculture in the development process of the country, the study was devoted to examining gendered agriculture constraints. In the study, household data was collected using standard questionnaires that were administered to both female headed and male headed households in the districts of Soroti and Serere. Preliminary analysis was carried out using descriptive statistics while the constraints were examined using linear regression analysis.

From the preliminary analysis, gender difference manifest in a number of aspects. For instance; male headed households are more likely to earn more off-income compared to female headed; male cultivate on larger pieces of land compared to females; females are more tenants compared to males; males are more knowledgeable about herbicides compared to females; males are more knowledgeable about crop diseases compared to females; and male have an upper hand in accessing extension services. Overall however, limited access to inputs (such as fertilizer, land, improved seeds), weather shocks, pest and disease attack, poor farming practices (such as inappropriate weed management, lack of equipment (such as Ox-plough, spray pumps), limited storage facilities, and lack cooperatives still surface.

Upon linear regression (using OLS technique) it was discovered that overall agriculture production is hampered by; limited access to production land, limited use of modern production inputs (such as fertilizers, improved seeds, and hand hoes), poor farming methods characterized by poor crop spacing, and limited group participation. There are however some gender specific constraints most especially for female headed households. These include; small size of agriculture land, the tenancy type of land ownership, limited use of fertilizers, and limited use of improved

seeds. On the other hand poor farming practices such as poor crop spacing may hinder agriculture productivity among male headed households.

Based on the findings, it's therefore recommended to increase intervention in agriculture sector particularly regarding land management, provision of agriculture inputs, and extension services. But most importantly, the interventions should be gender sensitive so as to bridge the gender gap in agriculture.

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Appendix

Table 1: Average Output Produced for Selected Crop Enterprises grown in the Eastern Region

Crop Enterprises	N	Full sample		Males		Females	
		Mean (in Kgs)	Std. Dev	Mean (in Kgs)	Std. Dev	Mean (in Kgs)	Std. Dev
Rice	43	256.86	254.95	286.32	239.15	201.87	282.35
Maize	588	418.46	2,985.19	552.23	4062.13	264.11	371.62
Millet	292	264.13	2,046.62	401.16	2841.33	117.39	121.11
Sorghum	315	209.97	276.14	230.56	308.20	187.60	235.46
Groundnuts	120	185.63	418.47	197.72	251.78	173.12	541.66
Beans	74	83.10	158.16	73.47	87.38	91.28	200.53
Cowpeas	47	41.38	62.73	16.43	24.43	78.16	82.24
Soybeans	68	86.68	146.70	54.79	72.42	116.74	188.56
Green gram	117	61.47	92.62	56.48	97.13	67.09	87.80
Sweet potatoes	102	334.33	1,081.62	244.68	470.92	447.89	1542.60
Cassava	262	275.59	540.75	309.36	617.19	242.33	453.02
Cotton	37	359.65	357.58	356.80	234.54	365.58	546.25
Tomatoes	58	182.86	480.75	169.27	382.73	202.13	601.62
Sesame (Sim-Sim)	124	116.84	144.92	111.93	147.94	123.86	141.65

Source: primary data collection

Table2: Sex-disaggregated descriptive statistics for Production Factors

Variable	Full Sample (N=971)		Male (N=500)		Female (N=471)		Mean Diff
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	
Household Size	6.713	2.929	6.508	2.958	6.930	2.886	-0.422**
Earn off-farm income (1=yes, 0=No)	0.239	0.427	0.266	0.442	0.210	0.408	0.056**
Received income (1=yes, 0=No)	0.040	0.196	0.030	0.171	0.051	0.220	-0.021*
Land size (in acres)	4.309	66.704	4.940	0.440	3.611	0.245	1.330**
Land ownership status (2=tenant)	0.057	0.232	0.039	0.193	0.076	0.266	-0.037**
Land ownership status (3=freehold)	0.106	0.309	0.114	0.318	0.098	0.298	0.0160
Land ownership status (4=customary)	0.617	0.486	0.637	0.481	0.597	0.491	0.0400
Plot distance to residence (walking minutes)	20.04	40.05	20.39	39.17	19.68	40.99	0.708
Practice Crop spacing (1=yes, 0=no)	0.676	0.468	0.701	0.458	0.650	0.477	0.0510
Practice Weed management (1=yes, 0=no)	0.092	0.290	0.090	0.286	0.095	0.293	-0.00500
Use Fertilizer (1=yes, 0=no)	0.063	0.243	0.069	0.254	0.056	0.231	0.0130
Manure (1=yes, 0=no)	0.151	0.358	0.157	0.364	0.144	0.352	0.0120
Irrigation use (1=yes, 0=no)	0.021	0.142	0.023	0.150	0.018	0.133	0.00500
Use Improved seeds (1=yes, 0=no)	0.166	0.372	0.199	0.399	0.131	0.338	0.068***
Weather shocks (1=yes, 0=no)	0.784	0.412	0.810	0.393	0.756	0.430	0.054**
Pests disease attack (1=yes, 0=no)	0.793	0.405	0.818	0.386	0.767	0.423	0.051*
Knowledge of herbicides (1=yes, 0=no)	0.068	0.253	0.092	0.289	0.043	0.203	0.049***
Knowledge of crop diseases (1=yes, 0=no)	0.292	0.455	0.354	0.479	0.226	0.419	0.128***
Extension training (1=yes, 0=no)	0.577	0.494	0.614	0.487	0.537	0.499	0.077**
Belong to cooperative (1=yes, 0=no)	0.096	0.295	0.098	0.298	0.095	0.293	0.00300
Group participation (1=yes, 0=no)	0.414	0.493	0.436	0.496	0.391	0.488	0.0450
Own an Ox-plough (1=yes, 0=no)	0.405	0.491	0.392	0.489	0.418	0.494	-0.0260
Own spray pumps (1=yes, 0=no)	0.082	0.275	0.082	0.275	0.083	0.276	-0.00100
Own hand hoes (1=yes, 0=no)	0.911	0.284	0.926	0.262	0.896	0.306	0.030*
Own a storage facility (1=yes, 0=no)	0.276	0.447	0.260	0.439	0.293	0.456	-0.0330
Education level (2=some primary)	0.483	0.500	0.408	0.492	0.563	0.497	-0.155***
Education level (3=completed primary)	0.119	0.325	0.122	0.328	0.117	0.321	0.0050
Education level (4=some O-level)	0.205	0.404	0.242	0.429	0.166	0.372	0.076***
Education level (5=completed O-level)	0.120	0.326	0.142	0.349	0.098	0.297	0.044**
Education level (6=post O-level)	0.036	0.186	0.050	0.218	0.021	0.144	0.029**
Marital status (1=Married)	0.524	0.500	0.546	0.498	0.501	0.501	-0.0900
Age cohort (1=20-24 years)	0.338	0.473	0.106	0.308	0.335	0.473	0.005
Age cohort (2=25-29 years)	0.240	0.427	0.280	0.449	0.197	0.398	0.083***
Age cohort (3=30-35 years)	0.103	0.304	0.340	0.474	0.100	0.300	0.006
Religion (1=Catholics)	0.260	0.439	0.249	0.433	0.273	0.446	-0.024
Religion (2=Protestant)	0.445	0.497	0.457	0.499	0.431	0.496	0.027
Religion (3=Others)	0.290	0.454	0.285	0.452	0.294	0.456	-0.009

Source: primary data collection

Table 3: Pairwise correlation matrix

	1	2	3	4	5	6	7
(1) Household Size	1.000						
(2) Earn off-farm income	0.032	1.000					
(3) Received income	-0.028	0.1560*	1.000				
(4) Land size (in acres)	0.1361*	-0.0761*	-0.010	1.000			
(5) Tenants	-0.0990*	-0.054	-0.051	-0.036	1.000		
(6) Free land hold	0.1614*	0.1477*	-0.003	-0.017	-0.0848*	1.000	
(7) Customary land hold	-0.1103*	0.051	0.0646*	0.031	-0.3121*	-0.4385*	1.000
(8) Plot distance to residence	0.1388*	0.031	0.0960*	0.046	0.1062*	-0.009	-0.032
(9) Practice Crop spacing	0.019	0.2074*	0.062	0.036	0.054	0.060	0.059
(10) Practice Weed management	0.048	-0.055	0.009	0.0871*	0.1183*	-0.017	-0.060
(11) Use Fertilizer	-0.014	-0.057	0.1260*	0.1075*	0.1511*	-0.035	-0.039
(12) Manure	-0.012	0.1059*	0.0955*	0.1325*	0.055	0.045	-0.047
(13) Irrigation use	0.016	-0.0840*	0.008	0.0806*	0.031	-0.027	-0.009
(14) Use Improved seeds	0.034	-0.043	-0.005	0.051	-0.0844*	-0.046	0.0703*
(15) Weather shocks	0.027	0.2261*	0.029	-0.059	-0.003	0.0961*	-0.1407*
(16) Pests disease attack	0.051	0.1983*	0.025	-0.0662*	-0.020	0.1075*	-0.1805*
(17) Knowledge of herbicides	-0.006	0.022	0.1384*	0.047	-0.029	-0.026	0.0655*
(18) Knowledge of crop diseases	-0.059	0.0911*	0.0949*	0.045	-0.022	-0.004	0.2171*
(19) Extension training	-0.012	0.1183*	0.1116*	0.0859*	-0.1208*	0.0953*	-0.0780*
(20) Belong to cooperative	-0.1088*	0.062	0.1628*	-0.065	0.009	-0.028	0.059
(21) Group participation	0.007	0.2547*	0.052	0.034	-0.049	0.0783*	-0.0883*
(22) Own an Ox-plough	0.3740*	0.025	0.034	0.1921*	-0.1181*	0.0790*	0.009
(23) Own spray pumps	0.1625*	0.1132*	-0.004	0.006	-0.058	0.2176*	-0.030
(24) Own hand hoes	0.0907*	0.0897*	0.027	-0.0796*	0.029	0.036	-0.057
(25) Own a storage facility	0.1078*	0.1025*	0.0966*	-0.023	-0.062	-0.017	0.2047*
(26) Some primary education	0.056	0.053	0.054	-0.0697*	0.028	-0.017	0.035
(27) Completed primary	-0.057	-0.0723*	-0.059	0.064	-0.062	-0.010	0.006
(28) Some O-level	-0.001	0.015	-0.026	0.004	0.031	0.033	-0.049
(29) Completed O-level	-0.044	0.000	0.037	0.024	-0.036	0.028	0.003
(30) Post O-level	0.043	0.021	-0.040	0.056	0.024	0.005	-0.0991*
(31) 20-24 years	-0.0935*	0.018	0.009	0.036	0.026	-0.016	0.031
(32) 25-29 years	-0.1351*	-0.009	-0.017	-0.055	-0.002	-0.052	0.027
(33) 30-35 years	-0.006	0.025	0.051	-0.013	-0.025	0.004	-0.012
(34) Catholics	-0.0651*	-0.1002*	-0.048	0.058	-0.050	0.004	0.0807*
(35) Protestants	-0.005	0.1314*	-0.020	-0.054	0.046	-0.017	-0.035
(36) Other denominations	0.0680*	-0.041	0.059	0.004	0.001	-0.004	-0.035

*, denotes significance at 5 percent

Table 4: Pairwise correlation matrix (continued)

	8	9	10	11	12	13	14
(8) Plot distance to residence	1.000						
(9) Practice Crop spacing	0.020	1.000					
(10) Practice Weed management	-0.014	0.1644*	1.000				
(11) Use Fertilizer	0.001	0.1602*	0.5196*	1.000			
(12) Manure	0.0743*	0.2397*	0.3686*	0.5025*	1.000		
(13) Irrigation use	0.021	0.0677*	0.2176*	0.3083*	0.2376*	1.000	
(14) Use Improved seeds	-0.016	0.0780*	0.0693*	-0.008	0.065	0.038	1.000
(15)Weather shocks	-0.014	0.1388*	-0.1806*	-0.1955*	-0.0867*	-0.032	0.017
(16) Pests disease attack	0.1272*	0.1322*	-0.1768*	-0.1420*	-0.012	-0.014	0.0674*
(17) Knowledge of herbicides	0.035	0.0771*	0.1068*	0.018	0.0780*	-0.009	0.0986*
(18) Knowledge of crop diseases	0.016	0.1227*	-0.023	-0.049	0.056	0.008	0.1816*
(19) Extension training	-0.016	0.1559*	-0.1335*	-0.1224*	0.021	0.011	0.1790*
(20) Belong to cooperative	0.043	0.046	-0.037	-0.017	0.004	0.034	0.1303*
(21) Group participation	-0.026	0.2300*	-0.0971*	-0.0823*	0.0660*	0.012	0.1161*
(22) Own an Ox-plough	0.1245*	-0.047	-0.012	-0.014	-0.009	-0.042	0.1121*
(23) Own spray pumps	0.0975*	-0.004	-0.044	0.000	0.012	-0.017	0.040
(24) Own hand hoes	0.040	0.2314*	0.016	0.063	0.0956*	0.044	0.052
(25) Own a storage facility	0.0877*	0.030	-0.0847*	-0.1015*	0.022	-0.051	0.011
(26) Some primary education	0.017	0.048	0.057	-0.003	-0.029	-0.0651*	-0.044
(27) Completed primary	0.005	-0.0790*	-0.0950*	-0.041	0.012	0.040	0.014
(28) Some O-level	-0.030	-0.032	0.041	0.034	0.002	0.039	-0.033
(29) Completed O-level	0.023	0.056	-0.026	0.000	0.030	0.017	0.059
(30) Post O-level	0.019	-0.033	-0.004	0.019	0.043	0.011	0.049
(31) 20-24 years	-0.061	-0.023	-0.0783*	-0.035	-0.040	-0.007	-0.025
(32) 25-29 years	-0.039	0.039	0.039	-0.001	-0.047	0.007	0.034
(33) 30-35 years	-0.050	0.041	0.001	0.013	0.1024*	0.050	0.037
(34) Catholics	-0.048	-0.045	-0.043	-0.010	-0.024	-0.016	-0.010
(35) Protestants	0.008	0.1050*	0.038	0.018	-0.002	-0.023	-0.022
(36) Other denominations	0.033	-0.0678*	-0.014	-0.008	0.029	0.042	0.025

*, denotes significance at 5 percent

Table 5: Pairwise correlation matrix (continued)

	15	16	17	18	19	20	21
(15) Weather shocks	1.000						
(16) Pests disease attack	0.6729*	1.000					
(17) Knowledge of herbicides	-0.001	-0.005	1.000				
(18) Knowledge of crop diseases	0.0718*	0.037	0.2705*	1.000			
(19) Extension training	0.1874*	0.2535*	0.1102*	0.1713*	1.000		
(20) Belong to cooperative	0.1178*	0.0925*	0.1514*	0.1275*	0.1173*	1.000	
(21) Group participation	0.2863*	0.2495*	-0.029	0.046	0.2673*	0.1849*	1.000
(22) Own an Ox-plough	-0.014	-0.039	-0.031	0.048	0.0991*	-0.042	0.018
(23) Own spray pumps	0.0893*	0.0646*	-0.006	0.0932*	0.022	0.047	0.060
(24) Own hand hoes	0.1451*	0.1453*	0.051	-0.0876*	-0.040	0.0941*	0.1590*
(25) Own a storage facility	-0.1299*	-0.1759*	0.0963*	0.2282*	-0.021	0.1305*	0.019
(26) Some primary education	0.024	0.039	-0.015	-0.0723*	-0.060	-0.042	-0.1137*
(27) Completed primary	0.009	0.048	-0.048	0.012	0.046	0.026	0.0772*
(28) Some O-level	0.020	-0.050	-0.021	0.050	0.017	-0.002	0.060
(29) Completed O-level	0.023	0.030	0.0846*	0.048	0.055	0.035	0.042
(30) Post O-level	0.049	0.059	0.036	-0.015	0.032	0.023	0.039
(31) 20-24 years	0.028	0.000	-0.0764*	-0.017	-0.032	0.020	0.019
(32) 25-29 years	0.004	-0.015	0.0979*	0.0829*	0.027	0.048	-0.017
(33) 30-35 years	0.0776*	0.045	0.0752*	0.0674*	0.050	0.0806*	0.1004*
(34) Catholics	-0.039	-0.0659*	-0.048	-0.053	-0.020	0.1184*	-0.001
(35) Protestants	0.050	0.0666*	0.015	0.019	0.001	-0.0995*	0.017
(36) Other denominations	-0.009	0.005	0.032	0.015	0.008	-0.020	-0.013

*, denotes significance at 5 percent

Table 6: Pairwise correlation matrix (continued)

	22	23	24	25	26	27	28
(22) Own an Ox-plough	1.000						
(23) Own spray pumps	0.1802*	1.000					
(24) Own hand hoes	-0.046	0.054	1.000				
(25) Own a storage facility	0.1151*	0.0999*	0.1763*	1.000			
(26) Some primary education	-0.012	-0.042	-0.011	0.003	1.000		
(27) Completed primary	0.007	-0.018	-0.053	0.014	-0.3560*	1.000	
(28) Some O-level	0.008	0.043	-0.003	-0.045	-0.4907*	-0.1870*	1.000
(29) Completed O-level	-0.028	0.027	0.037	0.005	-0.3578*	-0.1363*	-0.1879*
(30) Post O-level	0.0769*	0.063	0.041	-0.0700*	-0.1869*	-0.0712*	-0.0982*
(31) 20-24 years	-0.025	-0.024	0.016	-0.012	-0.1064*	0.026	0.010
(32) 25-29 years	-0.1587*	-0.046	-0.029	0.020	-0.046	0.009	-0.011
(33) 30-35 years	-0.038	0.046	0.058	-0.027	-0.022	0.042	-0.004
(34) Catholics	0.002	-0.057	0.060	0.040	-0.004	0.032	0.003
(35) Protestants	-0.050	-0.001	-0.002	-0.042	0.015	-0.030	-0.057
(36) Other denominations	0.048	0.034	-0.052	0.009	-0.015	0.007	0.055

*, denotes significance at 5 percent

Table 7: Pairwise correlation matrix (continued)

	28	29	30	31	32	33	34	35
28) Some O-level	1.000							
29) Completed O-level	-0.0716*	1.000						
30) Post O-level	0.1303*	0.025	1.000					
31) 20-24 years	0.0661*	0.008	-0.4013*	1.000				
32) 25-29 years	-0.032	0.025	-0.2420*	-0.1904*	1.000			
33) 30-35 years	-0.042	0.024	-0.005	-0.020	-0.043	1.000		
34) Catholics	0.060	0.039	-0.017	0.0749*	-0.004	-0.5309*	1.000	
35) Protestants	-0.022	-0.063	0.032	-0.0667*	0.043	-0.3790*	-0.5714*	1.000

*, denotes significance at 5 percent

Table 8: Regression Analysis for Gendered Constraints in Agriculture Production

	(1)		(2)		(3)	
VARIABLES	**Full Sample**	**Std. Dev**	**Male**	**Std. Dev**	**Female**	**Std. Dev**
Household size	0.079	(0.157)	0.205	(0.216)	-0.047	(0.244)
Earn off-farm income	-0.631***	(0.183)	-0.560**	(0.256)	-0.588**	(0.276)
Received income	0.624**	(0.265)	0.225	(0.358)	1.108**	(0.441)
Land size	0.215***	(0.061)	0.173*	(0.090)	0.176**	(0.080)
Land ownership status (2=tenant)	-0.002	(0.366)	0.159	(0.388)	0.240	(0.630)
Land ownership status (3=freehold)	0.793***	(0.206)	0.308	(0.289)	1.134***	(0.335)
Land ownership status (4=customary)	0.021	(0.206)	-0.113	(0.273)	0.231	(0.317)
Plot distance to residence	0.001	(0.002)	-0.002	(0.003)	-0.001	(0.003)
Practice crop spacing	0.461***	(0.177)	0.696***	(0.254)	0.206	(0.259)
Practice weed management	0.116	(0.318)	-0.140	(0.391)	0.555	(0.628)
Use fertilizer	0.888**	(0.407)	0.566	(0.397)	1.895**	(0.848)
Apply manure	-0.288*	(0.172)	-0.356	(0.232)	-0.292	(0.349)
Use irrigation	0.162	(0.539)	0.262	(0.636)	0.466	(0.699)
Use improved seeds	0.396**	(0.178)	0.100	(0.235)	0.646*	(0.342)
Weather shocks	-0.273	(0.257)	-0.559	(0.376)	-0.016	(0.400)
Pests and disease attack	0.469*	(0.275)	0.585	(0.460)	0.666*	(0.390)
Knowledge of herbicides	0.154	(0.190)	-0.103	(0.261)	0.562	(0.547)
Knowledge of crop diseases	-0.007	(0.163)	0.091	(0.212)	-0.142	(0.286)
Extension training	0.167	(0.162)	0.573**	(0.225)	-0.312	(0.247)
Belong to cooperative	-0.218	(0.207)	-0.327	(0.296)	-0.417	(0.306)
Group participation	0.661***	(0.150)	0.641***	(0.200)	0.613**	(0.249)
Own an ox-plough	0.129	(0.143)	0.246	(0.197)	0.215	(0.218)
Own spray pumps	0.306	(0.239)	0.227	(0.325)	0.201	(0.401)
Own hand hoes	2.511***	(0.407)	3.030***	(0.515)	1.819***	(0.624)
Own storage facilities	0.146	(0.154)	0.242	(0.215)	0.267	(0.266)
Education level (2=some primary)	1.190	(0.751)	0.838	(0.743)	1.081	(1.329)
Education level (3=completed primary)	0.798	(0.776)	0.253	(0.804)	1.040	(1.379)
Education level (4=some O-level)	1.075	(0.757)	0.548	(0.752)	1.110	(1.351)
Education level (5=completed O-level)	0.867	(0.745)	0.324	(0.744)	1.008	(1.343)
Education level (6=post O-level)	0.921	(0.804)	0.219	(0.850)	1.177	(1.433)
Marital status (1=Married)	-0.130	(0.168)	-0.357	(0.251)	0.158	(0.251)
Age cohort (1=20-24 years)	0.671***	(0.205)	0.905***	(0.301)	0.482*	(0.271)
Age cohort (2=25-29 years)	0.743***	(0.241)	1.117***	(0.344)	0.470	(0.333)
Age cohort (3=30-35 years)	0.468	(0.314)	1.008**	(0.449)	-0.126	(0.512)
Sub-county (2= Kabulabul)	0.371*	(0.203)	-0.232	(0.191)	0.062	(0.312)
Sub-county (3= Kadungulu)	0.510**	(0.218)			-0.006	(0.346)
Sub-county (4= Tubur)			-0.904***	(0.322)		
Religion (1= Catholics)	-0.451	(0.505)			-1.343*	(0.798)
Religion (2=Protestants)	-0.494	(0.495)	-0.163	(0.217)	-1.381*	(0.798)
Religion (3=Others)	-0.575	(0.508)	0.034	(0.243)	-1.632**	(0.815)
Constant	0.339	(0.938)	0.090	(1.076)	2.432	(1.630)
Observations	484		274		210	
R-squared	0.414		0.516		0.402	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Crop Specific Regression Analysis for Gendered constraints in Agriculture Production

VARIABLES	Maize		Sorghum		Millet	
	Male (Std. Dev)	Female (Std. Dev)	Male (Std. Dev)	Female (Std. Dev)	Male (Std. Dev)	Female (Std. Dev)
Household size	0.239 (0.220)	-0.112 (0.239)	0.095 (0.261)	-0.169 (0.313)	0.074 (0.299)	-0.061 (0.364)
Earn off-farm income	-0.555** (0.254)	-0.688** (0.284)	-0.341 (0.272)	-0.592** (0.270)	-0.568* (0.339)	-0.497 (0.319)
Received income	0.273 (0.388)	0.835* (0.458)	-0.093 (0.307)	0.988 (0.782)	-0.355 (0.388)	0.634 (0.637)
Land size	0.171* (0.092)	0.193** (0.083)	0.158 (0.134)	0.122 (0.114)	0.152 (0.100)	0.124 (0.119)
Land ownership status (tenant)	-0.060 (0.434)	0.033 (0.586)	0.706* (0.399)	0.167 (0.860)	0.588 (0.611)	-0.243 (0.715)
Land ownership status (freehold)	0.357 (0.300)	1.100*** (0.330)	0.419 (0.358)	1.088** (0.510)	0.608 (0.400)	0.857* (0.433)
Land ownership status (4=customary)	-0.103 (0.281)	0.198 (0.326)	0.038 (0.334)	0.438 (0.444)	0.297 (0.312)	-0.068 (0.467)
Plot distance to residence	-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.004)	0.002 (0.003)	-0.001 (0.003)
Practice crop spacing	0.665*** (0.255)	0.221 (0.276)	0.510* (0.289)	0.057 (0.415)	0.507 (0.309)	0.248 (0.394)
Practice weed management	-0.082 (0.386)	0.470 (0.586)	0.862 (0.528)	0.278 (0.510)	0.110 (0.482)	-0.667 (0.600)
Use fertilizer	0.593 (0.397)	1.909** (0.798)	0.439 (0.459)	1.698** (0.732)	1.487***(0.423)	0.787 (0.999)
Apply manure	-0.375 (0.234)	-0.245 (0.352)	-0.289 (0.302)	0.219 (0.443)	-0.230 (0.302)	0.016 (0.479)
Use irrigation	0.228 (0.621)	0.572 (0.622)	0.502 (0.720)		0.587 (0.482)	0.779 (0.493)
Use improved seeds	0.067 (0.236)	0.495 (0.363)	0.010 (0.274)	0.414 (0.390)	0.175 (0.287)	0.734 (0.455)
Weather shocks	-0.468 (0.381)	-0.041 (0.433)	-0.560 (0.498)	-0.533 (0.418)	-0.292 (0.457)	0.086 (0.641)
Pests and disease attack	0.609 (0.478)	0.610 (0.413)	0.266 (0.574)	0.941** (0.373)	0.197 (0.546)	0.358 (0.546)
Knowledge of herbicides	-0.190 (0.271)	0.560 (0.529)	-0.488 (0.339)	1.366** (0.565)	-0.260 (0.384)	1.754*** (0.610)
Knowledge of crop diseases	0.126 (0.207)	0.052 (0.294)	0.413* (0.225)	-0.156 (0.391)	-0.174 (0.269)	0.174 (0.464)
Extension training	0.718*** (0.232)	-0.276 (0.247)	0.812*** (0.278)	0.193 (0.307)	0.878*** (0.307)	-0.267 (0.367)
Belong to cooperative	-0.331 (0.296)	-0.318 (0.306)	-0.775** (0.370)	-0.428 (0.401)	-0.624* (0.339)	-0.599 (0.470)
Group participation	0.658*** (0.200)	0.639** (0.261)	0.971*** (0.225)	0.396 (0.327)	0.879*** (0.259)	0.755** (0.341)
Own an ox-plough	0.316 (0.199)	0.164 (0.233)	0.401* (0.231)	0.182 (0.298)	0.485** (0.219)	0.045 (0.325)
Own spray pumps	0.080 (0.320)	0.391 (0.398)	-0.083 (0.351)	-0.040 (0.467)	-0.074 (0.369)	0.418 (0.561)
Own hand hoes	2.942*** (0.532)	1.483** (0.643)	2.736*** (0.616)	-0.264 (0.795)	3.440*** (0.645)	0.844 (0.958)
Own storage facilities	0.160 (0.211)	0.292 (0.274)	0.118 (0.241)	0.275 (0.304)	0.413 (0.274)	0.567 (0.361)
Education level (2=some primary)	-0.272 (0.570)	1.180 (1.380)	-1.287* (0.737)	1.363 (1.770)	-0.638 (0.791)	0.929 (2.062)
Education level (3=completed primary)	-0.859 (0.621)	1.136 (1.428)	-1.856** (0.812)	1.593 (1.795)	-1.278 (0.858)	0.969 (2.078)
Education level (4=some O-level)	-0.585 (0.579)	1.193 (1.410)	-1.591** (0.784)	1.500 (1.810)	-0.678 (0.765)	0.549 (2.049)
Education level (5=completed O-level)	-0.775 (0.580)	1.128 (1.392)	-1.900** (0.759)	1.833 (1.746)	-1.211 (0.817)	1.003 (2.063)
Education level (6=post O-level)	-1.057 (0.688)	1.393 (1.489)	-2.060** (0.942)	1.138 (2.024)	-1.241 (0.894)	1.050 (2.184)

Marital status (1=Married)	-0.265 (0.262)	0.218 (0.255)	-0.437 (0.338)	0.147 (0.342)	-0.172 (0.296)	0.318 (0.388)
Age cohort (1=20-24 years)	0.941*** (0.305)	0.414 (0.275)	1.047*** (0.361)	0.186 (0.392)	0.934** (0.373)	0.352 (0.411)
Age cohort (2=25-29 years)	1.101*** (0.358)	0.426 (0.334)	1.458*** (0.424)	-0.140 (0.396)	1.250*** (0.427)	0.445 (0.453)
Age cohort (3=30-35 years)	1.001** (0.442)	-0.097 (0.535)	1.035* (0.540)	-0.667 (0.724)	0.817 (0.542)	-0.311 (0.654)
Sub-county (2= Kabulabul)	0.674** (0.316)	0.083 (0.280)	0.283 (0.386)	0.275 (0.523)	0.666* (0.341)	0.146 (0.441)
Sub-county (3= Kadungulu)	0.934*** (0.335)		0.595 (0.392)	0.074 (0.505)	0.772** (0.375)	
Sub-county (4= Tubur)		-0.078 (0.362)				0.004 (0.520)
Religion (1= Catholics)	-	-0.724 (0.831)		0.215 (0.370)	-0.172 (0.285)	-0.306 (1.389)
Religion (2=Protestants)	-0.131 (0.216)	-0.686 (0.816)	-0.079 (0.253)	0.196 (0.347)	-0.349 (0.278)	-0.557 (1.417)
Religion (3=Others)	0.161 (0.240)	-0.852 (0.849)	0.428 (0.270)			-0.719 (1.404)
Constant	0.012 (1.055)	2.107 (1.646)	1.663 (1.320)	3.089 (2.071)	-0.015 (1.255)	2.938 (2.530)
Observations	259	200	189	140	183	139
R-squared	0.527	0.365	0.534	0.320	0.563	0.336

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

ANNEX 6: Choice of agribusiness activities among youths and women: does the source of financing matter?

Abstract

This paper examines whether the source of finance matters in the choice of agribusiness activities by the youth in rural Uganda. We employ propensity score matching method to control for endogeneity. We use survey data collected from Soroti and Serere districts in Eastern Uganda. Our main result is that if the youth access finance through the sale of farm produce, their choice of agribusiness activities is more diverse than when they access funds through credit.

1.0 Introduction

Agribusiness refers to engagement in crop and animal husbandry for commercial purposes besides processing of farm output and also marketing farm input (for an example see: Ayo, et al., 2012). Agribusiness is not new in Uganda although it was largely among cash crops especially coffee, tea and cotton as these were grown as sources of raw materials for the British manufacturing sector. Today, however, agribusiness is being promoted for purposes of enabling the transition of Uganda's economy to the middle income status through commercializing of agriculture production as opposed to subsistence farming. This is because 39.5% of households are in subsistence agriculture (UNHS 2016/17). A disaggregation by age cohorts indicates that 68.4%, 48.5%, 35.3%, 36.3% and 50.2% of persons aged 14–17, 15–24, 18–30, 31–64 and 60+ years respectively are employed in subsistence agriculture (UNHS 2016/17). Moreover, persons engaged in any form of subsistence agriculture are more likely to be poor. For example households whose main source of income is subsistence agriculture have a 46.9 percent likelihood of being poor (UNHS 2016/17). This when compared to 2%, 20.6% and 23% likelihood of being poor when a household engages in commercial farming, wage employment and non-agricultural enterprises implies that being poor is largely synonymous with subsistence farming. Furthermore, a person who is a subsistence farmer only is 28.4% more likely to be poor compared to 17.9%, 4.9%, 39.1%, 0.5% and 9.1% of a person who is: a paid employee not casual labourer in agriculture, a paid employee casual labourer in agriculture, self-employed, contributing family worker and not working respectively (UNHS 2016/17).

Therefore, to abate poverty in Uganda partly implies alleviating subsistence agriculture in preference for agribusiness. This is because the likelihood of being poor is 2 percent and 46.9 percent if a household's main source of income is commercial and subsistence farming respectively. However, this implies the need for perception re-orientation to the extent that agriculture is not only perceived as farming but also includes research, agro-processing, engineering, financial management and marketing (Holz-Clause & Jost, 1995). It is through this re-orientation that engagement in agriculture can facilitate improvement of rural livelihood (White, 2012). Indeed, Agribusiness can act as an engine for socio-economic transformation through enabling value addition (Mittal & Singh, 2007; Panda & Sreekumar, 2012; Sabourin, 2015; Stanton, 2000), employment creation (Bairwa, et al., 2014; Tersoo, 2014; Drost, et al., 2014; Odongo, et al., 2017; Mulley & Unruh, 2004), provision of raw materials to agro-based processing firms (Elepu & Nalukenge, 2009; Mulley & Unruh, 2004) as well as provision of market to farmers' produce (Kirsten & Sartorius, 2002).

In Uganda, agribusiness argued to be a driver for job creation (Drost et al., 2014; Odongo et al., 2017; Mulley & Unruh, 2004). While studying the constraints for youth to engage in agribusiness in northern Uganda, Drost et al., (2014) found agribusiness to provide an opportunity for employing the formally displaced youth in the war affected

areas of the country. Mulley & Unruh, (2004) found the tea industry in Western Uganda to serve as an off-farm employer to some local workers. Moreover, Elepu & Nalukenge, (2009) and Mulley & Unruh, (2004) report that through contract farming in which agribusiness firms contract farmers to grow crops of their interest, firms are assured of steady supply of raw materials while farmers benefit through accessing farm inputs such as improved seeds and extension services coupled with access to a guaranteed market for their produce. This is also supported by (Kirsten & Sartorius, 2002).

Although, the contributions of agribusiness to Uganda's development is immense, it still faces a number of challenges. Mugonola & Baliddawa, (2014) point to the few and small markets of the agricultural products, banks being reluctant to lending to smallholder farmers, the unavailability of some farm inputs coupled with their poor quality, the volatilities in the agricultural product prices which translates into unstable farmers' incomes, High illiteracy rates which affects the business planning by the farmers. Drost et al., (2014) observe limited accessibility to land, insufficient knowledge and limited access to production and market networks as the major challenges to agribusiness in the country.

However this paper is concerned with how the source of credit affects the choice of agribusiness among youths and women in Uganda. The importance of credit to agribusiness cannot be understated for example, in a study of soybean farmers in Togo Ali & Awade (2019) show that being credit unconstrained to the extent of having a full amount of credit is positively associated with soybean production and revenue. Even then, the use of that traditional credit use, formal or informal, is extremely low (across credit type, country, crop and farm size categories). Indeed, Adjognon et al., (2017) using the Living Standards Measure Study (LSMS) survey dataset for Malawi, Uganda, Nigeria and Tanzania show that farming households typically purchase modern farm inputs with cash from nonfarm activities and crop sales. Similarly, Sheahan (2017) using the LSMS survey dataset for Ethiopia, Malawi, Niger, Nigeria, Tanzania, and Uganda show that they is limited utilisation of credit to purchase farm inputs. Also using a dataset from rural Burkina Faso Porgo et al., (2018) show that farming households that are credit constrained allocate relatively lower share of land to maize and cotton while they allocate relatively higher share of land to sorghum and millet.

The uniqueness of our study is that we do not dwell with whether a rural youths and women are credit constrained and how that affects their choice of agribusiness enterprise besides the accrued revenue and production, rather we are interested in establishing how the choice of agribusiness enterprise is explained the choice of credit. To the best our knowledge, there has been no such survey-based analysis that seeks to understand the how the source credit affects the choice of agribusiness. Our analysis is based on a 2018 survey dataset of youths and women from rural Eastern. The choice of youths and women is because they are the most vulnerable in terms of being susceptible to poverty as they contribute the fraction of Uganda's population that engages in subsistence agriculture (UNHS 2016/17).

3.0 Data and Methodology

3.1 Data

3.1.1 Data collection and sample selection

We use household survey data collected in 2018 from Soroti and Serere districts in Eastern Uganda. We chose to collect data from the eastern region on two grounds: (1) the region is still trapped in high rates of poverty[2] relative to other regions of the country and (2) due to strong campaigns emphasizing the youth to take up commercial farming as well as agribusiness activities other than relying on substance production[3]. One could argue that households engaged in agribusiness activities have a relatively higher chance of overcoming poverty and its associated effects since they can earn better incomes compared to their counterparts who rely on subsistence production. However, this may not be true in some households especially if production is not significantly big to positively impact on household incomes. Moreover, if the earnings from agribusiness activities are small, they may not last for long whereby pushing the households back into poverty to the extent that they may even fail to raise capital for re-investment. Thus, households that cannot manage sizeable agribusiness activities can equally be affected by the agricultural cycles.

Although, our sample selection was somehow driven by the operations of Awoja Riverside farm and KIBO[4], we still employed a multi-stage sampling procedure to select respondents. For instance, the sample was drawn from six sub-counties; three from each district. The sub-counties were purposively selected considering those with similar socioeconomic and agro-ecological conditions to allow for participation in various agribusinesses to be the only exogenous difference among the subjects. Moreover, at parish and village level, selection was based on Awoja Riverside farm and KIBO's existence especially in reference to agribusiness start-ups /ownership by the youth. From each of the selected villages, a list of households was made with the help of Awoja Riverside farm and KIBO but verified by the local leaders on the grounds that the household has a youth who owns/manages a personal farm or engages in any agribusiness. From the village lists, half of the youth was randomly selected. For various reasons especially absence, a total of 968 youths was interviewed on the choices of agribusinesses, possible drivers for the agribusiness choices as well as their socio-demographics.

We observe a selection bias problem in study which arises from the youth who are not members to either Awoja Riverside farm or KIBO. But, through the local leaders verification process, it was noted that the number is too small to influence our results and majority are either school going children while others are unproductive in relation to agriculture for various reasons say disability concerns or mobility.

3.1.2 Indicators

[2] Poverty incidence stands at 35.7 percent (UBOS, 2018)

[3] These campaigns are spearheaded by two Non-Governmental Organizations: Awoja Riverside farm and KIBO, alongside the national campaigns calling on farmers to engage in commercial farming. AWOJA and KIBO mobilize people with a special attention on the youth and women and provide them with various forms of knowledge and skills for purposes of raising their incomes and household status.

[4] Awoja Riverside farm and KIBO aim at encouraging and facilitating the formation of homogeneous youth self-help groups in Soroti and Serere districts, and then empower these groups with skills transfer programs, food security projects, sanitation programs and market information provisions. Groups evolve endogenously, and the youth may self-select into a group provided they are accepted by other group members.

For each respondent, we collected data on socioeconomic characteristics, household demographics, agricultural production (all agricultural activities the households engages in and then, we paid special attention to activities that are carried out for income generation purposes). We also captured data on the sources of funds for financing the agribusiness activities as well as data on the various farm inputs. We indicate for the choice of agribusiness activities basing on the participants' responses about their farm activities that are carried out for income generation. Such activities include poultry, piggery and fruit farming among others. Since our outcome variable for the farm activities in binary, we construct a dummy taking a value of 1 for the youth farmers who engage in a particular activity and 0 otherwise. The sources of finance for agribusiness are measured by funds raised from the sale of farm produce and credit attainment.

3.1.3 Summary statistics

A range of agribusiness activities exists in our area of study. We observe that 43 percent of the surveyed youth farmers engage in crop production[5]as a way of generating income. 44 percent grow fruits while less that 10 percent of them grow vegetables. Those who invest in piggery account for 14 percent of the total youth and 30 percent of them are in poultry. Cattle keeping youths for purposes of income generation stand at 32 percent and those who trade in farm produce or in the sale of farm inputs still stands at close to 2 percent. We also notes that the percentage of the youth who rely on finances derived from the sale of farm produce to invest in agribusiness activities is 24 percent while those who rely on credit to finance agribusinesses is only 4 percent. In relation to the demographic characteristics of the youths, we notes that about 52 percent are males and the average age of sample is 22 years. 53 percent of them are married and they at least attended secondary level of education. Moreover, majority of them (73 percent) are born in that particular village. The average household size is quite big (7 persons) and each household owns at least 2 parcels of land which is mainly customary owned. Lastly, over 49 percent of the youths are members of at least a farmers' group, a savings or investment group.

Table 1: Descriptive statistics

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Agribusiness choices					
Crops	968	0.425	0.495	0	1
Fruits	968	0.444	0.497	0	1
Vegetables	968	0.092	0.289	0	1
Piggery	968	0.135	0.342	0	1
Poultry	968	0.298	0.457	0	1
Cattle	968	0.319	0.466	0	1
Trade	968	0.018	0.131	0	1
Sale inputs	968	0.015	0.124	0	1

[5] Crops which are mostly grown for sale include cassava, millet, sorghum and maize.

Explanatory variables					
Farm finances	968	0.239	0.426	0	1
Credit	966	0.041	0.199	0	1
Males	968	0.519	0.499	0	1
Age	968	22.416	4.659	16	35
Education	968	0.362	0.481	0	1
Married	968	0.526	0.500	0	1
Born in village	968	0.725	0.447	0	1
HH Size	968	6.651	2.892	1	21
Land	968	2.132	1.572	1	10
Group membership	968	0.492	0.500	0	1
Land Tenure	968	0.606	0.489	0	1

3.1.4 Empirical Model

To test whether the source of finance determines the choice of agribusiness activities by the youths, we need to first understand that the choice of agribusiness activities is a decision influenced by the characteristics of the household. While any household can decide to engage in any agri-business activity that can easily be managed to raise income and household status, richer households may be in possession of more adequate resources such as land, labor and capital that give them a comparative advantage to produce for market (Barrett. 2008) or engage in other agribusiness related activities. The decision of a household to choose a specific agribusiness therefore, is based on self-selection rather than random assignment. Put differently, the characteristics of participants in that particular business may differ from those of non-participants which may cause biased estimates if the two groups are directly compared (Blundell & Costa Dias, 2000). So, estimating the causal effect of the source of finance to agribusiness selection choices presents a threat of endogeneity due to selection bias. This speaks to the fact that using the standard regression models like Ordinary Least Squares (OLS) estimation technique may create problems. For instance, its functional form cannot allow for the estimation of probability binary outcomes efficiently. Long, Long, & Freese, (2006) point out that linear probability regression model assumes that the level of change in the outcome variable is constant for all levels of the predictor variables. However, when the outcome variable consists of a probability, it is very likely that the impact of the predictor variables increases or decreases as the predicted probability approaches 0 or 1. Moreover, linear probability models normally present heteroscedastic errors (Greene, 2002), meaning that the estimated coefficients are not efficient, and the hypothesis tests and confidence intervals may not be valid.

To overcome such problems in our results, we use propensity score matching method to produce estimates of the counterfactual (Blundell & Costa Dias, 2000). This technique has been used in a number of studies that use

survey data (see: Melesse & Bulte, 2015 and Okumu & Mawejje, 2019). Propensity score matching has the advantage that it controls for endogeneity even if only a single data wave is accessible. Moreover, Ravallion, (2007) points out that propensity score matching does not require a parametric model linking the outcome to the treatment, and it allows estimation of mean impacts without arbitrary assumption about functional forms and error distribution. This improves the accuracy of the causal estimates (DiPrete & Gangl, 2004).

We estimate the propensity scores using a logit model. In this model, only variables that simultaneously influence participation and outcomes are included (Heckman, et al., 1997). So, we include the dummy variable that indicates for the sources of finance for agribusiness activities as well as a vector of controls defined from the socio-demographics of the respondents. After estimating the propensity scores, we then, estimate the average treatment effect on the treated as:

$$ATT = E(ATT|D = 1) = E[(Y(1)|D = 1)] - [E(Y(0)|D = 1)]$$

Where ATT is the average treatment effect on the treated, $E[(Y(1)|D = 1)]$is the expected selection of a given agribusiness activity and $E[(Y(0)|D = 1)]$is the expected selection of the agribusiness activity if it had not been selected. We use the later in our estimation because it's counterfactual and thus required in determining credible average treatment effects on the treated. Moreover, since propensity score matching methods involves matching of groups, its helps to construct the counterfactual from the unselected activities controlling for selection bias due to observed covariates (Heckman et al., 1997).

4.0 Empirical Results

4.1 Estimating propensity scores

Table 2 presents the logistic regression estimates of the marginal effects of the household observables used to estimate propensity scores. In column (1), we report propensity scores when the youths use funds raised from the sale of farm produce to invest in agribusiness activities while in column (2), we report propensity scores when the youths use credit to engage in agribusiness activities. We notes from many observables in model (1) that there is a higher likelihood of the youth to invest in agribusiness when they access funds through the sale of farm produce compared to when they rely on credit.

Table 2: Estimates of the Logit model (Standard errors are in parenthesis)

Variables	**Estimates**	**Estimates**
	(1)	**(2)**
Males	0.391	-0.787
	(0.165)**	(0.368)**

Age	-0.028	-0.026
	(0.021)	(0.045)
Education	0.056	-0.002
	(0.167)	(0.363)
Married	0.553	0.799
	(0.216)**	(0.467)*
Born in village	-0.532	-0.092
	(0.182)***	(0.393)
HH Size	0.046	-0.082
	(0.029)	(0.068)
Land	0.115	0.282
	(0.049)**	(0.084)
Group Membership	0.799	1.079
	(0.160)***	(0.378)***
Land Tenure	0.335	0.472
	(0.169)**	(0.388)
Constant	-1.896	-3.784
	(0.521)***	(1.145)***
Number of Obs.	968	968
Prob > chi2	0.000	0.001
Pseudo R2	0.054	0.1048

4.2 Farm finances and agribusiness choices

In table 3 we present results explaining the probability of choosing a particular agribusiness activity when the youth is using funds raised from the sale of his farm produce. The results clearly indicate there is a higher chance of investing in crop production (excluding fruits and vegetables), piggery, poultry, cattle, trading in farm produce as well as selling of farm inputs increases whenever the youth access funds through the sale of their farm produce. The possible explanation for these results lies in the confidence that the youth possess when they are using unrepayable funds. This confidence allows them to diversify their choices when selecting agribusiness activities. We also notes that if the youth sale their farm produce, their possibility of investing in fruit farming reduces while their choice of investing in vegetable growing is not significantly different between the matched youth and the unmatched youth.

Table 3: Farm finances and Agribusiness choices

Choice of Agribusiness activity	*Matching algorithm*	*Number of treated*	*Number of control*	*Mean outcome treated*	*T-test for distribution of each variable*
Crops	Nearest neighbor	231	181	0.374	Satisfied
	NN = 3			(0.058)***	
Fruits	Nearest neighbor	231	181	-0.217	Satisfied
	NN = 3			(0.055)***	
Vegetables	Nearest neighbor	231	181	-0.052	Satisfied
	NN = 3			(0.036)	
Piggery	Nearest neighbor	231	181	0.242	Satisfied
	NN = 3			(0.039)***	
Poultry	Nearest neighbor	231	181	0.359	Satisfied
	NN = 3			(0.058)***	
Cattle	Nearest neighbor	231	181	0.128	Satisfied
	NN = 3			(0.053)***	
Trade	Nearest neighbor	231	181	0.048	Satisfied
	NN = 3			(0.019)***	
Sale inputs	Nearest neighbor	231	181	0.061	Satisfied
	NN = 3			(0.016)***	

***Significant at 1%, **Significant at 5%, *Significant at 10%. Bootstrap standard errors at 200 replications for ATT in parenthesis.

4.3 Credit and agribusiness choices

Although a voluminous body of literature exists that relates credit to agribusiness (Barry & Robison, 2001; Gustafson, 2004; Kirsten & Sartorius, 2002; Nwibo & Okorie, 2013), evidence relating to how access to credit can influence the choice for agribusiness activities is largely lacking. Existing literature explains how credit can be exchanged between different agribusiness firms (see: Gustafson, 2004), how agribusiness firms can provide credit to smallholder farmers (Kirsten & Sartorius, 2002) and the structure of agricultural finance (Barry & Robison, 2001).

In this section, we try to examine the extent to which access to credit can influence the choice of agribusiness activities among the youth. The results from the nearest neighbor as the matching algorithm are reported in table 4. They indicate no significant differences in choosing of agribusiness activities between the matched youth and the unmatched youth. These results are not strange. One explanation for these results is that many of the farm household's access credit through SACCOs and ROSCAs which tends to be too small to significantly boost

agribusiness activities. In fact, our data reveals that the average amount of credit received by the youth stand at 13792 UG shillings per month which is too small to start-up a meaningful agribusiness investment.

Table 4: Credit and Agribusiness choices

Choice of Agri-business activity	*Matching algorithm*	*Number of treated*	*Number of control*	*Mean outcome treated*	*T-test for distribution of each variable*
Crops	Nearest neighbor NN = 3	40	41	0.175 (0.110)	Satisfied
Fruits	Nearest neighbor NN = 3	40	41	0.056 (0.115)	Satisfied
Vegetables	Nearest neighbor NN = 3	40	41	0.000 (0.090)	Satisfied
Piggery	Nearest neighbor NN = 3	40	41	0.000 (0.096)	Satisfied
Poultry	Nearest neighbor NN = 3	40	41	0.231 (0.119)	Satisfied
Cattle	Nearest neighbor NN = 3	40	41	0.100 (0.113)	Satisfied
Trade	Nearest neighbor NN = 3	40	41	0.025 (0.027)	Satisfied
Sale inputs	Nearest neighbor NN = 3	40	41	0.075 (0.043)	Satisfied

***Significant at 1%, **Significant at 5%, *Significant at 10%. Bootstrap standard errors at 200 replications for ATT in parenthesis.

4.3 Robustness checks of the ATT estimates to different matching algorithms

This section checks the robustness of our results to the different matching algorithms. This is grounded on the argument that different matching algorisms may possess differing influence on the estimated results. For instance, Baser, (2006) points out that sensitivity analysis of matching algorithms is important since none is a priori superior to others. We use Kernel matching algorithm and Radius matching algorithm to test for the robustness of our results. First, we estimate the possibility of choosing a particular agribusiness when the youth are relying on funds raised from the sale of their farm produce. The results are reported in table 6 and are significantly robust to our earlier findings across all matching algorithms.

Table 6: Robustness of the ATT estimates for the different estimators

Choice of Agribusiness activity	*Matching algorithms*	*Number of treated*	*Number of control*	*Mean outcome treated*	*T-test for distribution of each variable*
Crops	Kernel matching	231	718	0.433	Satisfied
	(band width = 0.06)			(0.035)***	
	Radius matching	229	716	0.434	Satisfied
	Caliper = 0.01			(0.037)***	
Fruits	Kernel matching	231	718	-0.278	Satisfied
	(band width = 0.06)			(0.035)***	
	Radius matching	229	716	-0.264	Satisfied
	Caliper = 0.01			(0.037)***	
Vegetables	Kernel matching	231	718	-0.035	Satisfied
	(band width = 0.06)			(0.023)	
	Radius matching	229	716	-0.028	Satisfied
	Caliper = 0.01			(0.022)	
Piggery	Kernel matching	231	718	0.290	Satisfied
	(band width = 0.06)			(0.038)***	
	Radius matching	229	716	0.293	Satisfied
	Caliper = 0.01			(0.030)***	
Poultry	Kernel matching	231	718	0.352	Satisfied

	(band width = 0.06)			(0.038)***	
	Radius matching	229	716	0.352	Satisfied
	Caliper = 0.01			(0.038)***	
Cattle	Kernel matching	231	718	0.153	Satisfied
	(band width = 0.06)			(0.040)***	
	Radius matching	229	716	0.169	Satisfied
	Caliper = 0.01			(0.035)***	
Trade	Kernel matching	231	718	0.041	Satisfied
	(band width = 0.06)			(0.015)***	
	Radius matching	229	716	0.048	Satisfied
	Caliper = 0.01			(0.015)***	
Sale inputs	Kernel matching	231	718	0.060	Satisfied
	(band width = 0.06)			(0.016)***	
	Radius matching	229	716	0.060	Satisfied
	Caliper = 0.01			(0.016)***	

***Significant at 1%, **Significant at 5%, *Significant at 10%. Bootstrap standard errors at 200 replications for ATT in parenthesis.

Second, we turn to a robustness check that tests our estimates on the possibility of choosing a particular agribusiness when the youth are relying on credit. We still follow Kernel matching algorithm and Radius matching algorithm. Generally, our results remain robust to our earlier findings in table 4 except for crop production and poultry where the results indicate a significantly positive impact between the matched youth and unmatched youth when they rely on credit to invest in agribusiness activities.

Table 7: Robustness of the ATT estimates for the different estimators

Choice of Agri-business activity	***Matching algorithms***	***Number of treated***	***Number of control***	***Mean outcome treated***	***T-test for distribution of each variable***
Crops	Kernel matching	40	892	0.273	Satisfied
	(band width = 0.06)			(0.073)***	

	Radius matching	37	882	0.296	Satisfied
	Caliper = 0.01			(0.086)***	
Fruits	Kernel matching	40	892	-0.045	Satisfied
	(band width = 0.06)			(0.085)	
	Radius matching	37	882	-0.097	Satisfied
	Caliper = 0.01			(0.081)	
Vegetables	Kernel matching	40	892	0.026	Satisfied
	(band width = 0.06)			(0.049)	
	Radius matching	37	882	0.045	Satisfied
	Caliper = 0.01			(0.056)	
Piggery	Kernel matching	40	892	0.086	Satisfied
	(band width = 0.06)			(0.069)	
	Radius matching	37	882	0.066	Satisfied
	Caliper = 0.01			(0.061)	
Poultry	Kernel matching	40	892	0.268	Satisfied
	(band width = 0.06)			(0.078)***	
	Radius matching	37	882	0.292	Satisfied
	Caliper = 0.01			(0.089)***	
Cattle	Kernel matching	40	892	0.065	Satisfied
	(band width = 0.06)			(0.080)	
	Radius matching	37	882	0.052	Satisfied
	Caliper = 0.01			(0.083)	
Trade	Kernel matching	40	892	0.007	Satisfied
	(band width = 0.06)			(0.027)	
	Radius matching	37	882	0.014	Satisfied
	Caliper = 0.01			(0.025)	
Sale inputs	Kernel matching	40	892	0.063	Satisfied

(band width = 0.06)			(0.045)	
Radius matching	37	882	0.069	Satisfied
Caliper = 0.01			(0.044)	

***Significant at 1%, **Significant at 5%, *Significant at 10%. Bootstrap standard errors at 200 replications for ATT in parenthesis.

5.0 Conclusion and discussion

Literature has it that financial accessibility contributes to agricultural sector growth. Yet, empirical evidence that relates to how the source of finance can influence the agribusiness investment decisions of the youth is largely lacking. A review of empirical studies indicates that the development of the agricultural sector through agribusiness provides an avenue for expanding the employment sector (Drost et al., 2014; Odongo et al., 2017; Mulley & Unruh, 2004) as well as benefiting the farmers through accessing farm inputs and extension services (Elepu & Nalukenge, 2009; Mulley & Unruh, 2004). Literature further points to value addition by the agribusiness processing firms together with the provision of a ready market for the farmer's' produce (Kirsten & Sartorius, 2002).

Coherent with existing studies, we find that if the youth access finance through the sale of farm produce, their choice of agribusinesses is more diverse than when they rely on credit to fund agribusiness investments. These results suggest that encouraging for agricultural expansion as well diversification through value chain cannot be realized easily if farmers rely on funding from SACCOs or ROSCAs. So, policy makers need to better understand the conditions that surround credit accessibility especially by the youth farmers. Possibly, the amount of credit is too small to bare significant impacts on their livelihoods. While we acknowledge that our sampling procedure might have caused a selection bias due to the youth who are non-members to either Awoja Riverside farm or KIBO, it is unlikely that our results can be driven otherwise since, we conducted a verification process through local leaders and found out that many of those youth either school going children or are unproductive in relation to agriculture for various reasons say disability concerns or mobility.

Additionally, a look at our results especially on credit demonstrate a contradiction to some studies that have found credit to boost development. The possible explanations in our context are: first, our area of study is much trapped in poverty which may cause potential lenders to be reluctant toward extending loans to the youth. Second, Most of the borrowing is through SACCOs and ROSCAs which normally bare less potential for extending big loans to borrowers as it was demonstrated that the average amount of loans is less than 15000 UGS $\simeq$ 4 US$.

We use propensity score matching method as our estimation technique for purposes of controlling for endogeneity since our study is based on a single survey wave. Moreover, propensity score matching does not require a parametric model linking the outcome to the treatment, and it allows for estimation of mean impacts without arbitrary assumption about functional forms and error distribution (Ravallion, 2007).

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Appendix 1: Variable Descriptions

Variables	***Description***
Agribusiness choices	
Crops	Dummy taking value "1" if respondent grows some food crops e.g. maize, cassava, millet etc. for purposes of generating income, 0 otherwise
Fruits	Dummy taking value "1" if respondent grows fruits for purposes of generating income, 0 otherwise
Vegetables	Dummy taking value "1" if respondent grows vegetables for purposes of generating income, 0 otherwise
Piggery	Dummy taking value "1" if respondent engages in piggery related business for purposes of generating income, 0 otherwise
Poultry	Dummy taking value "1" if respondent engages in poultry related business for purposes of generating income, 0 otherwise
Cattle	Dummy taking value "1" if respondent rears cattle for purposes of generating income, 0 otherwise
Trade	Dummy taking value "1" if respondent trades in farm produce, 0 otherwise
Sale inputs	Dummy taking value "1" if respondent supplies/sales farm inputs, 0 otherwise

Explanatory

Variables

Farm finances	Respondent accessed finances from farm produce or farm wage labor
Credit	Respondent accessed through credit
Males	Dummy taking value "1" if respondent is male
Age	Age of respondents in complete years
Education	Dummy taking value "1" if respondent attended secondary level and above, 0 otherwise
Married	Respondent's marital status with married or engaged = 1, 0 otherwise.
Born in village	Dummy taking value "1" if respondent was born in the village, 0 otherwise
HH size	Average number of people staying at household
Land	Number of land parcels owned by the household
Group membership	Dummy taking value "1" if respondent belongs to farmer, savings or investment group, 0 otherwise
Land Tenure	Dummy taking value "1" if land tenure for the land owned by household is customary, 0 otherwise

ANNEX 7: Training report from Awoja

Project Activity Report

Title: Enhancing Agri-business Skills & Opportunities for Rural Women & Girls in Serere & Soroti Districts

Implementing Partner: Awoja Riverside Farm & Leisure. **Enterprise**: Horticulture

Reporting Period: April to June 2019

Responsible Persons: Project Lead: Joseph A. Asutai.

Agronomists: Julius Eeru & Paul Akonyu, Poultry Trainers; Dr Thomas Edyangu & Omar

Background

A consortium of Centre for Basic Research (CBR), KIBO Foundation and Awoja Riverside Farm is implementing an IDRC (International Development Research Centre)-funded research and training in the Districts of Soroti and Serere, in Eastern Uganda.

The Project Objective is to enhance agri-business skills and opportunities for rural women and girls in Serere and Soroti Districts through equipping them with agribusiness and lifeskills, which can be used in their daily lives in order for them to be productive and sustainable in their enterprises and also arm them with skills that can make it easy for them to harness the opportunities around them.

About Awoja Riverside Farm

Awoja Riverside FL (Farm & Leisure) is a hub of agricultural learning. It is a private social enterprise offering agriculture diversified and practical training. Agricultural demos and trainings are our core business. Our focus is on especially youth and women. We ensure satisfaction of clientele through delivery of finest agricultural and agriculture-related quality services and goods, employing creativity and innovation.

The Project Locations

The selected districts of Serere and Soroti are in Uganda's Eastern region, whose poverty incidence is the highest, according to Uganda Bureau Of Statistics.

Eastern region's incidence of poverty was reported at 35.7 percent in 2016/2017, up from 24.5 per cent in 2012/2013. The incidence in rural areas (31 percent) is double that in urban areas (15 percent).

Design and Training

The choice of enterprises is dictated by the business viability. It was guided by the *Seven P Formula*, namely, product, price, promotion, place, packaging, positioning, and people.

1. The Enterprises (product): The products surveyed and chosen by Awoja Riverside Farm are horticultural crops, in the area of crop husbandry. In animal husbandry, poultry and piggery were selected as they topped profitability rankings.

Why horticulture (tomatoes, onions, watermelon, and capsicum (green pepper)?

a) Lifestyles have changed across the country, including the very rural communities. All age groups now fry food. It is simply trendy. There is the convenience, unlike the relatively laborious process of processing groundnut or sesame paste. Secondly, the stocks of groundnuts and sesame have dropped drastically, owing to low yields, resulting, largely, from poor agronomic practices. As well, reduction in the production capacity, thanks to an inadequacy of oxen and ox-ploughs for tillage.
b) Especially in urban settings, the demand for fried fast foods, the demand has spiked. For the foreseeable future, it can only but increase.
c) Resulting from the above, there is a huge and ever growing market across the local populace.
d) Yet the whole Teso sub-region depends on distant Bugisu and Sebei for supplies of these same crops. Watermelon is an easy-to-grow delicacy. Sometimes, it also attracts market across the border in Kenya. All the listed crops, above, mature within about a three month duration, unlike the traditional crops. They are a quick rescue thus.
e) They are generally less laborious relative to other crops.
f) Considering earnings from given square feet or acre, at that, these crops earn farmers many times more than many other crops.

Why Poultry?

Figure 1 Comparing Different Livestock

a) It is popular in the rapidly growing industry of fast foods.
b) It is a delicacy in every meal.
c) For people who are mindful about healthy meat, it is one such source.
d) It has a very high Return on Investment (RoI).
e) Especially for the local breeds, they maintain themselves: they scavenge and are generally disease resistant.
f) They are not labour intensive.
g) They are a quick rescue: in times of sickness, one can catch one and handover to a clinic or pharmacy in exchange for medication, or to support education, for example, in case a child has been sent back home for lack of a pen, pencil, exercise books, or school uniform.
h) It has a low 'denomination' unlike a goat or a cow, which can't be traded if one needed to make a purchase of a small value.
i) There a very old history of local involvement in poultry except not for agribusiness purposes.
j) Increased production/productivity is quite easily achievable without any sophistication or deterrent costs.
k) As a business, it is diversifiable into meat, eggs, manure, breeding.

Why Piggery?

a) Pork has an insatiable market, Uganda is the biggest consumer in the lake region.

b) They have a fast growth rate and food-to-meat conversion rate.
c) That itself points to a high return on investment.
d) Piggery doesn't require much space to run.
e) There are three lucrative revenue streams: either sell them when matured, or sell them as piglets, or slaughter for pork.
f) They can be slaughtered at different ages; two to three months young (weaners) or a little older, four months (porkers) or at eight months (baconers), or at as elderly animals (sausage pigs).
g) They have a higher growth rate than other animals like cattle, goats and sheep.
h) They have incomparable offspring numbers than cattle, goats, or sheep.

2. The Price: The selected products have good and client-competitive prices. The costs of production, especially that they are being produced in rural areas are lower. The labour is cheap there. Land/space is cheap. Security costs are minimal. Water is also cheap. There is also the advantage that they will supply some of the inputs, themselves, for example, feeds for poultry and piggery. From the on-going marketing, buyers are eager to pick the products from the farms, ofcourse, we are keen on the price offers.

3. Promotion: Awoja Riverside Farm is charged with the responsibility to market the products. In the project host villages, there is already due anxiety for the breeds of cockerels and pigs that have been described to the trainees. The youth farms will be suppliers. The "pork joints" and butcheries are expectant. Awoja Riverside Farm has also shared with market vendors in Soroti, the imminent supply of the listed horticultural products.

4. The locations (place): The specific project sites, accordingly, target the very rural countryside, in the sub-counties of Serere District's remote Bugondo and Kadungulu, and Soroti District's Asuret and Tubur. They are where poverty is most prevalent. The choice of the sites was also informed by considerations of agronomic and socio-economic dynamics; the dictates of weather, existing and prospective viable economic activities, and (potential) backward and forward market linkages.

Bugondo and Kadungulu are renowned for their emerging production of maize grain. The two sub-counties are also constituted by fishing communities, thanks to their proximity to the lake. Maize grain (specifically, maize bran) is the most prominent single ingredient in the planned composition of feeds for poultry and piggery. The addition of silver fish into the feed menus is a recommended enrichment.

Horticulture, on the other hand, hosted in Soroti District, is located in sites which are fairly resourced by some perennial water sources, so that horticulture, enabled by some form of irrigation, makes meaningful agribusiness. Production is envisaged to increase as it should run all through the year. Productivity

should, too, increase, given that the plants are better watered. Increased production (all through the year) and productivity should translate into higher household incomes, throughout the year.

5. Packaging: This is planned for the yet-to-be concluded value addition. The plan is, for the poultry and pig meat, offer that that assures clientele of hygiene, purity, other offers like boneless packages, lean meat, sausages, delicacies like gizzards, etc.

6. Positioning: Ours is to provide greater access and affordability of delicacies to the masses. It is to bring the farm gate price to the open market. It is to avail what locals are dependent on distant suppliers for, at the former's doorsteps.

7. People: The quality of people involved starts with the trainers chosen. Their products (trainees) will hopefully be like them, passionate and business oriented. As for the trainees, we believe that t5heir ownership of the enterprises, the fact that they will pocket their earnings directly, will cause them to be customer-sensitive.

Training Methodology.

The trainings are characteristically delivered through experiential learning. Every demonstrable concept or practice is indeed demonstrated. Apart from it being a very effective approach, it particularly caters for a large segment of our clientele whose formal learning is less than to allow for other methodologies.

Hands-on training is slow but we cater for that time by conducting the trainings for a stretch of all the time that the crop or livestock will take to mature. In the case of poultry, the training will, effectively run for eight months, including the pre-stocking time of the birds. For the piggery, it will run for ten months, that is, up to February 2020. As for horticulture, it runs for between four months and six months. Part of that period was to allow for first field tillage. Also, whereas watermelon will mature within three months of planting, onions and green pepper, which have to go through the nurseries, will stretch to five months.

Fig 2 Examining Chicken Diseases, in Kabos

For each of those enterprises, those periods cater for the continued hands-on (experiential) learning. As a rule of thumb, practical demonstrations (hands-on training) form a basis for transfer of concepts, knowledge, skills, and practices. The trainings last the entire plant or livestock growth to maturation period, i.e., from seed to plate/market, or from piglet to adulthood, or from one day old chick to adult chicken.

During these growth periods (five months for poultry, eight for piggery, three to five for the horticultural plants), the trainers provide hands-on extension support to the farmer groups. The presentation of an anomaly, for example, a disease or a deficiency, is opportune in a way, because trainees experience the exact manifestations of the condition and the precise ways of intervention.

Special attention is paid to the interactive and participatory bottom-up methodology of adult learning, where all trainee farmers are considered to be variously resourceful (knowledgeable). They are progressively engaged at different stages during the training.

There are group discussions to ensure that participants adopt (and adapt) the approach to analyse the production practices in their areas and identify situation specific sustainable solutions that guide the implementation process.

As they set up gardens, sties and pens, the individual group members work together, with a developing common purpose. They create their leadership structures, too. Typically, lead farmers have emerged among them. These could be fast and proactive learners or individuals with previous exposure to similar trainings or economic activity.

For all locations, trainees choose a learning hub, a demo, guided by such criteria as honesty of the owners of the demo host home, security, safety, accessibility, suitability of soils - in the case of agronomy, among others. They identify space for gardens, space for pens, or space for sties.

In the case of poultry, trainees have been requested to contribute to the project, four local hens. The purpose for this is: **i)**. for every trainee to develop a stake in the project, amongst all trainees; **ii)**. Accordingly, ensure that everybody is concerned, every day, every time, about the safety and security of their personal four chicken; **iii)**. Improve the local breeds by crossing those local breeds with the hybrid cockerels that the project will provide. The project will, as well, supply hybrid hens to the trainees. The hubs will act as stock multiplication facilities. In less than half a year, the individual youth groups should boast of thousands of birds.

For both crop and livestock, the project is supplying hybrid seeds and hybrid chicken and piglets. These have the advantages of fast growth and early maturity, weight gain, high yield, and tolerance to certain disease, tolerance to weather conditions.

Inputs to manage the nurseries and main gardens have been provided. These include, seeds, fertilisers, watering cans, sprayers, pesticides, fungicides, and insecticides.

The trainings endeavor to utilize locally available materials, for example, materials for construction of crop nursery shades, poultry houses (pens) and pig sties. Farmers have been taught how to generate local organic manure. They have been taught to make organic pesticides from mixes of plants like neem tree, aloe vera, ash, hot pepper, coffee, and animal urine. Feed formation using nutritious locally available resources, have also been demonstrated. Even in measuring lengths, they have been taught how to use their fists and thumbs to estimate 15 and 30 centimetres, and eventually arrive at a metre. This is particularly important in determining plant spaces.

Figure: 3 Using Fists and Thumbs for measurement

The learning hubs will run for, at least, the duration a given enterprise item takes to mature. At this point, the groups will be at liberty to mutually subdivide into smaller groups or even individual members in their respective household. We believe that the deliberately prolonged period of operating together as a group is good for peer learning. It is good to instill a work ethic. It is good as a control mechanism from a temptation to sell or give away a seed, crop, or livestock. It is also important for bulk marketing.

There have been quick adopters of the enterprises. These are members of the project host villages, who had not been selected by the project but expressed desire to learn. Some of them are youths, some of them are elderly persons. In other cases, it could be members of a home which is chosen to host the trainings, or members of church whose building hosted the trainings. They have been allowed to involve fully but will be handed the items being distributed to the groups. Neither will they benefit from the harvest.

Figure: 4 An Adopter, in a red shirt, in Ogolai

Activity Schedule

Activity One: Reconnaissance

Reconnaissance was done to identify what enterprise was suitable where, what resources were needed for implementation, and who would be useful in making that happen in the given localities. It also involved establishment of rapport with the local leadership, from opinion leaders to elected leaders, Local Council One to Local Council Three (the subcounty). In Serere, we notified the area members of parliament.

Horticultural crops are particularly weather sensitive. A dependable supply of water is a requisite if farming is to run all year round. The selected crops also require specific soil types. So, to ensure that the planned agribusiness is *agronomically* viable, we paid assessment visits to different locations. Accordingly, the following six locations were deemed suitable for crop: Asuret sub-county: Omodoi village; Arapai sub-county: Amotot village; Tubur sub-county: 3 locations in Ogolai village.

Activity Two: Sensitization of Youth Groups

By and large, this was a buy-in exercise. The general community, the youth in particular, and the community leadership were rallied. Roles and obligations (for every stakeholder) were duly allotted. Importantly, too, the Local Council leadership cleared and welcomed the project to their jurisdictions.

Fig 5: **Sensitization of Community in Dakabela**

Activity Three**:** Site selection

It was aimed at identifying the suitable sites for planting as well as gazetting them after negotiations with the land owners. They had to be agro-ecologically good and secure. For poultry and piggery, it largely related to safety, security, centrality/accessibility in addition to the pre-requisite for livestock feed availability.

Figure 6 Site selection and Negotiations at Akera Ichan Group

Activity Four**:** Field Establishment

The gardens were opened up. This entailed bush clearing and first tillage. Farmers were taught how the field is designed and prepared. It allowed for an appreciation of different native and modern tools for tillage. The purpose was to clear weeds, expose and dislodge some pathogens, allow some composting, break and loosen the soil in order to increase soil aeration and water percolation. Every location has two

and half acres identified and earmarked for the project. One acre is devoted to watermelon. A second is devoted to greenpepper and the half is for onions.

***Activity Five*:** Pre-planting & Planting

Prior to planting of watermelon, there was an in-depth sharing of agribusiness; understanding the market, the why, how, when, where, and who of horticulture. From an agronomic dimension, the trainees are walked through the essentials – from planting materials, ways and means, to the growing medium. They practiced sizing, spacing, manuring, among others.

Above: (L) AkeraIchan and (R) Abule Youth Groups planting water melon

Below: (L) Amotot Youth Group planting watermelon. **Below: (R) Poultry Feed formulation in Moru Group**

***Activity Six*:** Field Management

This is currently on-going. The nurseries are being managed with practices like watering, shading, and hardening. Soon, they will be learning transplanting, hands-on. The fields of watermelons are being managed through weeding, mulching, pruning, pest management, disease control and management, soil and water management practices.


Figure 7 Watermelons Sprouting & managed by weed and pest control

***Activity Seven*:** Nursery Bed Establishment


Above, Figure: 7 Ogalai PWDs & Orphans (L) and (R) Figure: 8 Abule Community Youth establishing onion & capsicum nurseries

Establishment of nurseries is specifically for onions and greenpepper. (Watermelon was planted directly). The farmers understood that, small, young and delicate planting materials, be they seed or vegetative materials, are usually first raised in the nursery beds to prepare them for the life in the field. They learnt the different types of nursery beds such as surface, sunken, raised beds, and why those differences. They learnt how to use porous pots and plastic bags. They learnt soil sterilization as a need to rid the soils of pathogens so that the seed and seedling are healthy, and positively influence future

Figure 9 Onion & Capsicum Nurseries in Ogolai

Table 1: Groups Trained on Horticulture (watermelon, onions & capsicum)

District	Group Name	Sub – County	Village	Males	Females	Total
Soroti	Elshadai Ojaret	Asuret	Omodoi	12	18	30
	Amotot	Arapai	Amotot	13	17	30
	Ogolai Youth	Tubur	Ogolai “B"	14	12	26
	Akera Ichan Youth	Tubur	Ogolai “A”	13	15	28
	Ogolai PWDS and Orphans	Tubur	Ogolai “B”	16	11	27
	Abule Community Youth	Tubur	Abule	14	16	30
Total				**82**	**89**	**171**

Table 2: Initial Result Areas

Enterprise/Crop	Acreage Established	Comment
Watermelon	6 acres	All established
Onions	12 Nurseries	All established
Capsicum	12 Nurseries	All established

Field Experience

General Observations

a) Most of the trainees had no knowledge on growing of the said horticultural crops. Fortunately, the training is hand-on.

b) There is excitement about the anticipated prospects of proceeds from the products from the enterprises.

c) All the pigs reared in the project area are local inferior breeds

d) Just as with pigs, the poultry in the project locations are of the traditional inferior breeds.

e) Many of the selected youth are, by characteristic, vulnerable. Some are heads of families, many girls are childmothers or recent victims of childmotherhood, a majority of both sexes are school dropouts, largely as a result of poverty.

f) There is a high demand for the project amongst non-selected persons.

Successes

a) All sites for horticulture have been planted.

b) Other than the extension support, the core trainings have been accomplished.

c) Some youth have embraced the enterprises as much as to invest in them, privately.

d) Agronomic practices, such as soil sterilization, hitherto unknown to the communities, are being adopted across the villages.

e) The adaptors are already in dozens.

f) The LC III leadership of Bugondo sub-conty has promised supplies of poultry to the best performing group, using an already existing vote in his office.

g) The area Member of Parliament, Hon Elijah Okupa, is inviting the youth for exposure visit, to his farm, which runs a poultry unit. The manager there, he says, can provide continued technical support to the trainees, conveniently.

Challenges

a) Poor time keeping by participants.

b) The road surfaces to the different locations are bad.

c) The heavy rains are disruptive

d) The misperception that this is an NGO (charity) project has played into the prevalent dependency

e) The misperception that this is an NGO (charity) project has played into the prevalent dependency syndrome; the communities are expecting handouts.

f) It urns that there are many more trips to the groups than had been budgeted for.

g) Absenteeism is rampant among young mothers. One reason is that the babies fall sick.

h) Control groups have continuously called asking for the trainings as they had understood.

Remedies

a) Continuous moderation of community expectations for hand-outs.
b) Some interested parties not selected by the project have been allowed to attend the trainings and are limited to just that. They don't benefit from the hand-outs.

ANNEX 8: Training report from KiBO Foundation.

NEEDS ASSESSMENTS

On Tuesday 30th April the KiBO Foundation training team, together with a team from Awoja Riverside Farm conducted a needs assessment in Bugondo Sub-County in Serere District. Within Bugondo Sub-country the team visited Moru, Kikota and Kabwos villages. While at these respective locations, the training team met with Local leaders, and the leaders of the various groups to be trained, and explained to them the content of the training.

The KiBO team also conducted the needs assessment with a team from Awoja Riverside Farm, as well as the community mobilizers. As the training team interacted with the various groups, it was agreed that the




training time be restricted to two hours a day, as many of the members were young mothers who had other pressing domestic matters to attend to. The trainers also agreed to train two groups concurrently with Awoja. Each group would be trained on alternate days by both the KiBO and Awoja team, with KiBO Foundation starting with a short teambuilding activity for everyone (both groups), and then followed by a separation of the groups. This is reflected in the schedule attached below. It was also agreed that each cohort would carry out one community service activity (to be arranged in conjunction with the relevant LC Chairman), and would also host one motivational speaker for knowledge sharing.

Group A: Aroo Einer Aswam Poultry Keeping Group				Group B: Moroo Youth Development Poultry Keeping Group			
Date	Session	Time	Org. Responsible	Date	Session	Time	Org. Responsible
Mon 6th May 2019	Teambuilding & Introduction to Entrepreneurship	11am-1pm	KiBO Foundation	Mon 6th May 2019	Teambuilding & Session with Awoja	11am-1pm	KiBO Foundation & Awoja
Tues 7th May 2019	Session with Awoja	11am-1pm	Awoja	Tues 7th May 2019	Introduction to Entrepreneurship	11am-1pm	KiBO Foundation
Wed 8th May 2019	Self- awareness & river of life	11am-1pm	KiBO Foundation	Wed 8th May 2019	Session with Awoja	11am-1pm	Awoja
Thurs 9th May 2019	Session with Awoja	11am-1pm	Awoja	Thurs 9th May 2019	Self-awareness & River of life	11am-1pm	KiBO Foundation
Fri 10th May 2019	Business Dev't Strategy, Business Management skills, Business Action Planning	11am-1pm	KiBO Foundation	Fri 10th May 2019	Session with Awoja	11am-1pm	Awoja
Mon 13th May 2019	Session with Awoja	11am-1pm	Awoja	Mon 13th May 2019	Business Dev't Strategy, Business Management skills, Business Action Plan	11am-1pm	KiBO Foundation
Tues 14th May 2019	Financial literacy & 1st group presentation	11am-1pm	KiBO Foundation	Tues 14th May 2019	Session with Awoja	11am-1pm	Awoja
Wed 15th May 2019	Session with Awoja	11am-1pm	Awoja	Wed 15th May 2019	Financial Literacy & 1st group presentation	11am-1pm	KiBO Foundation
Thurs 16th May 2019	SCAMPER Model & Final Presentation & Community Service	11am-1pm	KiBO Foundation	Thurs 16th May 2019	Session with Awoja	11am-1pm	Awoja
Fri 17th May 2019	Session with Awoja	11am-1pm	Awoja	Fri 17th May 2019	SCAMPER Model & Final Presentation & Speaker series	11am-1pm	KiBO Foundation

OVERVIEW OF THE TRAINING TEAMBUILDING AND INTRODUCTION TO BUSINESS

MAY 6-7 & 20, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group | Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

Introduction to team dynamics through problem solving games which test one's leadership ability and one's capacity to work in a group while under pressure. Through the games it was our hope that the students would learn key life skills which can be used in their daily lives, such as communication, leadership and delegation

The Introduction to business module focuses on the definition of business, **why** people start businesses and the importance of having a business. Additionally, it focuses on the key reasons why businesses are successful and why they fail.

The trainers combined the morning and afternoon groups for teambuilding in order to maximally utilize the time. This proved to be an excellent tactic with the groups displaying a competitive, yet friendly spirit. For most, this was their first taste of teambuilding.

The introduction to business, helped to open the minds of the participants as many initially thought they knew what it took to be a successful entrepreneur but they soon realized that there were many more aspects





to consider for one to become a successful entrepreneur. The students greatly enjoyed their first module. We had the training on May 6th-7th with Moru, Kikota, Aroo, Atape while Opucet and Kabos on May 20th

OVERVIEW OF THE TRAINING SELF-AWARENESS & RIVER OF LIFE, BUSINESS ACTION PLANNING (THE BULLS EYE GAME

MAY 8-10 & 21, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group | Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

The session on Self-awareness focused on the importance of understanding one's personality. They key take home message here was that if you understand yourself, knowing your strengths and weaknesses you are in a better position to make the right choices be it personal or professional for your life.

The river of life session was an important session as it requires participants to share their life journey picking the key lessons and focusing on how these key lessons learned can help shape one's future

The sessions were interactive and the group discussions were lively. The students enjoyed the bull's eye game as it simplified the process of setting goals and taking the necessary steps to seeing a target realized both in one's personal life and in business. Though most participants were shy and unwilling to share their personal stories, a few did take courage and shared, albeit briefly. The facilitators encouraged them not to dwell on the past but rather learn from it and work towards preparing for their futures. Due to the poor attendance on may 9th the trainers decided to combine the morning and afternoon groups for effectiveness and it turned out well. On 10th May, the trainers continued with self-awareness and the personal action plan

with the Moru youth as the trainers felt that the group had not fully grasped the concept of the bulls eye

game. We had the training on May 8th -10th with Moru, Kikota, Aroo, Atape while Opucet and Kabos on May 21st .

OVERVIEW OF THE TRAINING BUSINESS MANAGEMENT SKILLS

MAY 7,13 & 22, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group | Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

In this module the participants were introduced to some key fundamental skills which one must possess if they are to run a successful business. The competencies introduced included: Financial management skills, Sales and marketing, Leadership with an emphasis on leading a group and managing an organization, How to negotiate, planning and Decision making

Most of the students shared their experience on how they had poorly managed their business especially allowing customers to take products on credit, with many of them defaulting on payment terms, and as a result led to relationships and business setbacks. One key learning point that was noted by all was the importance of not favoring relatives and friends when it comes to credit. Businesses must remain impartial to all customers. The facilitators gave practical and relevant examples that related well to the audience when explaining their points. The students greatly enjoyed this module because it was an eye opener, many had started businesses in the past but due to lack of knowledge in certain areas it ultimately led to their businesses folding. One key aspect of this was leadership and financial management We had the training on May 7 &13 with Moru, Kikota, Aroo, Atape while Opucet and Kabos on May 22

OVERVIEW OF THE TRAINING SAVING AND BUDGETING & INTRODUCTION TO GROUP PRESENTATIONS

MAY 19,13 & 22, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group | Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

Students were introduced to saving, in terms of the different ways in which one can save, the different places where one can save money, and most importantly why saving is necessary and how to save with a purpose. The trainers used the example of the Jewish five jar method of saving.

With regards to budgeting, the participants were split into groups and each group would represent a family (with parents and children) and one member from each group had to act as the 'breadwinner'. Fake notes of money (totaling Two million Uganda shillings) were then scattered in the room and each breadwinner had to then scramble and collect as much money as possible. Once this was done they then had to add up the money and make a budget for their family and present it to the class. Lastly the trainees were then split in groups and given guidelines on how to go about the business group presentations. Each group had to prepare a business presentation incorporating all the key components covered in the two weeks, as though they were

meeting potential funders. We had the training on May 9th & 13th with Moru, Kikota, Aroo, Atape while Opucet and Kabos on May 22nd

OVERVIEW OF THE TRAINING BOOK KEEPING AND FIRST BUSINESS PRESENTATIONS

MAY 9 & 22, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group | Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

Students were shown how to handle record keeping in a simple and practical way, and manage their books while running a business. The trainees learned that with records they could adequately budget and forecast future expenses, profits and even losses. The examples given were again crucial in aiding the students' understanding as they were all relevant examples to their daily lives. Following this, the groups made their first business presentations where they pitched their business ideas to the trainers who acted as prospective funders.

The practical budgeting exercise was a huge success as it was both a fun and exciting game, while also teaching the students how to present themselves in public and get their points across well. The facilitators' use of examples enabled great learning as the sessions were very interactive and it was pleasing to see that many questions were asked, which was a clear indicator that the students' understanding had improved

significantly. This exercise also helped the students to gain confidence by speaking in front of an audience. We had the training on May 9 with Moru, Kikota, Aroo, Atape while Opucet and Kabos on May 22

OVERVIEW OF THE TRAINING GROUP BUSINESS PRESENTATION, SPEAKER SERIES AND COMMUNITY SERVICE

MAY 10, 2019

With: Moru Youth Development Group | Kikota | ArooEiner Ka Aswam Poultry Group | Atape Group

The groups had at this point been further divided into smaller business groups and they had to carry out a 5-minute presentation on their business idea as if they were speaking to prospective funders.

The final business group presentations were a success with a total of 8 groups presenting. While it was clear that the students needed more time to practice public presentation, and how to manage time, they did a good job. Some trainees however, were still rather timid and in certain groups, most of the talking was left to only a few people. The winning group was Abarata Kere (Prosperity for all), which scored a total of 133 points out of a possible 150. This group was formed with participants from the Aroo group. The winning team demonstrated excellent teamwork, research and viability of their business idea. Their business idea was rearing of sheep and selling them for meat consumption.

The Sub-county chief Mr. Patrick Otecat and the LC3 Chairperson Mr. Ewidu Apollo attended as guest speakers and commended KiBO Foundation and Awoja Riverside farm for the great work done with empowering the trainees. They also challenged the trainees to ensure that the free knowledge gained was not wasted but put to good use, as ordinarily trainings such as this would be very costly.

They also pledged to support the outstanding groups (following a recommendation from KiBO Foundation and Awoja Riverside Farm) as they have revealed that they had Fifteen million Uganda shillings (UGX 15,000,000) to distribute under the Youth Livelihood Program. They also requested that these trainings continue to take place as there are still many who could benefit from such an opportunity.

The Sub-county chief Mr. Charles Otecat and the LC3 Chairperson Bugondo Sub-county Mr. Ewidu Apollo also came to speak to both the morning and the afternoon groups.

Additionally, the trainees conducted a cleanup of the churches that had provided the training venues. The trainees slashed the grass, swept and cleared the surrounding areas.

OVERVIEW OF THE TRAINING GROUP BUSINESS PRESENTATION, SPEAKER SERIES AND COMMUNITY SERVICE, **MAY 23, 2019**

With: Opucet Youth Multipurpose Group & Kabos Youth Farmers Group

The groups had been divided further into smaller business groups and they had to make a 5-minute presentation as if they were speaking to prospective funders, incorporating all the components covered in the previous week. The final business group presentations were a success with a total of 8 groups presenting. While the students do need more time to practice presenting and how to manage time, they did a good job. One group however did not prepare or take the exercise seriously and it showed in the quality of their presentation. As a result, they scored the lowest of the eight groups. The winning group however was Opucet Cattle farmers who scored 125 points out of 150. The overall quality of presentations was weaker than with the previous groups, but this was due to the students not preparing as well as they could have done, and generally due to the lack of dynamic personalities which were more visible in the previous groups.

Additionally, we conducted a cleanup of the school where we were located; slashing the grass, sweeping inside classrooms and clearing the surrounding areas and the church.

Mr. Patrick Osipa our coordinator came as the motivational speaker for the group. In his talk he urged the groups to take agriculture seriously as a viable source of income, and he encouraged the groups to get registered and he offered to assist in this process. He said that the training had added value to them, and that they now needed to put it into practice and take action, as they had the necessary tools to be successful. He also urged the KiBO team to come back and follow up on the students to check on their progress

It was also noted that a high percentage of the women in attendance were either pregnant or already with young children. As a result, the team spoke to the group about the importance of making smart lifestyle choices. The girls were advised to not see their lives only in terms of having and raising children but they were encouraged to earn a living along with their husbands. The men were also told to stop engaging in wasteful activities like gambling or drinking, and even chasing women. They were asked to be responsible and ensure that they are in a position to provide for their children. The lead trainers for these groups were: **Solomon Orikot, Anna Apolot and Irene Akurut.**

Additional support and supervision was offered by: **Baingana Sabiti and Kevin Akwero**

CHALLENGES

Some of the challenges we encountered during the training were due to the fact that new participants joined the training after some days of commencement which meant we had to stay behind and register them and this consumed a lot of time. Apart from the obvious paperwork, the new entrants obviously had some gaps in terms of understanding some areas that had been covered prior.

Also Some participants attempted to sign in for their colleagues that were absent, but we quickly spotted it and addressed the conduct.

There was a low turn up in attendance, because of the rain. Being a rainy season in the region, many of the participants had to attend to their garden to utilize the rain because it's been dry for a while.

WHAT WORKED

The leaders of the respective training groups were supportive, especially in the area of mobilization of their colleagues to ensure that they arrive on time for the training. The morning groups displayed the most consistent attendance.

RECOMMENDATION

It is our recommendation that more than one follow up session be held beyond what has been planned. The poverty levels in this area are rather high, with many young families- children bearing babies. This poverty could have a great impact on the sustainability of this intervention in terms of uptake of information, commitment to the lessons learned and maintenance of the startup produce/animals received.

Training summary local language (Ateso)

TEAMWORK DYNAMICS

A. Build confidence and improve communication skills

B. Teach them skills required in a work environment

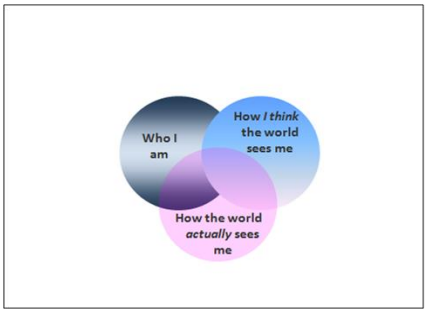
C. To have fun.

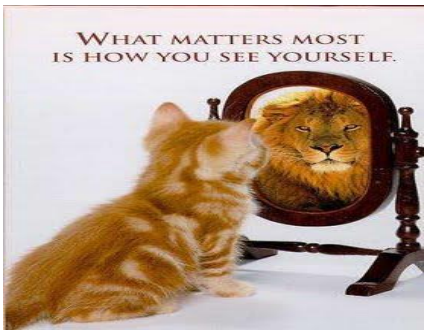
What 2 games did you enjoy most and what did you learn?

- A. GAME A
- B. GAME B

SELF AWARENESS

- **Knowing who we are:** **Most important of all**





BULLS EYE GAME (BUSINESS ACTION PLAN)

Be SMART!

- S – specific
- M – measurable
- A – achievable
- R – realistic
- T – Time Bound

BUSINESS DEVELOPMENT STRATEGY

A. What do customers need?

B. That we have

C. That competitors do not have?

STUDENT BUSINESS ANSWER SHEET

A. Finance

B. Management

C. Competitor

D. Solution

E. Sales and Marketing

F. Competitor

GROUP PRESENTATIONS

1. Think of a Business
2. Name for The Business
3. What services, Products the Business is going to offer?
4. Where is it going to be located?
5. Who will your customers be (Target)
6. How unique is your business from the rest?
7. What is your Profit estimate?
8. What is your product/Service statement/Tagline/Slogan

ASWAM KWAPE ETIMU

ALOSIKINETA NU ADUKUN ETIMU

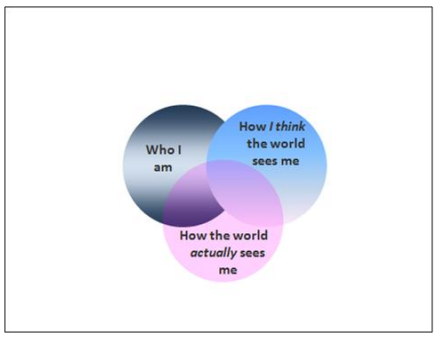
- **Adukun atiting ka aitojokaar apirianut na ainer kede lucie itunga**
- **Aisisianakin apirianut na ibusakinit kotoma aswam**
- **Anu adumun alakanar**

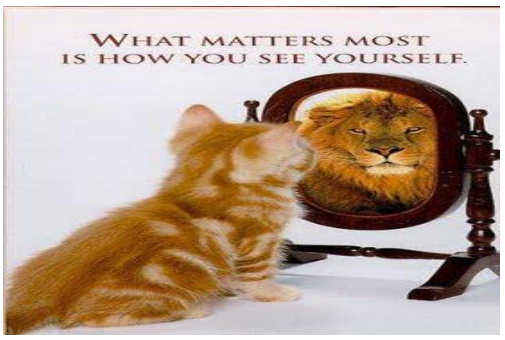
ANUBO ABOLIASIO AAREI NU OPOTU OMINAKISI IJO NOI IDO INYO OBU IJO ISISIAU

1. **Abolia nasodit**
2. **Abolia na iyareit**

AIJEN AKON AIJAR

Aijen ebe lu bo angai ooni **Nu epolok kakere nesi epone lo isesenia ijo akon aijar**





- **Ingai bo engo**
- **Epone lo awomitor engo ebe itei akwap engo**
- **Epone do lo esesenia engo akwap**
-

AINAPETA NU EBEIT ASWAM KOBIASARA (AKONGU EMONG)

AIPIOROR (AILA) KOTOMA OBIASARA

- **S-Specific - Aitebeikin**
- **M-Measurable - kopedorite aitodolikin**
- **A- Achievable – orai akirot na ipedori angetakin aiswamaun**
- **R- Realistic - Nu epedoros (orai akirot na epedor)**
- **T- Time bound - kopedori aitodolikin kotoma apak na itutubitai**

AINAPETA NU ITOPOLOETE EBIASARA

APAPULA NA EBONGONOKINI ESISIAN

- **Inyobo ekotosi agwelak?**
- **Yen ijatatar oni**
- **Yen emameotor lu ebolobolоete ka oni**

IPONESIO LU ITOPOLOET EBIASARA

Apiyai-Adukun iponesio lu ipedoria jo atupit ka awanyanar akon apiyai

Eidare- aitosom itunga lu ibecokina, aisinyikoikit ka aingarenikit kesi ejok

Lo ebolobolobloere- aijen itunga lu ibolobolobloto jo ka iwaitin lu itelekaret kesi.

IPONESIO LU ITOPOLOET EBIASARA (AIYATAKIN)

Abongokinet – aitegelikina kotoma aijanakin koipone lo mam lu ibolobolotor jo epedorete

Egwelare kede aitijenar osokooni – ajaut kede alosikinet na epedori aitelekar

Agwelan- asekun aiboisit na ipu agwelak kotoma ka eipud lo ipedori jo abongokin.

APAPULA NA EBONGONOKINI ESISIAN

- **Apiyai**
- **Eidare**

- **Lo ebolobolоere**

APAPULA NA ABONGONOKINA (AIYATAKIN)

- **Abongokinet**
- **Egwelare ka aitijenar osokoni**
- **Lu ebolobolоere**

AINAPETA NU EBIASARA

1.	1.	1.
2.	2.	2.
3.	3.	3.

APAPULA NA EBONGONOKINI ESISIAN

- **Aomisioit**
- **Ainapeta**
- **Aibumakin**

APESIKIN AKIRO KOTOMA AIBUNGET

1. **Aomomoun aomisioit na ebiasara**
2. **Ekiror lo ebiasara**
3. **Iboro ka aswamisinei nu ebeit ekon ebiasara aijanakin**
4. **Aibo ebeit ekon ebiasara ajaun (aibikakinio)?**
5. **Lu bo angai iteunit ijo kwape agwelak kon**
6. **Epone bo ali itegelikinar ekon ebiasara ane ejasi lucie kere?**
7. **Ameda bo na itia ayi iwomit ijo ebe idumuni?**
8. **Anibo akirot na inyara jo ebiasara kon**

APAPULA NA EBONGONOKINI ESISIAN

Nu epolok kotoma agwelanar ka esokooni

Akiro nu itutuonorere aijen eitosomae loka apiyai

ANNEX 9: Mid-line review report

Section 1: Introduction

This report is guided by the mid-line survey which was conducted in October, 2018 among the groups that were trained in technical and soft skills in Soroti and Serere districts of Uganda. The mid-line survey was intended to assess the extent to which rural women and young entrepreneurs mastered the capacity building training content and also to acquire a better understanding of the organization of the trainings to guide the explanations of the impact evaluation results. The assessed trainings were conducted by both Awoja Riverside (AR) — which trained the participants in the technical skills (piggery, horticulture and poultry keeping) and KiBO Foundation (KF) — which trained the participants in soft skills. Details are given in later sections of this report.

The first trainings were given to all members of the sixteen selected groups. These groups include Madaka Youth Group which was trained in piggery, Amiria cell Youth Group, Amiria Town Council Youth Group, Aroo Eineraswam Poultry Group, Atape Youth Group, Eteteunos Youth Group, Ewala Youth Group, Kabos Youth Group, Kikota Youth group, Moru Youth Group and Opucet Multipurpose Youth Group which all trained in poultry and Abulei Community Youth group, Amotot Youth Group, Elishadai Youth Association, Ogolai Youth Group and OPW Youth Group which trained in horticulture. The group sizes range between 30 to 35 members in Opucet Multipurpose Youth Group and Kabos Youth Group. All groups that trained in piggery and poultry are located in Serere district while the groups that trained in horticulture are located in Soroti district.

Table 1: Groups from which the sample for the midline survey was attained

Group Name	Group Size	Technical Skills Training	Soft Skills Training
Madaka Youth Group	36	Piggery	✓
Amiria cell Youth Group	30	Poultry	✓
Amiria Town council Youth Group	30	Poultry	✓
Aroo Eineraswam Poultry Group	30	Poultry	✓
Atape Youth Group,	30	Poultry	✓
Eteteunos Youth Group	32	Poultry	✓

Ewala Youth Group	30	Poultry	✓
Kabos Youth Group	35	Poultry	✓
Kikota Youth group	30	Poultry	✓
Moru Youth Group	32	Poultry	✓
Opucet Multipurpose Youth Group	35	Poultry	✓
Abulei Community Youth group	30	Horticulture	✓
Amotot Youth Group	30	Horticulture	✓
Elishadai Youth Association	30	Horticulture	✓
Ogolai Youth Group	30	Horticulture	✓
OPW Youth Group	30	Horticulture	✓

Note: Group sizes are reported basing on most responses.

For purposes of the mid-line survey a sample of six members from each group was randomly selected using a randomization table. A randomization table is typically useful in the presence of a census book or names of the respondents. From our baseline data, we had a list of all members from each group. Consequently, we used those lists to draw our sample for the midline survey with the help of the randomization table. The randomization table requires the use of 9 digits from 1 to 9 randomly drawn. For example, if the randomization table is such we have the following set up 4, 2, 7, 1, 8, 3, 5, 6, and 9 which were randomly selected then, for a given group a person who stands in the 4^{th} position on the list is selected. Thereafter, you count two people then the person in the 6^{th} position is selected. For the third person, we count another 7 positions to suggest that he/she would be in the 13^{th} position. The technique offers randomization at two levels. First at the digit level and second, at the subject level. Note that if a number picks already selected name/respondents, then, we opted for the next name until the required sample is attained. From the sixteen groups listed in the preceding paragraph, 96 respondents were selected; 6 from piggery, 60 from poultry and 30 from horticulture.

The subsequent sections captures the extent to which the various individuals appreciated technical skills. Specifically, sections 2, 3 and 4 capture how the youths appreciated technical skills in piggery, poultry and

horticulture respectively. Thereafter we proceed to section 5 which captures how the youths appreciated the various soft skills. Finally, section 6 captures the challenges during training and how they could be solved in future trainings.

Section 2: Piggery Training

As mentioned in the preceding section, the training in piggery was done by both AR and KF. AR undertook technical skills training while KF engaged in soft skills training. The training was availed to Madaka Youth Group which is located in Serere District, Kasilo Sub-County, Kabulabula Parish, Madaka Village. The group is composed of 36 youths of which 6 (3 males and 3 females) of them were randomly selected to respond to the mid-term review questionnaire. 5 of the respondents engaged in farming as the primary occupation while the other was a teacher. 2 of the 6 participants did not have a secondary occupation; however the secondary occupation of the teacher is farming. The others engaged in one of the following occupations fishing, bricklaying and business. With regard to educational attainment, the teacher completed Senior Four. While the participant who engaged in farming and business as a primary and secondary occupations respectively completed Primary Seven. Also the respondent who engaged in farming and brick laying as primary and secondary occupations completed Senior Three. Otherwise all the other respondents did not go beyond Primary Six although they attained some primary education.

Below is a thematic write up about the extent to which the trainees appreciated the technical skills aspects of the skills development. We first established whether piggery was the most preferred choice of enterprise for MYG, all the 6 respondents said yes. MYG preferred piggery as an enterprise because it is: 1) a quick earner to solve household financial problems; 2) easy to rear; and 3) high multiplication rate offering cash flow to the household.

In terms of technical skills, the MYG was taught housing structure of a piggery, hygiene, mixing feeds, feeding pigs and disease control.

Housing structure was at aimed enabling the members of MYG understand what it takes to house pigs in a modern yet affordable way. Generally, the respondents were aware that the housing structure should be 3 to 5 meters from the ground. The structure should be well ventilated with ventilators being set up after 3 meters. The housing structure should have a ladder to the door. Furthermore, the window of should be on the opposite side of the door. Furthermore, where possible the floor was to be cemented; however, in the event that the farmer cannot afford to cement then, the floor could be smeared with cow dung.

Hygiene is all about how to keep the pigs healthy in terms of the surrounding environment. It was common to get responses such as if the floor is cemented, then the farmers are expected to mop every day otherwise where it is made of cow dung then it has to be swept every day. Furthermore, where possible it not advisable for the pigs to lie directly on the floor, rather timber husks can be used as a cushion to protect the pigs from the cold floor. Even then, where timber husks are used, these should be replaced frequently to avoid then from being infested with bugs. Also to avoid the potential spread of diseases and bugs, it is advisable that whenever a farmer enters the pig house, they should put on disinfected gloves and gumboots. Better still, when cleaning the pig house, the farmer should also be dressed in gloves and gumboots.

Mixing of feeds, this is aimed at ensuring a balancing act in food nutrients every time feeds are availed to pigs. The most common mixture of feeds was maize brand, water and cassava leaves or maize brand, potatoes and blood.

Feeding the pigs, it was typical to get responses such as put the food in feeders and clean the feeders every after a meal. Also each pig was to be given its own feeder. Also each pig should be given a half a kilogram of service.

Disease management and control, responses to managing and controlling diseases was more to do with: don't allow them to move out of their house; visitors must first dip their feet in medicine before entering the piggery house; vaccinate pigs and spray the pig house; keep hygiene; and regular monitoring of the health of pigs to the extent that in the event of anyone, it must be isolated.

Section 3: Poultry Training

Just like the training in piggery, poultry training was also conducted by AR and KF. AR was responsible for the technical skills related to poultry keeping while KF engaged the subjects in soft skills training. AR engaged the trainees into understanding the reasons related to choosing poultry as a business, constructing the housing structure for the chicken, how to maintain hygiene in the housing structure, mixing of feeds, feeding of the chicken as well as the mechanisms needed for disease control. KF trained the subjects in soft skills as highlighted in the section 5.

Although, the training was availed to all members (about 30 member per group) of the 10 groups that were selected by AR and KF in Serere district, the mid-line survey randomly selected 6 members from each group. These groups include Amiria cell Youth Group, Amiria Town council Youth Group, Aroo Eineraswam Poultry Group, Atape Youth Group, Eteteunos Youth Group, Ewala Youth Group, Kabos Youth Group, Kikota Youth group, Moru

Youth Group and Opucet Multipurpose Youth Group. This gives a total of 60 respondents from the poultry training that were involved in the mid-line survey.

From the 60 respondents, 23 were females and 37 were males, all averaged 25.5 years. Majority of the respondents were married (66.7 percent) followed by the singles (23.3 percent) while the rest were either engaged (6.7 percent), divorced (1.7 percent) or widowed (1.7 percent). Regarding education attainment, 50 percent of the respondents had attended primary level, 45 percent secondary while only 5 percent had reached post-secondary. 96.7 percent of the subjects had farming as the main occupation while the rest were tailors (3.3 percent). Most of the respondents did not have a secondary activity while some engaged in fishing, pet businesses and teaching.

With regard to the thematic areas that guided poultry training, the following write up highlights the extent to which the trainees recalled the content from the technical and soft skills training that was delivered to them. First, attention is paid to the technical skills and second, to the soft skills. As earlier noted, the technical training was driven by understanding the reasons for choosing poultry as a business, constructing the housing structure for the chicken, how to maintain hygiene in the housing structure, mixing of feeds, feeding of the chicken as well as the mechanisms needed for disease control. To start with, all the selected respondents reported poultry training as their best choice even though they had received information about the possibility of being trained in piggery or horticulture. Almost all respondents reported having received training in rearing of Layers (over 80.0 percent) while close to 20.0 percent also reported having been trained in Kloilers.

Why poultry? This thematic area was intended to provide information to the trainees regarding how engaging in poultry can change their living standards say by increasing their income earnings and improving their diets. From the survey, it turned out that 48.3 percent of the respondents observe poultry as an income generating activity, 28.3 percent observe it as an easy activity to engage in with a ready market which also speaks to income, 18.3 percent recognize it as a source of food while the rest observe it a prestige to have chicken at home.

Housing structure; this thematic area was aimed at training the members on the attributes of the housing structure for the chicken. Precisely, the spacing, ventilation, the nature of walls and floor among others. Generally, the respondents were able to describe the nature of the housing structure for chicken. For instance, majority reported presence of windows (using wire mesh) or proper ventilation to control temperatures in the house. They also went ahead to report that the house must be at least 7 meters high and big enough to allow for the chicken move freely. Moreover, they also recognized the need for proper roofing and putting of the wood husks on the floor and also pointed out that the laying room needs to be separated from the living room.

Hygiene; the training in this thematic area was intended to provide an understanding to the trainees on how to maintain the cleanliness of the habitat for the chicken as it plays a remarkable role in disease prevention. The respondents reported that for a better hygiene maintenance, the house should be well roofed to avoid leaking while others reported frequent sweeping of the habitat as well as time to time cleaning of the feeders and drinkers. Additionally, the need for removing/turning of wood husks (every after 1-2 weeks) was also pointed out by the respondents together with need to wear specific boots/shoes while entering the habitat.

Mixing of feeds; this training was aimed at providing a better understanding to the trainees about the ingredients that constitute the proper feeds for better chicken growth. From the survey, it generally turned out that most of the respondents have a better understanding of the ingredients that define better feeds. For instance, almost all respondents reported mixing of maize bran with silver fish, soya, shells, vitamins and calcium. Some few respondents also pointed out termites and leaves. It also turned out from the survey that majority of the respondents did not remember the quantities.

Feeding of chicken, this thematic training area was aimed at providing knowledge on the specific types of foods at must be fed to chicken basing on age, type as well as the number of times chicken has to fed in a day. The focus was not only on food but also on water provision. The respondents were able to report that chicken feeders and drinkers have to be cleaned every time chicken is fed. They also pointed out that the feeders need to be a bit raised to avoid wastage of food as chicken can turn the feeders into playing gadgets. The participants also reported that feeds and water should be put in separate containers and that the mixing of the feeds for the chicks differed from that of the grown up chicken, though, they could not remember the true quantities for each stage/age. It was also noted from the survey that chicken has to be feed 2-3 a day while water must constantly be in drinkers (4 – 10 drinkers for 100 birds) and mixed with medicine (I DON'T KNOW WHAT THIS MEANS).

Disease control and management, the training in this thematic area was intended to provide knowledge and skills on how to control diseases and their spread among the chicken. This was deemed fundamental as it speaks directly the gains (through cost saving) that a farmer registers from his/her poultry project. The survey results indicate that 65.0 percent of the respondents knew that diseases are controlled through proper vaccination of the chicks while 11.7 percent of the respondents reported maintaining proper hygiene as the strongest tool for disease control. Not allowing for the mixing of outside chicken with housed chicken was reported by 5.0 percent of the respondents which is the same percentage for those that reported separation of the sick chicken from the healthy ones. The rest of the respondents reported that visitors need to take a bath before access the habitat.

Section 4: Horticulture training

Horticultural based farmers received both technical skills training from AR and soft skills training from KF. The technical training focused on Watermelon, Green paper and Onions. In regard to technical skills training, emphasis was put on different thematic areas including site selection that sorts a specific crop, nursery bed preparation, spacing of the crops at planting, watering of the specific crops, manure application, weeding and weed management, pest identification and pest management, signs of maturity, harvesting and post-harvest handling.

During the trainings, AR trained all members in the selected groups (about 30 member per group), but, for the mid-line survey, 6 members were randomly selected from each group that formally received training from AR and KB. These groups include Abulei Community Youth group, Amotot Youth Group, Elishadai Youth Association, Ogolai Youth Group and OPW Youth Group all located in Soroti district. This gives a total of 30 participants that responded to the Mid-line survey in relation to horticulture training questions.

From the 30 respondents, 13 were females and 17 were males, all averaged at 27.3 years. Majority of the respondents were married (73.3 percent) and 16.7 were singles while the rest were either engaged (6.7 percent) or widowed (3.3 percent). In terms of education attainment, 60.0 percent of horticuture respondents attended primary level, 30.0 percent secondary while 10.0 percent had reached post-secondary. 86.7 percent of the subjects had farming as their main occupation while the rest took teaching, tailoring and nursing as their main occupation. 36.7 percent of the respondents who engaged in horticulture training did not have a secondary activity and same percentage served for those who engage in pet businesses. For the rest, the secondary activity included building, tailoring, teaching and social works.

Next, the write-up turns to the thematic areas that guided the training in horticulture. First, among the interviewed respondents, 93.3 percent reported that training in horticulture was the most preferred choice and the rest preferred poultry because they felt that poultry is fast-income generating.

As previous stated, most of the respondents reported to have received training in the growing of watermelon, green paper and onions. However, majority of them could not remember the varieties though, they admitted to have been taught the varieties for each crop.

What was the training about? This question address the key (thematic) areas for which the training in horticulture was focused.

Site selection; this thematic area was intended to training horticultural farmers on how to identify/define the best soils and location for each crop. This was guided by the fact that not all crop do better in all locations but rather each crop may require specific soil types as well as locations. From the survey, it turned out that all crops required

fertile but not water logged areas. But, specifically, green paper requires sandy soils. In regard to location, all respondents emphasized having the garden near their homes for security purposes.

Nursery bed preparation; this training was aimed at equipping the trainees with knowledge and skills related to preparing and managing the nursery bed for each specific crop in which they were trained. The table below summarizes the key responses from the respondents.

Table 2: Nursery bed preparation for various horticulture crops

Watermelon	Green paper	Onions
• Soften soils and raise it a bit to prevent from logging water. • Allow for soil to cool for some time before planting the seeds. • Put a shade and a fence	• Soften soils and raise it a bit to prevent from logging water. • Put a shade that allows little sun to penetrate • Add a fence	• Soften soils and raise it a bit to prevent from logging water. • Burn the soil to keep germs and allow some time to cool • Provide a shade and a fence • Plant in lines

In regard to nursery bed preparation, majority of the respondents pointed out that, a farmer needs to soften the soils in a nursery bed and also raise it a little as a way of preventing from water logging and also needs to provide a shade to block direct sun rays. Additionally, they also mentioned the need for a fence which can protect the young crop from breaking due to strong winds or other aliens.

Spacing; the training in thematic area was intended to provide the trainees with an understanding of the rightful spacing of the specific crops in which they were trained in. The table below summarizes the key responses from the respondents.

Table 3: Spacing of various horticulture crops

Watermelon	Percent	Green paper	Percent	Onions	Percent
1*1 meter	53.3	100*100cm	62.5	1*1 foot	80

2*2 meters	23.3	1*1 meter	16.7	0.5*0.5 feet	8
150*150cm	13.3	1*1 foot	4.2	0.25*0.25feet	8
		2.2 feet	12.5		
Don't remember	10.1		4.1		4.0

Watering, this training area was intended to train the learners on how many times in a day and how frequently they need to provide water (irrigate) to their crops especially during the dry season. This theme was deemed important due that fact of climate change and its associated effects of the unpredictable rains. The survey generally revealed that during the dry season, watering of watermelon should be done twine every day (morning and evening), twice a week for green paper and once for onions but, in the evening. Moreover, it also turned out that borehole water is not good because its normally salty.

Manure application; this thematic area was aimed at equipping the trainees with knowledge about how manure can be applied. Although, attention was also paid the synthetic fertilizers, much emphasis was placed on manure due to its availability and affordability. In line of this, the survey revealed that almost all respondents had knowledge about the application of manure. They pointed out that manure should be placed in gaps/rows and that at the time of planting either watermelon or green paper, 1-2 lids of manure should be put in the hole/ditch before planting. Moreover, majority of the respondents mentioned cow dung and chicken droppings as the best forms of manure.

Weeding and weed management; one of the important activities that must be done in any garden is weeding/weed removal and its management. This is because, weeds can out compete the required crops for nutrients whereby affecting their growth potential. Additionally, they can also be a source of different pests in the sense that some pests depend on weeds as their source of food and once, the food is used up, they turn to crops. Thus, this thematic area was intended to train the subjects on how and at what stage to weed their gardens and the best systems for managing the weeds. The reason for proper management of weeds is that crops like watermelon can easily be uprooted or lose some roots if weeds are not removed with care. In this regard, the survey showed that many respondents highlighted a need for regular weeding of watermelon through the use of a hand hoe while still young and removing of growing weeds by hand when they have matured (after spreading the roots). They

also observed that after planting, weeding should be done after 1-2 weeks depending on the extent of weed growth. For green paper, it turned out that weeding should be done using a hand hoe but, by hand near the stem to avoid damage (weeding should be after 3 weeks of planting) while for onions, weeding is done by the use of a small hand hoe and by hand near the plant.

Pest identification and pest management; many farmers' expectations from their farm activities are down driven by pest invasion. They lower output levels, quality of products and to the extreme, the garden might whole be destroyed. Thus, training of the subjects into pest identification and pest management becomes a prerequisite if the farmers can gain from their effort. This was the essence for why the participants were trained in this thematic area. Generally, in regard to pest identification, it was reported that with pest invasion, leaves turn yellow or they are sometime eaten/destroyed or turn dry. The respondents also reported that pests can be identified by seeing spots on the leaves. Turning to pest management, all respondents reported spraying and dead crop removal as the best ways to manage pests from spreading.

Harvesting and post-harvest handling; the methods used for harvesting and how harvests are handled greatly define farmers' gains. This is because some damages occur at harvesting stage or after harvesting. So, this thematic training area was deemed necessary with an interest of training the subjects on how best to harvest each crop as well handling the harvest. During the training, emphasis was paid to signs of maturity for each crop, how to harvest it, storing the harvests and the ways of transporting the harvest in a way that minimizes damages. In regard to signs of maturity, respondents reported that for watermelon, it changes sounds and color to dark green while the outer cover becomes hard together with the drying of the stalk. For green paper, the mature ones change color to dark green while for onions, the leaves turn yellowish and thereafter, dry out. Turning to harvest methods, it was reported that for watermelon, hand picking in necessary to harvest only mature ones and a knife should be used but with care to avoid spoiling of the stem. For green paper, hand picking or use of a knife while sparing the stem is necessary while for onions, harvesting is done through the use of a hand hoe but, when the ground is soft, it is better to pull it from the ground as this reduces the extent of damages.

Further, storing of watermelon requires a cool but dry place but great attention must be paid toward not mixing damaged melons with fresh ones. Onions are stored in a cool and dry place (in sacks) but after sun drying while green paper has to be stored in a clean but dry place with good air circulation and if put in a box or sack, it should not be over squeezed. In relation to transportation of the harvests, the study revealed that regardless of which means of transport/container, there is a need to put some glass (as soft sponge) before putting watermelon while for a case of green paper, boxes, buckets or sacks can be used. Though, during transportation, over packaging

needs to be avoided. Lastly, the study also revealed that once onions are dry, movement can be by boxes or sacks since the probability of damage is quite low.

Section 5: Soft skills training

In this section, the write-up focuses on the soft skills. As earlier noted, the training in soft skills was conducted by KF and it was conducted to all groups that were selected. The first implication is that, regardless of which technical skills a group/individual was exposed to (horticulture, poultry or piggery), soft skills training cut across. The second implication is that, at the mid-line survey, all respondents answered the questions related to soft skills which gives a total of 96 respondents for this section (6 for piggery, 60 for poultry and 30 for horticulture).

During the soft skills training emphasis was majorly put on skills that were deemed necessary for turning farming into an agribusiness avenue. Precisely, how the farmers can monitor their activities, how they can better benefit from the market and how best they can manage their proceeds from sales. For that reason, the training paid remarkable attention on record keeping, team building and its relevance, skills including; communication, marketing, negotiation, planning, budgeting, saving, leadership and delegation. Below we elaborate how the respondents generally appreciate the aforementioned soft skills training.

Record keeping; one of the fundamental responsibilities of a successful entrepreneur is keeping of records. It helps to keep track of all business transactions. This is the gist that defined the decision to train the members in the selected groups in matters related to record keeping. At mid-line, our interest was to know the extent to which record keeping was taught and the trainees' subject mastery in this regard. The results disclose that the respondents fairly understood the meaning and importance of record keeping since they were able to point out that keeping of records acts as a reminder of business activities and also helps in future planning for all projects.

Team building; working together is important because it allows people and groups to achieve a common goal or derive mutual benefits. Precisely, it enables people to learn from each other with an interest of improving their economic activities and livelihoods, share social capital as well providing a ground of boosting their working potentials. This provided a basis upon which it was reasoned relevant to train the participants into understanding the meaning and the need for team building. At the mid-line, the results indicate that majority of the trainees know the relevance of team building. This is evidenced by the their responses that point out that team building facilitates

development and strengthening of unity among group members, enables sharing of business ideas and boosts the performance of the economic activity(ies) among members and also eases mobilization of support in times of need (social capital mobilization).

Self-awareness; this training theme was intended to train the learners into the need to for every individual to know his/her potential and limitations (self-realization). Most importantly this should be to the extent that one is able to apply their abilities and choice of interest towards improving their livelihood. Specifically, the focus was put into guiding the trainees into understanding what they can do better, for what purpose, the time to do it, where to do from and how to do it. The survey results showed that many trainees were able to explain what self-realization means. This conclusion is based on their responses that point to understanding the person's abilities, weaknesses and strength while other respondents defined it having self-control and conducting self-assessment in relation to business conduct. Moreover, some trainees also defined self-awareness as having the ability to understand the best business option that a person can do better.

Communication skills; any business requires a thorough communication between the sellers, buyers and service providers. This helps the business owner to build a strong link between the various actors in the business as well as developing the ability of engaging all business actors for purposes of attracting and retaining them. Training of the participants into communication skills was aimed at equipping them with the best communication approaches that can strengthen customers' and service providers' loyalty. In line of this theme, the survey results indicate that the respondents received a clear understanding of what communication means for a business. Their responses range from the use of good business language and character to convince customers, passing information from one person to another, having good morals while talking with other people, having the ability to speak in public and making people understand the content to having good customer care.

Marketing skills; Production without market targeting is one of the root causes of poverty in Uganda. Many people lack the confidence in accessing the market and resort to the use of marketing agents who are either family members, relatives or friends. Having agents may have a loophole in the sense that the farmer may not get the rightful market price as the agent may need a commission. This is the reason as to why, it was thought necessary to train the participants into marking skills. The main focus was put on activities aimed at enabling the farmers sell their commodities to a buyers directly and also expose them to marking aids like knowing the targeted market, producing commodities in the desired quality and quantity, promoting of the farmers' produce; training them into market search and the favorable price discovery process. The respondents from the survey observe marking as a process of identifying what people like (products) and provide it them, knowing the process of selling one's

products, promoting and advertising of the products while others observe marking as the ability to bargain for a better price.

Negotiation skills; is the ability to win over another party. It involves convincing buyers to take the product by offering a better price. In essence, negotiation skills coupled with marketing skills should result in increased farm sales. On the side of service providers, better negotiation skills enable farmers to buy inputs at a fair cost or even induce sellers of inputs to supply them on site. A combination of all the above should benefit our targeted farmer. The survey results reveal that the trainees did understand what negotiation means and why there is always a need to negotiate better. The participants' responses point to being friendly and being with the ability to communicate well with others, ability to convince people to buy a product and agreeing between the sellers and buyers about the product price.

Planning skills; this training theme was aimed at providing an understanding about how the trainees can identify the strategies for agribusiness development. The training focused on informing the farmers on the need for setting out what they wish to do, what proportions, over what time and in view of the financial constraints. During the training, it was hoped that, a farmer would be able carefully allocate funds to the immediate needs of their enterprise while being mindful of the priority spending activities. From the survey, the results speak to a clear understanding of what planning means and why planning is necessary in any business. In regard to the meaning of planning, majority of the respondents defined planning as the act of allocating resources to different activities and demands with an interest of specifying what one ought to do first. Responding to why planning is necessary, the respondents mentioned that planning eases program implementation, helps to avoids deficits and risks, helps to know the sequencing of the activities, guides decision making and helps to guide the business toward the intended goal.

Budgeting skills; training in this thematic area was focused on understanding the meaning of budgeting and why budgeting is necessary in any business. This training was aimed that training the subjects into the approaches for identifying the various activities that a farmer must undertake in their respective enterprise and then rationalizing financial allocations to each activity in view of the available or expected resources. The survey results revealed that budgeting complements the plan that farmer set out to implement as it helps in better allocation of resources to different items. Additionally, the respondents also pointed out that budgeting helps in tracking of incomes and the profitability of the business and that it also provides a better accountability for the business and its associated activities.

Saving skill involves keeping extra earnings from a given business enterprise. These extra earnings could be reinvested in expanding the agribusiness enterprise, improving household welfare, land acquisition or simply kept in the bank to earn interest. This is the sprit through which this training theme was seen as remarkably important that the trainees needed to know. From the survey, it is clear that respondents know what saving means as they defined it putting aside some resources for future use. Moreover, some respondents observed that saving especially in financial institutions can earn them some interest and can help them to solve unforeseen circumstances/emergencies.

Book keeping skill refers to record-keeping aspects of financial accounting which involves preparing source documents for all transactions, operations, and other events of a business on a day to day basis. This will typically result in transactions and business events in the form of journal entries in an agribusiness enterprises accounting system. Book keeping can be done manually on a physical ledger book or electronically in an accounting program for example QuickBooks. Book keeping is aimed at: knowing the business revenues; knowing the costs to the business; and guiding business planning.

Leadership skills; involves the ability to galvanize workers or others in ways that ensures the profitability and sustainability of any business enterprise. The training of the participants in the leadership skills was deemed necessary because all the trainees are in groups and thus, having good leaders within the groups is fundamental for the success and survival of the group as well as that of the established agribusiness enterprise. During the training, emphasis was paid to who and/or how a good leader should behave. Precisely, focus was put pertinent skills including ability to communicate well, being decisive, being dependable, having the ability to motivate other team members, be able to handle and delegate responsibilities, be able to listen to feedback and have the flexibility to solve problems in an ever-changing agribusiness environment. As the intention and focus of the training indicates above, even the survey results show that the respondents did understand who or what it costs to be good leader. This is evidenced by the respondents being able to point out most of the attributes listed above pertaining who a good leader is.

Delegation skills; in the real life situation, no leader or entrepreneur can fully commit to all business demands. Like any living organism, a business requires attention at all times including understanding the changes in the business environment, thinking (inventing) and sourcing for new additions. As no leader or entrepreneur can do all the business assignments, delegating of responsibilities keeps the business in life. This is the very reason as to why respondents were exposed to what delegation means and why it is important for any business; specifically, agribusiness. The respondents reported that delegation is an act of transferring a responsibility or a task from one

person to another. Further, they mentioned that delegation has the potential to save time, develop colleagues into future leaders, motivates others and also helps in sharing of responsibilities. Further, the trainees also noted that delegation aids group continuity, gives the leader time to rest and also helps to avoid conflicting interests.

Section 6: Challenges during training and how can be solved in future trainings

During the survey, we were also interested in knowing if there were some challenges that manifested during the trainings that could have affected the content mastery. The results point to inadequate feeding especially lunch, poor time keeping and some long sessions before a break could be given, sickness of some participants and fewer visual aids.

Turning to possible solutions that can improve future trainings, the respondents identified improving time management; training during dry seasons when participants can concentrate on the training content (to reduce conflicting interests), increasing time for practical work for example site visits, increasing the use of visual aids plus providing food and other refreshments.

Lastly, we also sought to understand the areas (content) that need more emphasis during the future technical skills trainings. The respondents raised the following: more training on vaccination, reduction of content per session, taking of trainees to demonstration firms, starting training early in the morning as opposed to afternoons and practically showing items such as medicine during the training sessions as part of visual aids.

ANNEX 10: Mid-line review survey instrument

Note 1	**CENTER FOR BASIC RESEARCH KAMPALA UGANDA ENHANCING AGRIBUSINESS ECONOMICS OPPORTUNITIES OF RURAL WOMEN AND YOUTH IN UGANDA BASELINE QUESTIONNIARE**
Note2	**The overall objective of the mid-line survey is to assess the extent to which rural women and young entrepreneurs mastered the capacity building training contents and also to acquire a better understanding of the organization of the trainings to guide the explanations of the impact evaluation results.**
A: Preliminary	
District	

Sub-county	
Parish	
village	
Group name	
Group code	
Group size	
Year for group formation	
Interviewer code/Initials	
Date of Interview	
Start time (HH/MIN)	
B: Households	**CURRENT HOUSEHOLD DEMOGRAPHICS AND EDUCATION**
respondent_details	**What is your?**
	b1: Name/code of respondent
	b2: Sex of respondent
	b3: Age of respondent (in completed years)
	b4: Marital status of respondent 1. Married 2.Engaged 3.Divorced 4. separate 5.Widow/widower ***6. Other, specify*** **(Tick appropriate)**
	b5: Primary occupation/activity of respondent
	b6: Next activity, ***please list the next activity***
	b7: Highest education level of respondent ***(Tick appropriate)*** 1.No formal education 2.Primary 3.Secondary 4.Post secondary
	b8: If not 1 in b7, What highest academic class did you complete?
	b9: Religion of the respondent ***(Tick appropriate)*** 1. Christian 2. Moslem 3. Traditionalist ***4.Other, specify*** **(Tick appropriate)**

C: Trainings	Capacity building trainings (Organisation/Structure)
	c1: In the last 8 months, did you receive any training related to agricultural activities in your household? ***YES/NO***
	c2: If YES to c1, from which organisation did you receive the training from? (AWOJA RIVERSIDE FARM/KIBO) **(Tick approriate)**
	c3: If NO to c1 or if the training was got but not from AWOJA RIVERSIDE FARM/KIBO , ***stop***
	c4: What was the training about? (***Specify activity -Hoticulture, poultry,piggery***) **(Tick appropriate)**
	c5: For how many days did the training last?
	c6: On avarage, for how many hours in a day, did the training last?
	c7: Then, for how long did each training session last ***(in minutes)*** before a break was given?
	c8: Were you given a break(s) during the trainings? ***YES/NO***
	c9: If YES to n8, for how long ***(in minutes)*** did the break(s) take? ***For multiple breaks, please, sum***
	c10: Did you get some refreshmnets during the training sessions? ***YES/NO***
	c11: On average, how many trainers were you getting per day?
	c12: Did the trainings have provisions for assessing the course content? ***YES/NO***
	c13: If YES to c12, which of the following approaches was used? 1.Individual exerices 2.Group exercises 3.Random class questions 4.Take home assignments ***(You can provide multiple responses)***
	c14: Were you graded for the assessments? ***YES/NO***
	c15: If YES to c14, in which form of grading were you graded? 1.percentages 2.scales like A, B, C etc.
	c16: Were you rewarded for passing the assessment item? ***YES/NO***
	c17: If YES to c16, what kind of rewards did u get? 1. Gifts 2.Rewarding statements like excellent, very good, good etc.
	c18: Did the trainers re-echo the areas that seemed inadquately mastered by the learners? ***YES/NO***

D: Training	**Training content details**
Hoticulture only	
	d1: In c4, you said you received training in hoticulture, was this your most prefered training/your training choice? ***YES/NO***
	d2: If NO to d1, what would have been your best choice? ***(Tick appropriate)*** 1. Poultry 2.Piggery
	d3: Why your choice in d2?
	d4: Now back to hoticulture, what crop were you trained in? ***(Tick appropriate***) 1. Tomatoes 2.Watermelon 3.Green paper 4.Onions 5. Others, ***please specify***
	d5:Specifically, what variety of the crop were you taught?
	Tomatoes: (d4t_i)
	(d4t_ii)
	(d4t_iii)
	(d4t_iv)
	Watermelon: (d4w_i)
	(d4w_ii)
	(d4w_iii)
	(d4w_iv)
	Green papper: (d4g_i)
	(d4g_ii)
	(d4g_iii)
	(d4g_iv)
	Onions: (d4o_i)
	(d4o_ii)
	(d4o_iii)
	(d4o_iv)

	Others: (d4ot_i)
	(d4ot_ii)
	(d4ot_iii)
	(d4ot_iv)
	d6: What were the major themes of the training? ***(Tick appropriate)***
THEMES: Tomatoes	**(i) Site selection**
	Briefly, explain the theme
	(i)Nursary bed preparation
	Briefly, explain the theme
	(ii) Spacing during planting
	Briefly, explain the theme
	(iii) Watering
	Briefly, explain the theme
	(iv) Manure application
	Briefly, explain the theme
	(v) Weeding and weed management
	Briefly, explain the theme
	(vi) Pests identification and pest management
	Briefly, explain the theme
	(vii) Post harvest handling
	(a) Signs of maturity
	Briefly, explain the theme
	(b) Harvesting
	Briefly, explain the theme

	(c) Storage of the harvested products
	Briefly, explain the theme
	(d) Transporting of the harvested products
	Briefly, explain the theme
THEMES: Watermelon	**(i) Site selection**
	Briefly, explain the theme
	(i)Nursary bed preparation
	Briefly, explain the theme
	(ii) Spacing during planting
	Briefly, explain the theme
	(iii) Watering
	Briefly, explain the theme
	(iv) Manure application
	Briefly, explain the theme
	(v) Weeding and weed management
	Briefly, explain the theme
	(vi) Pests identification and pest management
	Briefly, explain the theme
	(vii) Post harvest handling
	(a) Signs of maturity
	Briefly, explain the theme
	(b) Harvesting
	Briefly, explain the theme
	(c) Storage of the harvested products

	Briefly, explain the theme
	(d) Transporting of the harvested products
	Briefly, explain the theme
THEMES: Green papper	**(i) Site selection**
	Briefly, explain the theme
	(i)Nursary bed preparation
	Briefly, explain the theme
	(ii) Spacing during planting
	Briefly, explain the theme
	(iii) Watering
	Briefly, explain the theme
	(iv) Manure application
	Briefly, explain the theme
	(v) Weeding and weed management
	Briefly, explain the theme
	(vi) Pests identification and pest management
	Briefly, explain the theme
	(vii) Post harvest handling
	(a) Signs of maturity
	Briefly, explain the theme
	(b) Harvesting
	Briefly, explain the theme
	(c) Storage of the harvested products
	Briefly, explain the theme

	(d) Transporting of the harvested products
	Briefly, explain the theme
THEMES: Onions	**(i) Site selection**
	Briefly, explain the theme
	(i)Nursary bed preparation
	Briefly, explain the theme
	(ii) Spacing during planting
	Briefly, explain the theme
	(iii) Watering
	Briefly, explain the theme
	(iv) Manure application
	Briefly, explain the theme
	(v) Weeding and weed management
	Briefly, explain the theme
	(vi) Pests identification and pest management
	Briefly, explain the theme
	(vii) Post harvest handling
	(a) Signs of maturity
	Briefly, explain the theme
	(b) Harvesting
	Briefly, explain the theme
	(c) Storage of the harvested products
	Briefly, explain the theme
	(d) Transporting of the harvested products
	Briefly, explain the theme

THEMES FOR Other crops	**(i) Site selection**
	Briefly, explain the theme
	(i)Nursary bed preparation
	Briefly, explain the theme
	(ii) Spacing during planting
	Briefly, explain the theme
	(iii) Watering
	Briefly, explain the theme
	(iv) Manure application
	Briefly, explain the theme
	(v) Weeding and weed management
	Briefly, explain the theme
	(vi) Pests identification and pest management
	Briefly, explain the theme
	(vii) Post harvest handling
	(a) Signs of maturity
	Briefly, explain the theme
	(b) Harvesting
	Briefly, explain the theme
	(c) Storage of the harvested products
	Briefly, explain the theme
	(d) Transporting of the harvested products
	Briefly, explain the theme
Challenges	d6: Did you face any challenges that could have affected your content masterly? ***YES/NO***

	If YES to d5, what were the challenges ?
	d6_i Language barrier
	d6_ii Competing interests
	d6_iii Short breaks
	d6_vi inadquate re-citing of the content
	d6_v Others, ***please, specify***
Additions to new trainings	d7: Suppose, the same training was to be repeated, what do you think needs to be added to improve the trainig content?
	d7_i: More guest speakers
	d7_ii: More visual aids like charts
	d7_iii: Strengethening of the re-citing mechanisms
	d7_vi Others, ***please, specify***
Improve trainings	d8: Suppose, the same training was to be repeated, what do you think needs to be done to improve the training organisation/structure?
	d8_i Training in a local laguage
	d8_ii Expanding on the breaks
	d8_iii being brief in content
	d8_iv providing reading materials
	d8_v providing training allowance
	d8_vi increasing the use of visual aids like charts, projecting of the training materials
	d8_vii providing handout materials
	d8_vii Others, ***please, specify***
E: Training	**Training content details**
Poultry	
	e1: In c4, you said you received training in poultry keeping, was this your most prefered training/your training choice? **YES/NO**

	e2: If no to e1, what would have been your best choice? 1. Hoticulture 2. piggery
	e3: Why your choice in e2?
	e4: What type of chicken rearing were you taught? Local/Modified **(TICK APPROPRIATE)**
	e5: If improved chicken, please name the type **(TICK APPROPRIATE)**
	e5_i: Layers
	e5_ii: Broilers
	e5_iii: Kroilers
	e5_IV: Cross breed
	e6: What were the major themes of the training?
	e6_i: Why Poultry?
	Briefly, explain the theme
	e6_ii: Poultry as a business
	Briefly, explain the theme
	e6_iii: Record keeping
	Briefly, explain the theme
	e6_iv: Housing structure
	Briefly, explain the theme
	e6_v: Hygiene
	Briefly, explain the theme
	e6_vi: Mixing of feeds
	Briefly, explain the theme
	e6_vii: Feeding chicken
	Briefly, explain the theme
	e6_viii: Water feeding for the chicken

	Briefly, explain the theme
	e6_ix: Disease control and management
	Briefly, explain the theme
	e7: Did you face any challenges that could have affected your content masterly? **YES/NO**
	If YES to e7, what were the challenges
	e7_i: Language barrier
	e7_ii: Competing interest
	e7_iii: Short breaks
	e7_iv: Others, ***please, specify***
Additions to new trainings	e8: Suppose, the same training was to be repeated, what do you think needs to be added to improve the trainig content?
	e8_i: More guest speakers
	e8_ii: More visual aids like charts
	e8_iii: Strengethening of the re-citing mechanisms
	e8_vi Others, ***please, specify***
Improve trainings	e9: Suppose, the same training was to be repeated, what do you think needs to be done to improve the training organisation/structure?
	e9_i: Training in a local laguage
	e9_ii: Expanding on the breaks
	e9_iii: being brief in content
	e9_iv: providing reading materials
	e9_v: Increasing the use of visual aids
	e9_vi: providing training allowance
	e9_vii: Others, ***please, specify***
F: Training	**Training content details**
Piggery	

	f1: In c4, you said you received training in piggery rearing, was this your most prefered training/your training choice? **YES/NO**
	f2: If no to e1, what would have been your best choice? 1. Hoticulture 2. Poultry
	f3: Why your choice in e2?
	f4: What type of pigs were u taught to rear? ***(Tick appropriate)*** Local pigs/improved pigs
	f5: If modified, please name the type
	(i)
	(ii)
	(iii)
	(IV)
	f6: What were the major themes of the training?
	f6_i: Piggery as a business
	Briefly, explain the theme
	f6_ii: Record keeping
	Briefly, explain the theme
	f6_iii: Housing structure
	Briefly, explain the theme
	f6_iv: Hygiene
	Briefly, explain the theme
	f6_v: Mixing of feeds
	Briefly, explain the theme
	f6_vi: Feeding pigs
	Briefly, explain the theme
	f6_vii: Disease control and management

	Briefly, explain the theme
	f7: Did you face any challenges that could have affected your content masterly? YES/NO
	If YES to e6, what were the challenges?
	f7_i: Language barrier
	f7_ii: Competing interest
	f7_iii: Short breaks
	f7_iv Others, ***please, specify***
Additions to new trainings	f8: Suppose, the same training was to be repeated, what do you think needs to be added to improve the trainig content?
	f8_i: More guest speakers
	f8_ii: More visual aids like charts
	f8_iii: Strengethening of the re-citing mechanisms
	f8_vi Others, ***please, specify***
Improve trainings	f9: Suppose, the same training was to be repeated, what do you think needs to be done to improve the training organisation/structure?
	f9_i: Training in a local laguage
	f9_ii: Expanding on the breaks
	f9_iii: being brief in content
	f9_iv: providing reading materials
	f9_v: providing training allowance
	f9_vi: Increasing the use of visaul aids
	f9_vii: Others, ***please, specify***
G: Soft Skills	**Details of soft skills training**
	During the training, were you taught the following business development skills?
g 1	Team building ***YES/NO***
	g1_a: If YES to g1, what is team building?

	g1_b: Why is team bulding important?
	g2: Self-awareness ***YES/NO***
	g2_a: If YES to ……., what is self awareness?
	g2_b: Why is self awareness important in business environment?
	g3: Communication skills ***YES/NO***
	g3_a: Briefly, describe the skill
	g4: Marketing skill ***YES/NO***
	g4_a:What is marketing?
	g4_b:What is involved in marketing?
	g5: Negotiation skills ***YES/NO***
	g5_a: Briefly, describe the skill
	g6: Planning ***YES/NO***
	g6_a: What is planning?
	g6_b: Why plan?
	g7: Budgeting ***YES/NO***
	g7_a:What is budgeting?
	g7_b: Why budget?
	g7_b_i: To control spending
	g7_b_ii: To choose most presssing want(s)
	g7_b_iii: To plan for future
	g7_biv: Others, specify
	g8: Saving ***YES/NO***
	g8_a:What is saving?
	g8_b:Why save?
	g8_b_i: To pay for children's education expenses

	g8_b_ii: To buy more land
	g8_b_iii: To build a house
	g8_b_iv: To buy farm equipment
	g8_b_v: To invest in existing business
	g8_b_vi: To invest in new business
	g8_b_vii: To finance Celebrations (marriages, etc.)
	g8_b_viii: To buy domestic assets
	g8_b_ix: To provide for old age
	g8_b_x: Other, specify
	g9: Book keeping ***YES/NO***
	g9_a:What is book keeping?
	g9_b:Why book keeping?
	g9_b_i:To know the business revenues
	g9_b_ii:To know the costs to the business
	g9_b_iii:To guide business planning
	g9_b_iv:Other, specify
Other skills	
	g10: Leadership skills ***YES/NO***
	g10_a: Briefly, explain the skill
	g11: Delegation ***YES/NO***
	g11_a: Briefly, explain the theme
	g11_b: Why delegation?

ANNEX 11: Impact of the Impact of Agronomical and Soft Skills Training and information provision on enhancing Agribusiness Economic Opportunities of Women and Youth in Rural Uganda.

1.0 Introduction

This report presents results from trainings that were conducted as part of the main research project that was aimed at improving the technical capacity and economic status of vulnerable women and youths in rural areas of Uganda through enhancing their opportunities for employment in agribusiness. Specifically, the trainings were intended to: 1) build capacity of rural women and youths in order to enable them develop sustainable economic activities within their localities/villages; and 2) provide information to rural women and youths about the various activities (e.g. poultry and piggery farming, trade in agricultural inputs and outputs etc.) and crops that can provide agribusiness potentials in their areas for purposes of enhancing their livelihood.

The results contained in this report indicate the outcomes of the trainings. In other words it is based on data collected during the end-line survey (end-line data)[6]. The results are mainly comparisons of the means/averages from the various outcome variables of the training between the trained and the untrained/control group (the group that was not exposed to any training). The analysis is mainly conducted through balance checks using T-tests analytical strategy.

2.0 Details of the training[7]

The training was conducted by Awoja Riverside farm (AR) and KIBO foundation (KF). AWOJA Riverside farm and KIBO foundation are Non-Governmental Organisations (NGOs) with headquarters located in Soroti district but operating in both Soroti and Serere districts in Eastern Uganda. Both NGOs are aimed at encouraging for the formation of homogeneous youth self-help groups in both districts and empower them with skills transfer programs, food security projects, sanitation programs and market information.

[6] The survey was conducted in September and October, 2020.

[7] Although the trainings mainly focused on agricultural practices (horticulture, poultry, and piggery) and soft skills, it was also geared towards providing information on the various agricultural related activities and crops that can provide a potential for agribusiness given the prevailing conditions in the area. For instance, trainees were provided with information on the economic potentials that do better in the area like cattle rearing, goats keeping, fruits and vegetable growing, trading in farm produce and farm inputs. In relation to crops that can do better in area and promote agribusiness, trainees were informed about the soils and market availability (within and outside the area) favoring the growing rice, millet, maize, sorghum, beans, soya beans, sim sim, choloko (green grams), tomatoes, onions, watermelon, green pepper, citrus and sweet potatoes.

2.1 Details of the experiment

To start with, data from the end-line survey was collected from 944 subjects but '1' subject was dropped due missing data for most variables. The remaining 943, constituted 2 broad arms that is 532 subjects in the treatment arm (trained in soft skills and also received information about various activities that can provide agribusiness potential in the area) and 411 subjects in the untrained arm (received no training at all). From within the trained group, participants also chose to receive specialised/ detailed training in specific agronomic skills. On that note, 206 subjects received extra training in horticulture whose contents are detailed in appendix 2[8]. 321 subjects received additional training in poultry whose details are presented in appendix 3. 32 subjects received extra training in piggery; details are provided in appendix 4. However, it was noted from the data that some 27 trainees crossed from their specialised training groups and also received some training in other agronomic fields e.g. crossing from piggery training group to say poultry training group.

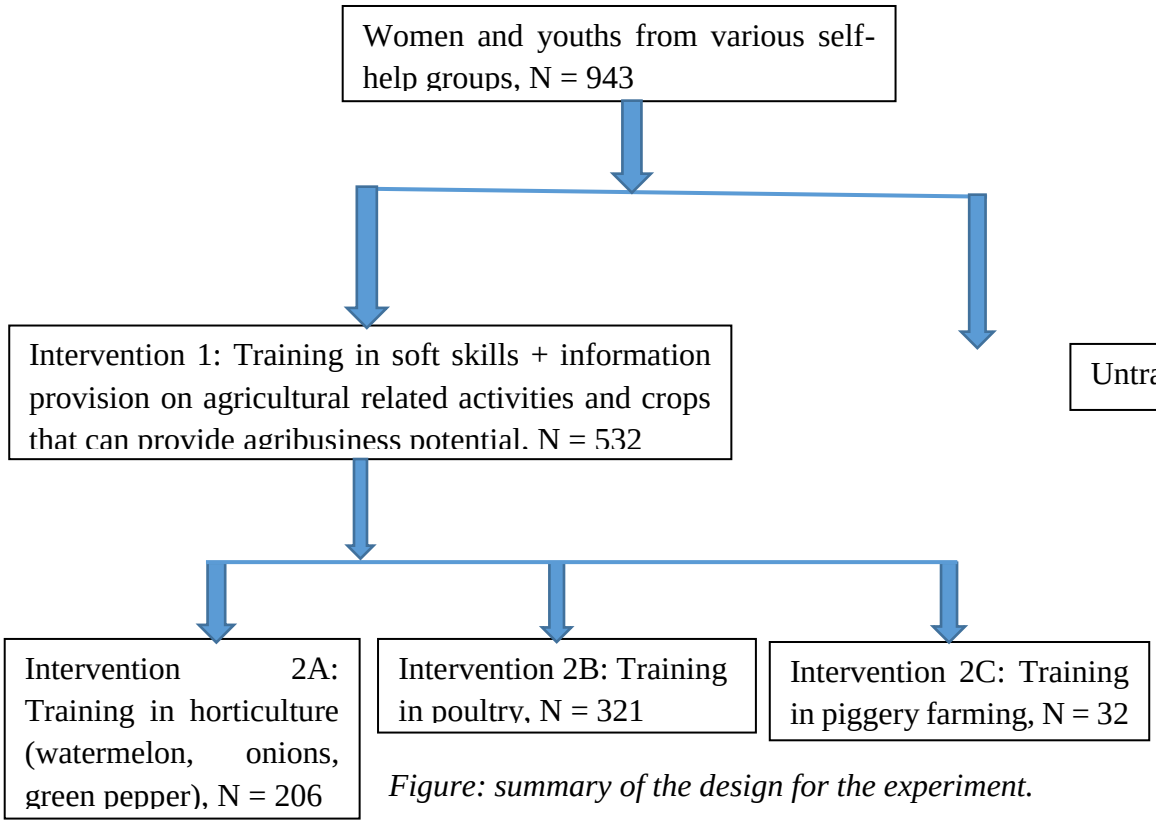


Figure: summary of the design for the experiment.

[8] Main emphasis in horticultural training was placed on three crops i.e. watermelon, onions and green pepper.

2.2 Analytical strategy

To analyse the data, we used T-tests in which we compare means for outcome variables. In some instances we compare the means of the trained group (532 subjects) against the untrained group (411 subjects) for example, when we are tracing for the effects of softs skills training on owning a saving account or savings[9]. In other instances, we compare the means of the groups that received specialised training to the rest. For example, we capture the effect of horticultural training by comparing the group that received the specialised training in horticulture (206 subjects) to the rest of the group members (737 subjects). This helps to know if the people who trained in growing of watermelon, onions and green pepper have for example, increased their participation in the growing of those three crops. To capture the effect of poultry training, we compare the mean participation, the mean production and earnings from poultry products for those who participated in poultry training (321 subjects) to the rest of the groups (622 subjects). Lastly, to capture the effects of piggery training on piggery farming outcomes, we compare for example, the mean participation in piggery farming for those who trained in piggery (32 subjects) to rest (911 subjects).

2.3 Selection of agronomic skills

Training in agronomic skills was conducted by Awoja Riverside farm. Through piloting, the selected groups were asked about the commonly done agricultural activities as well as their most preferred agricultural activities to guide in the preparation of the training content. The results from piloting dictated that more emphasis be placed on horticulture, poultry and piggery, even though, attention (through information provision) was also paid to other agricultural activities for example fruit and vegetable growing, cattle and goats rearing and trade etc. as other potential avenues for agribusiness.

The groups that trained in horticulture include Abulei Community Youth group, Amotot Youth Group, Elishadai/Ojaret Youth Association, Ogolai Youth Group and OPW Youth Group. The training in horticulture mainly focused on three crops i.e. watermelon, onions and green pepper. But, as earlier mentioned, during the training sessions some information about other crops that can provide a potential for agribusiness in the area was also provided to the trainees[10]. Such crops that do well in the area include maize, millet, sorghum, beans, soya beans, rice, choloko (green gram), sim sim, citrus, onions, sweet potatoes, tomatoes, fruits and vegetables.

[9] The analysis based on 532 subjects and 411 subjects carries on to other outcome variables because whoever received the training in soft skills also got information about other activities and crops that can provide a potential for agribusiness.

[10] The extra information was mainly focused on crops that do well in the area, their market availability and the ease with which the crops can be grown.

The training content had different thematic areas[11] including site selection, nursery bed preparation, crop spacing, watering/irrigating of the specific crops, manure application, weeding and weed management, pest identification and pest management, signs of maturity, harvesting and post-harvest handling[12]. Participants were asked if they practice better farming practices when growing watermelon, onions and green pepper (the key focal crops for horticulture training), the results in table 1 indicate more women and youths from the trained group (trained in horticulture) acknowledging to practicing better farming practices compared to their counterparts in the untrained group. These practices include correct spacing, pest and weed control, fertilizer and manure usage, seed preservation and watering of crops. Specifically, after being exposed to the training in horticulture, the trained group shows statistically significant number of farmers confessing to practicing correct spacing, better pest and weed management practices (except for local weed management practices), increased use of fertilisers and manure, seed preservation and watering of crops[13]. These results are not strange because when farmers get exposed/trained in new farming practices, their interest/willingness to adopt to such practices tends to be stimulated (Kilpatrick, 2000). Kilpatrick further argues that the interaction between the trainees and the trainers plays a fundamental role in changing the values and attitudes of the trainees towards the new practices. Moreover, Uzonna & Qijie, (2013) conclude that training of farmers enhances the uptake of improved farm practices. Such uptake does not only stop at farming practices like correct spacing, disease and pest control but also extends to crops (other crops can be adopted).

Table 1: Supplementary training in horticultural and farming practices[14]

Farming practices	Trained	Non-Trained	Differences	P-values
Correct spacing	0.796	0.609	-0.187	0.000
Pest management (inorganic)	0.451	0.259	-0.192	0.000
Pest management (local)	0.320	0.136	-0.185	0.000
Weed management (inorganic)	0.146	0.054	-0.091	0.000
Weed management (local)	0.199	0.164	-0.035	0.242
Fertilizers	0.078	0.043	-0.034	0.048
Manure	0.194	0.092	-0.102	0.000

[11] See appendix 2 for details of each thematic area.
[12] The thematic areas detailed better farming practices for watermelon, onions and green pepper.
[13] These were assessed by the research team during the mid-line survey and the details were presented in the mid-line review report.
[14] For a full variable description see appendix 6.

Seed preservation	0.364	0.288	-0.076	0.035
Watering/irrigating	0.121	0.030	-0.092	0.000
Spraying (disease control)	0.481	0.423	-0.057	0.143

Notes:
1) No. of trained=206
2) No. of non-trained=737

Source: Author's own computation from field survey data, 2020

With regard to poultry, training was mainly focused on layers and kuroilers as improved poultry varieties alongside training in rearing of local breeds. The youth groups that were trained in poultry include Amiria cell Youth Group; Amiria Town council Youth Group; Aroo Eineraswam Poultry Group; Atape Youth Group, Eteteunos Youth Group; Ewala Youth Group; Kabos Youth Group; Kikota Youth group; Moru Youth Group; and Opucet Multipurpose Youth Group.

The key thematic areas on which the training was focused include the reasons for choosing poultry as a business (why poultry?), the housing structure for the chicken, maintaining hygiene in the house, mixing of feeds, feeding of the chicken as well as disease control[15].

For piggery, the training was conducted with Madaka Youth Group. The training focused on why piggery is a good investment for the household, the housing structure for pigs and maintaining hygiene in the house, mixing of feeds, feeding the pigs, disease management and control[16].

2.4 Soft skills training

As earlier noted, training in soft skills was conducted by KIBO Foundation. All the groups that received agronomic skills training also received the soft skills training. The soft skills training emphasized skills that were deemed necessary for revolutionising households from subsistence farming into commercial farming/engaging in agricultural related activities for income generation. Precisely, how the farmers can better benefit from the market and how best they can manage their proceeds from sales. However, because the subjects are organised in groups, KIBO Foundation also extended the trainings on skills that can help the groups to grow stronger and bonded. Such training focused on team building, leadership and delegation.

[15] See appendix 3 for details of each thematic area in poultry training content.
[16] See appendix 4 for details of each thematic area in piggery training content

In relation to the training content, the main areas of focus were; self-awareness, team building, record keeping, saving, planning, budgeting, marketing, negotiation, communication, leadership and delegation skills[17].

Demographic characteristics of the group members

In Table 2 we summarize basic demographic characteristics of the trained and untrained group members, distinguishing between respondents who received the training that cut across all the treated groups (soft skills training and information provision on agricultural related activities and crops that can provide a potential for agribusiness) and the untrained group (received no training at all). The results indicate no statistical differences between the groups, except for gender (which presumably reflects chance). On average, respondents are less than 26 years old, majority of them are married and take farming as the main activity. Less than 8 percent of the respondents completed ordinary level of education. In relation to household asset stock, the groups remain statistically similar except for bicycles, radios and mobile money account ownership. For these, the trained arm seems to have more people owning such assets compared to their counterparts in the untrained arm.

Table 2: Demographic characteristics of the group members[18]

Variable	Trained (Mean)	N	Non-Trained (Mean)	N	Differences	P-values
Age	25.111	532	24.949	411	-0.162	0.733
Gender (male)	0.502	532	0.564	411	0.063	0.056
Married	0.570	532	0.521	411	-0.049	0.135
Education	0.077	532	0.063	411	-0.014	0.414
Occupation (farming)	0.737	532	0.701	411	-0.036	0.221
Household characteristics						
Electricity	0.021	532	0.034	411	0.013	0.205
Water source	0.981	532	0.973	411	-0.008	0.412
Rooms	3.019	532	2.983	411	-0.036	0.791
Household asset ownership						
Ox plough	0.438	532	0.416	411	-0.022	0.501
Carts	0.007	532	0.009	411	-0.002	0.728
Wheelbarrows	0.071	532	0.054	411	-0.018	0.265
Spray pumps	0.162	532	0.153	411	-0.008	0.727

[17] See appendix 5 for details of each thematic area in soft skills training content

[18] Refer to appendix 1 for detailed variable description.

Water tank	0.041	532	0.060	411	-0.019	0.198
Beehives	0.041	532	0.054	411	0.012	0.380
Storage facility	0.173	532	0.190	411	0.017	0.505
Bicycle	0.724	532	0.662	411	-0.062	0.040
Radio	0.605	532	0.496	411	-0.109	0.001
Television	0.013	532	0.024	411	0.011	0.201
Mobile money	0.789	532	0.703	411	-0.086	0.002
Motorbike	0.098	532	0.068	411	-0.030	0.106

Notes:

1) No. of trained=206
2) No. of non-trained=737

Source: Author's own computation from field survey data, 2020

3.0 How does agribusiness relate with economic empowerment?

Agribusiness can act as an engine of livelihood enhancement besides playing a fundamental role in inducing agricultural households to engage in value addition (Mittal and Singh, 2007; Panda and Sreekumar, 2012; Sabourin, 2015; Stanton, 2000), employment creation (Bairwa, et al., 2014; Drost, et al., 2014; Mulley and Unruh, 2004; Odongo, et al., 2017 and Tersoo, 2014), provision of raw materials to agro-based processing firms (Elepu and Nalukenge, 2009; Mulley and Unruh, 2004) and can provide a market to farmers' produce (Kirsten and Sartorius, 2002).

The desire to promote agribusiness in Uganda started far back during the colonial times. By that time, local chiefs were more focused towards expanding the production scale of the smaller holder farmers which turn would strengthen the country's export sector (Martiniello, 2015). This was mainly done through encouraging commercialization of coffee and cotton growing. Although, for long, agribusiness has been observed as a move from peasant/substance production to commercialized farm production, in the recent past, its definition seems to have become boarder. It extends from expanding the scale of farm production, to processing and marketing of farm inputs and outputs.

In Uganda, agribusiness has been seen as a provider of market to farmers' output (Elepu and Nalukenge, 2009 and Mulley and Unruh, 2004), a job creator (Mulley and Unruh, 2004; Odongo et al., 2017), an avenue for providing opportunities for employing the formally displaced youth in the war affected areas of Northern Uganda (Drost et al., (2014), a way of getting a steady supply of raw materials from the farmers contracted by agribusiness firms, while the contracted farmers benefit through accessing farm inputs (Elepu and Nalukenge, 2009) and an avenue of accessing guaranteed market for farmers' produce through agro-processing (Kirsten and Sartorius, 2002).

4.0 Empirical results

4.1 Training and agribusiness activities

In table 3 we compare the participation rate in agribusiness opportunities between trained and untrained groups. Precisely, the trained group is a combination of participants who trained in soft skills and also received information about other agricultural related activities and crops that can provide opportunities for agribusiness. Such agricultural related activities include production of fruits and vegetables, cattle (cows) and goats rearing, trade in farm produce and trade in farm inputs. This information was provided to all trained participants. The results reveal that trained women and youths statistically and significantly participate in poultry keeping, goats rearing and trade especially in farm produce. Specifically, 11.9 percent more people reported to be engaging in poultry keeping after they received the training (54.5 percent in the trained group compared to only 42.6 percent in the untrained group). 16.4 percent of the people in the trained group engage in goats rearing and 1.9 percent trade in farm produce compared to only 12.4 percent and 0.5 percent in the untrained group that engage in goats rearing and trade in farm produce respectively.

Table 3: Participation in agribusiness related activities

Agribusiness activities	Trained	Non-Trained	Differences	P-values
Fruits	0.158	0.127	-0.031	0.174
Vegetable	0.171	0.158	-0.013	0.598
Piggery	0.273	0.226	-0.046	0.105
Poultry	0.545	0.426	-0.119	0.000
Cattle rearing	0.156	0.161	0.005	0.849
Goats rearing	0.164	0.124	-0.039	0.089
Trade in farm produce	0.019	0.005	-0.014	0.059
Sale of farm inputs	0.006	0.007	0.002	0.751

Notes:
1) No. of trained=532
2) No. of non-trained=411

Source: Author's own computation from field survey data, 2020

Note that the results in table 3 were driven by the treated group which constitutes all participants that received the soft skills training and information on potential agribusiness activities and crops in the area. However, as earlier mentioned, the training also emphasised some specified/extra training to specific groups[19]. We now test for the effect of the training on agribusiness involvement for a group that received specified training in horticulture. The

[19] Decision about the specialized training was based on the choice made by the group.

results in table 4 indicate that women and youths that received training in horticulture significantly participate in fruit and vegetable growing, poultry keeping, goats rearing and trading in both farm produce and farm inputs.

Table 4: Participating in agribusiness related activities for horticulture trained group

Agribusiness activities	Trained	Non-Trained	Differences	P-values
Fruits	0.194	0.130	-0.064	0.021
Vegetables	0.252	0.141	-0.111	0.000
Piggery	0.291	0.242	-0.050	0.147
Poultry	0.553	0.476	-0.077	0.050
Cattle rearing	0.160	0.157	-0.003	0.923
Goats rearing	0.204	0.130	-0.074	0.008
Trade in farm produce	0.024	0.009	-0.015	0.095
Sale of farm inputs	0.015	0.004	-0.010	0.094

Notes:
1) No. of trained=206
2) No. of non-trained=737

Source: Author's own computation from field survey data, 2020

A deeper examination of the results in tables 3 and 4 suggest that when a training was offered to women and youths, they found it easier to participate more in poultry and goats rearing as these are some of the common activities in the area (see UIA, 2016). Moreover, UIA, (2016) also shows increasing involvement in the growing of fruits and vegetables which even prompted the government to establish a fruit industry in the area. As such extending a specialised training in horticulture supplements on the already existing interest in the growing of fruits and vegetables.

4.2 How did the training impact growing of specific crops?

As earlier mentioned, during the training information about crops[20] that can provide agribusiness potential to women and youths in the area was also provided. Uzonna & Qijie, (2013) maintains that training of farmers in better farming practices and crops results into increased adoptability to such new farming practices. As such, we test for the effect of training on participation in the growing of specific crops that can provide agribusiness potentials in the area. The results in table 5 show the major crops that women and youths are increasingly growing. Specifically, the results indicate that after the training, the trained women and youths significantly participate in growing of millet, sweet potatoes, cassava, cow peas, beans, groundnuts, choroko (green grams), tomatoes, and citrus. These findings can be attributed to the information that was provided during the training that relates to the

[20] Besides watermelon, onions and green pepper for which detailed training in horticulture was provided.

soil types that favour some of these crops[21], market availability and the presence of processing firms within the area that can provide a market potential for those crop yields.

Table 5: Participation in the growing specific crops

Crops	Trained	Non-Trained	Differences	P-values
Rice	0.107	0.105	-0.003	0.901
Maize	0.827	0.786	-0.041	0.111
Millet	0.479	0.418	-0.061	0.063
Sorghum	0.468	0.467	-0.001	0.978
Sweet potatoes	0.532	0.455	-0.077	0.019
Cassava	0.769	0.642	-0.126	0.000
Cow peas	0.222	0.148	-0.073	0.004
Beans	0.291	0.170	-0.121	0.000
Soya beans	0.152	0.129	-0.023	0.310
Groundnuts	0.425	0.302	-0.123	0.000
Choroko (Green grams)	0.376	0.273	-0.103	0.001
Sim sim	0.286	0.292	0.004	0.883
Tomatoes	0.117	0.068	-0.048	0.012
Citrus	0.083	0.051	-0.032	0.058

Notes:
1) No. of trained=532
2) No. of non-trained=411

Source: Author's own computation from field survey data, 2020

Given that the training was intended to boost agribusiness activities with a purpose of having women and youths produce for the market (have their incomes improve), the respondents were asked about the quantity they produced and sold in the season preceding the end-line survey. However, due to absence of a standard measurement scale (some farmers selling in kilograms, basins and sacks among others — which all differed in sizes almost per household), we decided to consider the average earnings from the sale of the participants' produce. Table 6 presents the average earnings from the sale of the farmers' produce, comparing the earnings from the trained and untrained groups.

Table 6: Participants' earnings from the sale of specific crops

Crops	Trained	Non-Trained	Differences	P-values
Rice	119,603.40	314,008.50	194,405.10	0.39
Maize	233,776.80	189,957.90	-43,818.85	0.50
Millet	49,914.85	36,301.22	-13,613.63	0.17

[21] For details about the crops that can do well in the area given the soil types, please refer to UgandaInvestiment Authority (2016), Teso Investment Profile. *https:// ugandainvest.go.ug/wp-content/uploads/2016/02Teso-Investment-Profile.pdf*

Sorghum	22,681.41	10,691.00	-11,990.41	0.03
Sweet potatoes	3,825.19	61.31	-3,763.87	0.06
Cassava	120,597.00	48,742.09	-71,854.90	0.03
Cow peas	14,510.34	2,523.11	-11,987.22	0.02
Beans	30,336.47	9,002.43	-21,334.03	0.02
Soya beans	37,382.33	6,714.11	-30,668.22	0.18
Groundnuts	34,541.35	34,849.15	307.80	0.98
Choroko (Green grams)	31,919.17	23,019.46	-8,899.71	0.24
Sim sim	79,232.14	117,392.00	38,159.83	0.29
Tomatoes	36,892.86	5,644.77	-31,248.09	0.00
Citrus	36,644.74	766.42	-35,878.31	0.05

Notes:

1) No. of trained=532
2) No. of non-trained=411

Source: Author's own computation from field survey data, 2020

The results in table 6 show that trained women and youths significantly earn from the sale of sorghum, sweet potatoes, cow peas, beans, watermelon, tomatoes, onions and citrus. These results support the findings in Kilpatrick, (2000). While studying the impact of education and training on farm management practices, Kilpatrick observed that farmers who are exposed to trainings and also practice the new farming practices tend to earn better from farm sales. Specifically, such farmers can earn higher gross operating surplus (profits). Taking a deeper examination about the earnings received by farmers who received training in horticulture, we still observe significant earnings from the sale of watermelon and onions by the trained women and youths compared to the rest of the respondents (see table 8).

We further test for farmers' participation in the production of watermelon, onions and green pepper. The reason for this is based on the fact that training in horticulture mainly focused on these three crops and other crops received less attention as earlier explained. As such, one would expect the group that received the training in horticulture to possibly engage more in growing of those three crops than women and youths who did not receive that training. The results indicate increased participation in the growing of watermelon and onions by the trained women and youths (see table 7). Specifically, 9.2 percent and 12.6 percent of those who trained in horticulture grow watermelon and onions respectively compared to only 0.7 percent and 1.2 percent from the untrained group. However, there is no statistical difference in participation between the trained and untrained women and youths in the growing of green pepper.

Table 7: Participation in growing of watermelon, onions and green pepper

Crops	Trained in horticulture	Non-Trained	Differences	P-values

Watermelon	0.092	0.007	-0.085	0.000
Onions	0.126	0.012	-0.114	0.000
Green pepper	0.019	0.009	-0.01	0.242

Notes:
1) No. of trained in horticulture=206
2) No. of non-trained in horticulture=737
Source: Author's own computation from field survey data, 2020

Note that the results in table 7 show participation in the growing of the listed crops (watermelon, onions and green pepper) but, the trainings were intended to boost agribusiness opportunities in the area. For that reason, we test whether the trained women and youths experienced any change in earnings from the sale of those three crops. We still compare the earnings of women and youths who trained in horticulture to the rest of the group members (the conventionally untrained group and the groups that trained in poultry and piggery). The results are presented in table 8.

Table 8: Earnings by participants from the sale of watermelon, onions and green pepper

Crops	Trained N = 206	Non-Trained N = 737	Differences	P-values
Watermelon	41,019.42	108.55	-40,910.87	0.000
Onions	44,495.15	1,492.55	-43,002.61	0.000
Green pepper	-	1,085.48	1,085.48	0.450

Notes:
1) No. of trained=206
2) No. of non-trained=737
Source: Author's own computation from field survey data, 2020

The results show positive and significantly higher earnings from the sale of watermelon and onions by the trained women and youths compared to women and youths who never received the detailed training in horticulture. Specifically, women and youths in the trained group (trained in horticulture) on average earn approximately Uganda Shillings (UGX) 41,000 and UGX 44,500 from the sale of watermelon and onions respectively compared to UGX 109 and UGX 1,490 earned by those who did not receive such training. This significant difference in the earnings between the two groups can be attributed to two reasons: 1) the increased participation in the growing of the two crops (watermelon and onions as shown in table 7); and 2) expanded scale in the growing of the two crops for purposes of marketing. These results still support the findings in Kilpatrick, (2000) in which it is argued that farmers who are exposed to trainings and also practice the new farming practices earn better from farm sales.

4.3 How did the training impact on poultry products and poultry farmers' turnover?

First, we test whether the trained group experienced a change in the quantity produced for poultry products (poultry meat and eggs). Results are presented in table 9. We also test whether, those who engaged in poultry

keeping experienced a change in their turnover. The results are reported in table 10. The results in table 9 show that 9.6 percent and 9.2 percent of the trained women and youths reported an increase in the production of poultry meat and eggs respectively. On the other hand, only 2.9 percent of the untrained women and youths reported an increase in the production of poultry meat and only 3.8 percent reported an increase in eggs production.

Table 9: Production of poultry products

Poultry products	Trained	Non-Trained	Differences	P-values
Poultry meat production	0.096	0.029	-0.067	0.000
Eggs production	0.092	0.038	-0.053	0.001

Notes:
1) No. of trained youths and women= 532
2) No. of non-trained youths and women= 411
Source: Authors own computations based on field survey data, 2020

Table 10: Change in turnover from poultry products

Poultry products	Trained	Non-Trained	Differences	P-values
Poultry meat	0.19	0.058	-0.131	0.001
Eggs production	0.175	0.066	-0.109	0.006

Notes:
1) No. of trained youths and women= 532
2) No. of non-trained youths and women= 411
Source: Authors own computations based on field survey data, 2020

In relation to the change in turnover, 19.0 percent and 17.5 percent of the trained women and youths reported an increase in turnover from poultry meat and eggs respectively compared to 5.8 percent and 6.6 percent that reported increased turnover from the untrained group. The difference between the two groups is statistically significant. The results in tables 9 and 10 can be an indicator for the changed mind-sets toward observing poultry keeping as a commercial activity that can enhance the participants' livelihood. It is important to note that poultry keeping is one of the common activities in Soroti and Serere districts but, previously, poultry keeping was mostly done on free range which is characterised by chicken getting exposed to poor hygiene and consequently diseases like Newcastle all of which potentially affect rural poultry production (Illango, et al., 2002). But, after being exposed to the training, women and youths started observing poultry keeping as a potential economic activity which has resulted into increased marketing of the poultry products.

4.4 Specialised training in poultry and poultry products production and poultry farmers' turnover

Here, we test whether there is a change in the production of poultry meat and eggs by comparing the group that received specialised/detailed training in poultry to the rest of the respondents (the conventionally untrained group and the groups that were trained in horticulture and piggery and the other training contents as explained earlier). Similar to results in table 9, in table 11, we observe a statistically significant increase in the production of poultry

meat and eggs by the group that received specialised training in poultry. Specifically, 10.9 percent and 11.5 percent of the trained women and youths reported increased production in poultry meat and eggs production respectively compared to only 4.5 percent of those who did not receive such training that reported increased production of poultry meat and eggs.

Table 11: Production of poultry products by women and youths who received detailed poultry training

Poultry products	Trained	Non-Trained	Differences	P-values
Poultry meat production	0.109	0.045	-0.064	0.000
Eggs production	0.115	0.045	-0.07	0.000

Notes:
1) No. of trained youths and women= 321
2) No. of non-trained youths and women= 622
Source: Authors own computations based on field survey data, 2020

Next, we test for the change in women and youths' turnover for those who received specialised training in poultry against other respondents. The results in table 12 show that trained women and youths with specialised poultry training reported a significant change in turnover from poultry meat and eggs. The possible explanation for the results in tables 13 and 14 is that after receiving the training in poultry, some women and youths started adopting to better housing conditions for chicken[22], engaging in hybrid chicken varieties and marketing of their poultry products. Precisely, they started observing poultry as a potential avenue/agribusiness activity through which they can boost their income status.

Table 12: Change in turnover from poultry products by women and youths who received detailed poultry training

Poultry products	Trained	Non-Trained	Differences	P-values
Poultry meat	0.212	0.092	-0.120	0.005
Eggs production	0.202	0.088	-0.114	0.006

Notes:
1) No. of trained youths and women= 321
2) No. of non-trained youths and women= 622
Source: Authors own computations based on field survey data, 2020

A further scrutiny of tables 9 – 12 indicates that all trained women and youths perform better in poultry related outcomes compared to the untrained group of whatever sort. Such results across different groups can be attributed to the fact that the study area is a typical poultry keeping zone (UIA, 2016) to the extent that complementing the traditional knowledge with a training supplements their traditional skills and interest in poultry.

[22] In fact at baseline, some women and youths reported that chicken spend nights (sleep) on tree in the courtyards exposing them to wild animals. The inadequate housing condition was also observed in Illango, et al., (2002) as one of the constraints to rural poultry production in Uganda.

4.5 The effects of training on piggery outcomes

Although, we observed no significant difference between the trained and untrained women and youths in their involvement in piggery as an enterprise as presented in table 3, the respondents were asked whether they experienced an increase in production of pork and turnover from piggery. The results in table 13 show the trained women and youths reported a significant increase in production of pork and turnover from piggery compared to their counterparts in the untrained group. In table 14, we compare pork production and turnover reported by women and youths who received detailed training in piggery to the rest of the respondents. The results in tables 13 and 14 suggest that even in the absence of the expected increment in the number of women and youths who engage in piggery, there is evidence of raring more pigs by piggery farmers or improved care or management plus marketing of piggery products by the trained group. This is demonstrated by increased pork production and turnover to piggery farmers.

Table 13: Production and change in turnover from piggery training

Piggery	Trained	Non-Trained	Differences	P-values
Piggery (pork) production	0.058	0.012	-0.046	0.000
Turnover from piggery	0.130	0.032	-0.098	0.004

Notes:
1) No. of trained youths and women= 532
2) No. of non-trained youths and women= 411
Source: Authors own computations based on field survey data, 2020

Table 14: Production and change in turnover from piggery by the people who specialised in poultry training

Piggery	Trained	Non-Trained	Differences	P-values
Piggery (pork) production	0.188	0.033	-0.155	0.000
Turnover from piggery	0.313	0.079	-0.233	0.012

Notes:
1) No. of trained youths and women= 32
2) No. of non-trained youths and women= 911
Source: Authors own computations based on field survey data, 2020

4.6 Training and value addition

Since the training was focused on agribusiness, attention was also paid towards the need for value addition. Respondents were asked whether they add value to their produce. The results indicate that 38.9 percent of the trained women and youths practice add value to their produce compared to 32.8 percent of the untrained. The main value addition method employed by women and youths is drying of their produce. However, the data also revealed that drying is mostly done on bare grounds.

Table 15: Training and Value addition

	Trained	Non-Trained	Differences	P-values
Value addition to produce	0.389	0.328	-0.061	0.055

Notes:
1) No. of trained youths and women= 532
2) No. of non-trained youths and women= 411
Source: Authors own computations based on field survey data, 2020

Table 16: The effect of soft skills training on household behaviours

Variable	Trained	Non-Trained	Differences	P-values
Owning a bank account	0.055	0.044	-0.012	0.454
Savings	0.115	0.049	-0.066	0.000
Savings Amount (Ushs)	69,227.44	69,878.44	651.00	0.976
Group_member	0.720	0.647	-0.073	0.017
Access_loan	0.130	0.071	-0.059	0.003

Notes:
1) No. of trained youths and women= 532
2) No. of non-trained youths and women= 411
Source: Authors own computations based on field survey data, 2020

The results in table 16 indicate that there is increased savings with especially microfinance institutions. Precisely, 11.5 percent of women and youths from the trained group save compared to 4.9 percent from the untrained group. Moreover, 72.0 percent of the trained members reported being members to either farmers' or saving group compared to their counterparts in the untrained group who stand at 64.7 percent. This difference is statistically significant with a P-value = 0.017. Furthermore, respondents were asked whether they had accessed a loan during the period after the training. The results show a significant difference in accessing loans between the trained and the untrained group. Specifically, 13 percent of the respondents from the trained group reported to have accessed at least a loan while only 7.1 percent had accessed a loan during the period between the training and the end-line survey.

5.0 Project challenges

This project was mainly affected by the invasion of Covid-19 pandemic. This did not only affect the time of the end-line survey through delayed execution of the survey, it also potentially affected the expected outcomes of the project. Many of the respondents seemed disheartened because of the pandemic.

6.0 Conclusions

Results in this study provide a justification for providing education and/or training to people if they are to engage in agribusiness activities. Previously, agribusiness was observed as a move from peasant/substance production to commercialized farm production. But, in the recent past, such a definition has become boarder and has extended from expanding the scale of farm production toward processing and marketing of farm inputs and outputs. The results from this study suggest that providing trainings and information about agribusiness opportunities increases

the farmers' earnings and thus, agribusiness can act as an engine to economic growth (Mittal and Singh, 2007; Panda and Sreekumar, 2012; Sabourin, 2015; Stanton, 2000). The results also suggest that any training in agribusiness should focus on both the impoved farming practices and other identified activities and crops that can provide agibusiness potential in a particular area. The key policy implication from this study is that boosting agribusiness requires training of farmers in improved farming and business practices, increased investment in training of farmers into improved farming and business practices; increased investment in value addition practices as this will help to increase on the farmers' turnover; increased information provision to farmers about activities and crops that can provide agribusiness opportunities in a changing world and increased sensitization of the youths about the potential for agriculture beyong farming.

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Appendices

Appendix 1: Variable name and description

Variable	Description
Age	Age of the Participants in complete years.
Gender (male)	Participants who are males by gender.
Married/engaged	Participants' marital status with married equal to 1, zero otherwise.
Education	Proportion of participants with education level exceeding ordinary level.
Occupation	Proportion of participants whose main occupation is farming.
	Household characteristics
Electricity	Households with access to electricity.
Water source	Households that access drinking water from borehole, spring or piped water.
Rooms	Number of rooms in the house.
	Household Assets
Ox plough	Households that own at least an ox plough.
Carts	Households that own at least a cart.
Wheelbarrow	Households that own at least a wheelbarrow.
Spray pumps	Households that own at least a praying pump.
Water tank	Households that own at least a water tank for home use.

Beehives	Households that own beehives for bee keeping.
Storage facility	Households that own a store for farm produce.
Bicycle	Households that own at least a bicycle.
Radio	Households that own at least a radio.
Television	Households that own at least a television.
Mobile phone	Households that own at least a mobile phone.
Motorbike	Households that own at least a motorbike.

Appendix 2: Details of horticultural training

Training thematic area	Main focus
Site selection	soil types (say sandy, loam etc.) and location (for each crop
Nursery bed preparation	How to soften the soils in the bed, height of the bed, shade from direct sun rays and fenc strong winds or other aliens.
Spacing	Rightful spacing of specific crops in the main garden after the nursery
Watering	The frequency of watering the crops in the nursery and main garden especially during the + the nature of the watering gadgets
Manure application	Types of manure to apply to which crop, making organic manure and how to apply manu from the crop
Weeding and weed management	Why remove the weeds, at what stage of removing the weeds and how to remove the weed of the tools for removing the weeds from a specific crop
Pest identification and pest management	How to identify pest invasion to specific crops and how to treat the pest through traditio spraying and removal of dead crops
Harvesting and post-harvest handling	Knowing the signs of maturity for each crop, how to harvest it, storing the harvests and transporting the harvest in a way that minimizes damages.

Appendix 3: Details of poultry trainings

Training thematic area	Main focus
Why poultry?	Poultry as an income generating activity, poultry an easy/domestic based activity, poultry based activity, the ready market for poultry products.
Housing structure	The attributes of a good housing structure for the chicken, spacing (number of chicken/r ventilation, the nature of walls and floor.
Hygiene	Understanding how to maintain the cleanliness of the habitat for the chicken to prevent dis forms of infections.
Mixing of feeds	Providing an understanding to the trainees about the ingredients that constitute the proper better chicken growth.
Feeding of chicken	Providing knowledge on the specific types of foods that must be fed to chicken basing on and the number of times chicken has to feed in a day.
Disease control and management	Provide knowledge and skills on how to control diseases and their spread among the chicke

Appendix 4: Details of piggery trainings

Training thematic area	Main focus
Why piggery?	A quick financial earner, easy to rear and high multiplication rate offering cash flow to the hous
Housing structure	The attributes of a modern house for pigs, yet at affordable cost
Hygiene	The need to maintain cleanliness in the house, the need for the workers to be clean and how to pigs healthy in a healthy environment.
Mixing of feeds	What types of foods that are good for pigs, how to mix the foods in terms of quantity to ensur nutrients

Feeding of pigs	The number of times to pigs and the rightful quantities basing on weight, number of times for water, the nature of food containers
Disease control and management	How to identify the deteriorating health of pigs, managing and controlling diseases, vaccinating frequency for spraying the house and the need to isolate sick pigs.

Appendix 5: Details of soft skills trainings

Training theme	Content of the training
Self-awareness	Identifying what people can do better, for what purpose, the time to do it, where to do from and how to do it.
Team building	The need to work together/group is important because it allows people and groups to achieve a common goal o mutual benefits. Precisely, it enables people to learn from each other with an interest of improving their ec activities and livelihoods
Record keeping	Why record or book keeping is necessary and to record the business flows.
Saving	What is savings, saving methods/modes of saving, the importance of saving.
Planning	What planning and why planning is necessary in any business?
Budgeting	What is budgeting and why budgeting is necessary in any business.
Marketing	Knowing the targeted market, producing commodities in the desired quality and quantity, promoting of the f produce, market search techniques and value addition
Negotiation	How to negotiate with customers, the contents of a fruitful negotiation.
Communication	The use of good business language, character to convince customers, having good morals while talking to others speaking, communication as a device for customer care.
Leadership	Attributes of a good leader and the need for good leaders for the survival of the groups.
Delegation	Why delegation is important for group existence and strength, identifying the person to whom to delegate

Appendix 6: Farming practice and their descriptions

Farming practices	Description of the farming practices
Correct spacing	Planting crops basing on scientifically proven spacing
Pest management(inorganic)	Controlling or fighting pests using inorganic practices including what works better for what crop?
Pest management (local)	Controlling or fighting pests using local practices like wood ash.
Weed management (inorganic)	Weed control using inorganic practices
Weed management (local)	Weed control using local practices e.g. removing it through the use of a hand hoe.
Fertilizers	Proper application of manure basing on age and other technical aspects like distance from the stem type is better for what?
Manure	Proper application of manure basing on age and other technical aspects like distance from the stem
Seed preservation	Keep seeds in a proper way for the planting in the following season
Watering/irrigating	Watering crops using the rightful gadgets and the rightful number of times basing on crop age and (wet or dry)
Spraying (disease control)	Treating diseases affecting crops through spraying

ANNEX 12: End line questionnaire

Question number	Variable description
subc	Sub-county
parish	Parish
village	Village
group	Group
youth	Youth name
youth_name	Youth name (Specify)
pp	Did you participate in the baseline survey last year?
Hhno	Household Number
Int_code	Interviewer Code/Initials:
idate	Date of Interview
A	**CURRENT HOUSEHOLD DEMOGRAPHICS AND EDUCATION**
respondent_details1	**What is your?**
m1	m1: Name
m2	m2: What is your relationship to the head of household
respondent_details2	**What is your?**
m3	m3: Sex
m4	m4: How old are you? (Record age in completed years)
m5	m5: What is your current marital status?
m6	m6: What is your primary occupation?
m7	m7: What is the highest education level that you completed?
m8	m8: In what year did you enroll in school? [PUT 888 if respondent does not know]
m9	m9: What year did you stop attending school? (PUT "000" if is STILL Schooling)
m10	m10: Were you ever taken out of school at certain times of the year to help with farm activities or other household responsibilities?
m11	m11: In the past 12 months, have you been away from the household for work or business related activities for at least 7 days?
hhead	**head of household details**
hhd	**head of hh**
m1_1	m1_1: What is the name of head of household?
m1_3	m1_3: What is the sex of head of household?
m1_4	m1_4: How old is the head of household? (Record age in completed years. RECORD 888 if does not know)?
m1_5	m1_5: Marital status of head of household?
m1_6	m1_6: What is the current primary occupation of the head of the household?
m1_7	m1_7: What is the highest education level that the head of household completed?
hhsizetorepeat	In total, how many people (including yourself) normally live in this/your household (including both family memb
hmany	How many members are aged?
c1_c1	0 - 5 years
c1_c2	6 - 17 years
c1_c3	18 - 24 years
c1_c4	25+ years
c1	Total adults
hnames	What are the names of the adult members of your household (18 years and above)? [EXCLUDE Yourself and the
c2_c1	Name of member 1:
c2_c2	Name of member 2:
c2_c3	Name of member 3:
c2_c4	Name of member 4:
c2_c5	Name of member 5:
Section_2	**SECTION 2: FAMILY HISTORY**

Qn201	Qn201: Were you born in this village?
res	**Q201-204**
Qn202	Qn202: Where were you born?
Qn203	Qn203: How did you come to this village?
Qn204	Qn204: In what year did YOU move to this Village?
Qn205	Qn205: In what Ugandan languages can you speak? That is, able to conduct transactions with others in this langu
Qn206	Qn206: What is your religion?
Qn207	Qn207: Do YOU belong to any farmer or investment or savings organization in the Village?
Qn208	Qn208: In which organization do you belong?
Qn209	Qn209: Are your parents still alive?
Qn210	Qn210: What is/was the highest level of education attained by Your father?
Qn211	Qn211: What is/was the main occupation of your father?
Qn212	Qn212: Does or did YOUR father belong to any farmer or investment or savings organization in the Village?
Qn213	Qn213: What is/was the highest level of education attained by YOUR mother?
Qn214	Qn214: What is/was the main occupation of your mother?
Qn215	Qn215: Does or did YOUR mother belong to any farmer or investment or savings organization in the Village?
Section_3	SECTION 3: HOUSING QUALITY AND ASSETS
hhq	**Housing Quality**
Qn301	Qn301: What materials have been used to construct the roof of the main house?
Qn302	Qn302: What materials have been used to construct the floor of the main house?
hhx	**Housing Quality**
Qn303	Qn303: What materials have been used to construct the walls?
Qn304	Qn304: In the last one year, how much (UGX) did you spend on building a new house or improving your house a
hhx1	**Housing Quality**
Qn305	Qn305: Does the main house have access to electricity?
Qn306	Qn306: What is the main source of drinking water for this household? Record up to three sources if any
hhx2	**Housing Quality**
Qn307	Qn307: What type of toilet facility does the household use?
Qn308	Qn308: Do you have a separate room which is used as a kitchen?
hhx3	**Housing Quality**
Qn309	Qn309: How many rooms in this household are used for sleeping?
Qn310	Qn310: Total number of outbuildings including kitchens (excluding toilets/latrines)
Qn311a-l	**Does your household or any member have the following:**
Qn311a	Qn311a: Ox plough
Qn311c	Qn311c: Carts
Qn311d	Qn311d: Wheelbarrows
Qn311f	Qn311f: Spraypumps
Qn311g	Qn311g: Diesel pumps
Qn311h	Qn311h: Water tanks
Qn311i	Qn311i: Beehives
Qn311j	Qn311j: Tractor
Qn311k	Qn311k: Hand hoe
Qn311l	Qn311l: Storage facility (building, container)
Qn311t-m	**Does your household or any member have the following:**
Qn311m	Qn311m: Bicycle
Qn311n	Qn311n: Radio
Qn311o	Qn311o: (Car) Batteries
Qn311p	Qn311p: TV
Qn311q	Qn311q: Mobile Phones
Qn311r	Qn311r: Chair
Qn311s	Qn311s: Tables

Qn311t	Qn311t: Beds
Qn311u	Qn311u: Mosquito nets
Qn311v	Qn311v: Motorcycle
Qn311w	Qn311w: Vehicles
Qn311x	Qn311x: Trailers
Qn311z	Qn311z: Grinders
Qn312t-a	***Number of items currently owned***
Qn312a	Qn312a: Ox plough
Qn312c	Qn312c: Carts
Qn312d	Qn312d: Wheelbarrows
Qn312f	Qn312f: Spraypumps
Qn312g	Qn312g: Diesel pumps
Qn312h	Qn312h: Water tanks
Qn312i	Qn312i: Beehives
Qn312j	Qn312j: Tractor
Qn312k	Qn312k: Hand hoe
Qn312l	Qn312l: Storage facility (building, container)
Qn312t-z	***Number of items currently owned***
Qn312m	Qn312m: Bicycle
Qn312n	Qn312n: Radio
Qn312o	Qn312o: (Car) Batteries
Qn312p	Qn312p: TV
Qn312q	Qn312q: Mobile Phones
Qn312r	Qn312r: Chair
Qn312s	Qn312s: Tables
Qn312t	Qn312t: Beds
Qn312u	Qn312u: Mosquito nets
Qn312v	Qn312v: Motorcycle
Qn312w	Qn312w: Vehicles
Qn312x	Qn312x: Trailers
Qn312z	Qn312z: Grinders
Qn314t-r	**Number of items purchased in the last 12 months**
Qn314a	Qn314a: Ox plough
Qn314c	Qn314c: Carts
Qn314d	Qn314d: Wheelbarrows
Qn314f	Qn314f: Spraypumps
Qn314g	Qn314g: Diesel pumps
Qn314h	Qn314h: Water tanks
Qn314i	Qn314i: Beehives
Qn314j	Qn314j: Tractor
Qn314k	Qn314k: Hand hoe
Qn314l	Qn314l: Storage facility (building, container)
Qn314t-z	**Number of items purchased in the last 12 months**
Qn314m	Qn314m: Bicycle
Qn314n	Qn314n: Radio
Qn314o	Qn314o: (Car) Batteries
Qn314p	Qn314p: TV
Qn314q	Qn314q: Mobile Phones
Qn314r	Qn314r: Chair
Qn314s	Qn314s: Tables
Qn314t	Qn314t: Beds

Qn314u	Qn314u: Mosquito nets
Qn314v	Qn314v: Motorcycle
Qn314w	Qn314w: Vehicles
Qn314x	Qn314x: Trailers
Qn314z	Qn314z: Grinders
Qn313t-r	**Total value of all items (in UGX)**
Qn313a	Qn313a: Ox plough
Qn313c	Qn313c: Carts
Qn313d	Qn313d: Wheelbarrows
Qn313f	Qn313f: Spraypumps
Qn313g	Qn313g: Diesel pumps
Qn313h	Qn313h: Water tanks
Qn313i	Qn313i: Beehives
Qn313j	Qn313j: Tractor
Qn313k	Qn313k: Hand hoe
Qn313l	Qn313l: Storage facility (building, container)
Qn313t-z	**Total value of all items (in UGX)**
Qn313m	Qn313m: Bicycle
Qn313n	Qn313n: Radio
Qn313o	Qn313o: (Car) Batteries
Qn313p	Qn313p: TV
Qn313q	Qn313q: Mobile Phones
Qn313r	Qn313r: Chair
Qn313s	Qn313s: Tables
Qn313t	Qn313t: Beds
Qn313u	Qn313u: Mosquito nets
Qn313v	Qn313v: Motorcycle
Qn313w	Qn313w: Vehicles
Qn313x	Qn313x: Trailers
Qn313z	Qn313z: Grinders
Q315	What agricultural/farming or farming related activities are you involved in?
Qn315a	Qn315a: Crop production
Qn315b	Qn315b: Fruit production
Qn315c	Qn315c: Vegetable production
Qn315d	Qn315d: Fish farming
Qn315e	Qn315e: Piggery
Qn315f	Qn315f: Poultry
Qn315g	Qn315g: Diary cattle farming
Qn315h	Qn315h: Other cattle rearing
Qn315i	Qn315i: Apiculture
Qn315j	Qn315j: Trader in on-farm produce
Qn315k	Qn315k: Agroforestry
Qn315l	Qn315l: Provision of on-farm inputs
Qn315n	Qn315n: Goats production
Qn315m	Qn315m: Other (Specify)
Q316	Of these agricultural/farming or farming related activities, which are YOU doing for income generation?
Qn316a	Qn316a: Crop production
Qn316b	Qn316b: Fruit production
Qn316c	Qn316c: Vegetable production
Qn316d	Qn316d: Fish farming
Qn316e	Qn316e: Piggery

Qn316f	Qn316f: Poultry
Qn316g	Qn316g: Diary cattle farming
Qn316h	Qn316h: Other cattle rearing
Qn316i	Qn316i: Apiculture
Qn316j	Qn316j: Trader in on-farm produce
Qn316k	Qn316k: Agroforestry
Qn316l	Qn316l: Provision of on-farm inputs
Qn316n	Qn316n: Goats production
Qn316m	Qn316m: Other (Specify)
Section_4	**SECTION 4: Business and Wage Labour (including farm labour) Activities**
Q401	Q401: Did you earn cash or in-kind income from farm business, non-farm business and wage labour including far
Q401b	Q401b: Excluding yourself and head of household, how many other household members earned cash of in-kind i
Q403	Q403: What main activity did/do you earn from?
Q404	Q404: How many years of experience do you have on this activity?
Q405	Q405: Where do you work from?
Q406	Q406: Number of months you worked for in the last 12 months?
Q407	Q407: Do/did you earn a monthly salary or only receive seasonal earnings?
Q409	Q409: On average, how much do you earn from this activity every month? [AVERAGE over months even if s/he e
Q410	Q410: On average, how much are your operational costs (excluding fixed costs) for this activity every month?
Q403_1	Q403_1: What main activity did/does head of household earn from?
hnname1_1	Member1
Q405_1	Q405_1: Where does head of household work from?
Q406_1	Q406_1: Number of months the head worked for in the last 12 months?
Q407_1	Q407_1: Does the head earn a monthly salary or only receive seasonal earnings?
Q408_1	Q408_1: What is the monthly earning, on average?
c22_c2	What is the name of the other household member who earned income (cash or in-kind) in the last 12 months?
hname2_2	Member1
Q403_2	Q403_2: What main activity did/does ${c22_c2} earn from?
Q405_2	Q405_2: Where does ${c22_c2} work from?
Q406_2	Q406_2: Number of months ${c22_c2} worked for in the last 12 months?
Q407_2	Q407_2: Does ${c22_c2} earn a monthly salary or only receive seasonal earnings?
Q408_2	Q408_2: What is the average monthly income?
c22_c3	What is the name of the other household member who earned income (cash or in-kind) in the last 12 months?
hname3_3	Member1
Q403_3	Q403_3: What main activity did/does ${c22_c3} earn from?
Q405_3	Q405_3: Where does ${c22_c3} work from?
Q406_3	Q406_3: Number of months ${c22_c3} worked for in the last 12 months?
Q407_3	Q407_3: Does ${c22_c3} earn a monthly salary or only receive seasonal earnings?
Q408_3	Q408_3: What is the average monthly income?
c22_c4	What is the name of the other household member who earned income (cash or in-kind) in the last 12 months?
hname4_4	Member1
Q403_4	Q403_4: What main activity did/does ${c22_c4} earn from?
Q405_4	Q405_4: Where does ${c22_c4} work from?
Q406_4	Q406_4: Number of months ${c22_c4} worked for in the last 12 months?
Q407_4	Q407_4: Does ${c22_c4} earn a monthly salary or only receive seasonal earnings?
Q408_4	Q408_4: What is the average monthly income?
c22_c5	What is the name of the other household member who earned income (cash or in-kind) in the last 12 months?
hname5_5	Member1
Q403_5	Q403_5: What main activity did/does ${c22_c5} earn from?
Q405_5	Q405_5: Where does ${c22_c5} work from?
Q406_5	Q406_5: Number of months ${c22_c5} worked for in the last 12 months?

Q407_5	Q407_5: Does ${c22_c5} earn a monthly salary or only receive seasonal earnings?
Q408_5	Q408_5: What is the average monthly income?
non-labour	**Non-labour Income, Remittance, Credit (self-help, ROSCA, etc) and Food Aid* Received**
Q411	Q411: Did you receive any non-labour income, remittance, or credit in the past 12 months?
Q412	Q412: What was the source of this non-labour income
Q412a	Q412a: Rent (farm land)
Q412b	Q412b: Rent (housing, shops)
Q412c	Q412c: Pension
Q412d	Q412d: ROSCA savings
Q412e	Q412e: Credit (money)
Q412f	Q412f: Institutional Food Aid
Q412g	Q412g: Remittance
Q413	Q413: What was the average monthly income from this source over the past 12 months?
Q413a	Q413a: Rent (farm land)
Q413b	Q413b: Rent (housing, shops)
Q413c	Q413c: Pension
Q413d	Q413d: ROSCA savings
Q413e	Q413e: Credit (money)
Q413f	Q413f: Institutional Food Aid
Q413g	Q413g: Remittance
Q411b	Q411b: Did any other member of this household receive non labour income, remittance, or credit in the past 12
Q414	Q414: What was the source of this non-labour income
Q414a	Q414a: Rent (farm land)
Q414b	Q414b: Rent (housing, shops)
Q414c	Q414c: Pension
Q414d	Q414d: ROSCA savings
Q414e	Q414e: Credit (money)
Q414f	Q414f: Institutional Food Aid
Q414g	Q414g: Remittance
Q415	Q415: What was the average monthly income from this source over the past 12 months?
Q415a	Q415a: Rent (farm land)
Q415b	Q415b: Rent (housing, shops)
Q415c	Q415c: Pension
Q415d	Q415d: ROSCA savings
Q415e	Q415e: Credit (money)
Q415f	Q415f: Institutional Food Aid
Q415g	Q415g: Remittance
Q416	What were the sources of the remittance
Q416a	Q416a: Commercial Bank
Q416b	Q416b: Micro finance Institutions
Q416c	Q416c: NGO
Q416d	Q416d: Local organization (communal)
Q416e	Q416e: Private organizations (individual)
Q416f	Q416f: Self-help group
Q416g	Q416g: Government
Q416h	Q416h: Friends
Q416i	Q416i: Relatives
Q416j	Q416j: Money lender
Q416k	Q416k: Tenant
Q416l	Q416l: SACCO
Q416m	Q416m: Other (Specify)

Q417	Q417: What is the sender's main job? (Indicate main jobs of all the senders)
Section_5	**SECTION 5: Land Tenure of the Parcels Accessible by the Household (Last 12 months)**
Q501	Q501: How many parcels of land were accessible by your household in the last 12 months (includes owned-and-
land	Let us assign a number to each parcel with some description that can help us to remember
parcel_1	Parcel_1 (Main parcel used in last 12 months)
Q502_1	Do you still have access to this parcel; if no, why?
Q503_1	Size of this parcel in acres?
Q504_1	Any change in size since 2017
Q504_1b	Why?
Q505_1	Nature of Tenancy
Q506_1	Year of Acquisition?
Q507_1	Walking time in minutes on foot from homestead
parcel_1x	Parcel_1 (Main parcel used in last 12 months)
Q508_1	Currently, do you (as a HH) have the following documents for this parcel?
Q509_1	Do you as a household have full control over this parcel including a right to sell?
Q510_1	If you were to buy this parcel of land, how much would you be willing to pay?
Q511_1	If you were to rent it out, at how much would you be willing to rent it out?
parcel_2	Parcel_2 (Another main parcel used in last 12 months)
Q502_2	Do you still have access to this parcel; if no, why?
Q503_2	Size of this parcel in acres?
Q504_2	Any change in size since 2017
Q504_2b	Why?
Q505_2	Nature of Tenancy
Q506_2	Year of Acquisition?
Q507_2	Walking time in minutes on foot from homestead
parcel_2x	Parcel_2 (Another main parcel used in last 12 months)
Q508_2	Currently, do you (as a HH) have the following documents for this parcel?
Q509_2	Do you as a household have full control over this parcel including a right to sell?
Q510_2	If you were to buy this parcel of land, how much would you be willing to pay?
Q511_2	If you were to rent it out, at how much would you be willing to rent it out?
parcel_3	Parcel_3 (Another main parcel used in last 12 months)
Q502_3	Do you still have access to this parcel; if no, why?
Q503_3	Size of this parcel in acres?
Q504_3	Any change in size since 2017
Q504_3b	Why?
Q505_3	Nature of Tenancy
Q506_3	Year of Acquisition?
Q507_3	Walking time in minutes on foot from homestead
parcel_3x	Parcel_3 (Another main parcel used in last 12 months)
Q508_3	Currently, do you (as a HH) have the following documents for this parcel?
Q509_3	Do you as a household have full control over this parcel including a right to sell?
Q510_3	If you were to buy this parcel of land, how much would you be willing to pay?
Q511_3	If you were to rent it out, at how much would you be willing to rent it out?
Section_6	**SECTION 6: Crop production and agribusiness**
Q601	Q601: Which of the following crops do you normally grow?
Q601_1	Wheat
Q601_2	Rice, paddy
Q601_3	Maize
Q601_4	Millet
Q601_5	Sorghum
Q601_6	Potatoes (Irish)

Q601_7	Sweet potatoes
Q601m	Q601: Which of the following crops do you normally grow?
Q601_8	Cassava
Q601_9	Cocoyam
Q601_10	Yams
Q601_11	Sugar cane
Q601_12	Cow peas
Q601_13	Pulses
Q601_14	Beans
Q601_15	Soybeans
Q601x	Q601: Which of the following crops do you normally grow?
Q601_16	Groundnuts
Q601_17	Choroko (Green gram)
Q601_18	Oil Palm
Q601_19	Shea nuts
Q601_20	Sesame seed (simsim)
Q601_21	Watermelon
Q601_22	Seed cotton
Q601_23	Tomatoes
Q601_24	Cabbage
Q601y	Q601: Which of the following crops do you normally grow?
Q601_25	Onions
Q601_26	Cashew nut
Q601_27	Banana
Q601_28	Tobacco
Q601_29	Sunflower
Q601_30	Coffee
Q601_31	Citrus
Q601_32	Pepper
Q601_33	Garden peas
Q606	Q606: Which of the following crops were/are you growing for income generation/sale?
Q606_1	Wheat
Q606_2	Rice, paddy
Q606_3	Maize
Q606_4	Millet
Q606_5	Sorghum
Q606_6	Potatoes (Irish)
Q606_7	Sweet potatoes
Q606_8	Cassava
Q606_9	Cocoyam
Q606_10	Yams
Q606_11	Sugar cane
Q606_12	Cow peas
Q606_13	Pulses
Q606_14	Beans
Q606_15	Soybeans
Q606_16	Groundnuts
Q606_17	Choroko (Green gram)
Q606_18	Oil Palm
Q606_19	Shea nuts
Q606_20	Sesame seed (simsim)

Q606_21	Watermelon
Q606_22	Seed cotton
Q606_23	Tomatoes
Q606_24	Cabbage
Q606_25	Onions
Q606_26	Cashew nut
Q606_27	Banana
Q606_28	Tobacco
Q606_29	Sunflower
Q606_30	Coffee
Q606_31	Citrus
Q606_32	Pepper
Q606_33	Garden peas
Q609	Q609: Thank you. Let us talk about the amount of the following crops that you produced and stored or sold in th
Wheat	Q609_1: Production of Wheat in past the 12 months:
Q609_1aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_1a	(a) Quantity of crop produced
Q609_1b	(b) Quantity sold
Q609_1bc	State the units of measurement used for quantity
Q609_1c	(c) Main form in which you sell this crop
Q609_1d	(d) Total earnings from this crop in the last 12 months
Q609_1e	(e) How do you store the rest of produce?
Q609_1f	(f) Where do you Mainly sell the produce?
Q609_1g	(g) What is the distance from your farm to this place where you sell the produce?
Rice_paddy	Q609_2: Production of Rice, paddy in past the 12 months:
Q609_2aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_2a	(a) Quantity of crop produced
Q609_2b	(b) Quantity sold
Q609_2bc	State the units of measurement used for quantity
Q609_2c	(c) Main form in which you sell this crop
Q609_2d	(d) Total earnings from this crop in the last 12 months
Q609_2e	(e) How do you store the rest of produce?
Q609_2f	(f) Where do you Mainly sell the produce?
Q609_2g	(g) What is the distance from your farm to this place where you sell the produce?
Maize	Q609_3: Production of Maize in past the 12 months:
Q609_3aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_3a	(a) Quantity of crop produced
Q609_3b	(b) Quantity sold
Q609_3bc	State the units of measurement used for quantity
Q609_3c	(c) Main form in which you sell this crop
Q609_3d	(d) Total earnings from this crop in the last 12 months
Q609_3e	(e) How do you store the rest of produce?
Q609_3f	(f) Where do you Mainly sell the produce?
Q609_3g	(g) What is the distance from your farm to this place where you sell the produce?
Millet	Q609_4: Production of Millet in past the 12 months:
Q609_4aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_4a	(a) Quantity of crop produced
Q609_4b	(b) Quantity sold
Q609_4bc	State the units of measurement used for quantity
Q609_4c	(c) Main form in which you sell this crop
Q609_4d	(d) Total earnings from this crop in the last 12 months

Q609_4e	(e) How do you store the rest of produce?
Q609_4f	(f) Where do you Mainly sell the produce?
Q609_4g	(g) What is the distance from your farm to this place where you sell the produce?
Sorghum	Q609_5: Production of Sorghum in past the 12 months:
Q609_5aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_5a	(a) Quantity of crop produced
Q609_5b	(b) Quantity sold
Q609_5bc	State the units of measurement used for quantity
Q609_5c	(c) Main form in which you sell this crop
Q609_5d	(d) Total earnings from this crop in the last 12 months
Q609_5e	(e) How do you store the rest of produce?
Q609_5f	(f) Where do you Mainly sell the produce?
Q609_5g	(g) What is the distance from your farm to this place where you sell the produce?
Potatoes_Irish	Q609_6: Production of Potatoes (Irish) in past the 12 months:
Q609_6aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_6a	(a) Quantity of crop produced
Q609_6b	(b) Quantity sold
Q609_6bc	State the units of measurement used for quantity
Q609_6c	(c) Main form in which you sell this crop
Q609_6d	(d) Total earnings from this crop in the last 12 months
Q609_6e	(e) How do you store the rest of produce?
Q609_6f	(f) Where do you Mainly sell the produce?
Q609_6g	(g) What is the distance from your farm to this place where you sell the produce?
Sweet_potatoes	Q609_7: Production of Sweet potatoes in past the 12 months:
Q609_7aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_7a	(a) Quantity of crop produced
Q609_7b	(b) Quantity sold
Q609_7bc	State the units of measurement used for quantity
Q609_7c	(c) Main form in which you sell this crop
Q609_7d	(d) Total earnings from this crop in the last 12 months
Q609_7e	(e) How do you store the rest of produce?
Q609_7f	(f) Where do you Mainly sell the produce?
Q609_7g	(g) What is the distance from your farm to this place where you sell the produce?
Cassava	Q609_8: Production of Cassava in past the 12 months:
Q609_8aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_8a	(a) Quantity of crop produced
Q609_8b	(b) Quantity sold
Q609_8bc	State the units of measurement used for quantity
Q609_8c	(c) Main form in which you sell this crop
Q609_8d	(d) Total earnings from this crop in the last 12 months
Q609_8e	(e) How do you store the rest of produce?
Q609_8f	(f) Where do you Mainly sell the produce?
Q609_8g	(g) What is the distance from your farm to this place where you sell the produce?
Cocoyam	Q609_9: Production of Cocoyam in past the 12 months:
Q609_9aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_9a	(a) Quantity of crop produced
Q609_9b	(b) Quantity sold
Q609_9bc	State the units of measurement used for quantity
Q609_9c	(c) Main form in which you sell this crop
Q609_9d	(d) Total earnings from this crop in the last 12 months
Q609_9e	(e) How do you store the rest of produce?

Q609_9f	(f) Where do you Mainly sell the produce?
Q609_9g	(g) What is the distance from your farm to this place where you sell the produce?
Yams	Q609_10: Production of Yams in past the 12 months:
Q609_10aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_10a	(a) Quantity of crop produced
Q609_10b	(b) Quantity sold
Q609_10bc	State the units of measurement used for quantity
Q609_10c	(c) Main form in which you sell this crop
Q609_10d	(d) Total earnings from this crop in the last 12 months
Q609_10e	(e) How do you store the rest of produce?
Q609_10f	(f) Where do you Mainly sell the produce?
Q609_10g	(g) What is the distance from your farm to this place where you sell the produce?
Sugarcane	Q609_11: Production of Sugar cane in past the 12 months:
Q609_11aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_11a	(a) Quantity of crop produced
Q609_11b	(b) Quantity sold
Q609_11bc	State the units of measurement used for quantity
Q609_11c	(c) Main form in which you sell this crop
Q609_11d	(d) Total earnings from this crop in the last 12 months
Q609_11e	(e) How do you store the rest of produce?
Q609_11f	(f) Where do you Mainly sell the produce?
Q609_11g	(g) What is the distance from your farm to this place where you sell the produce?
Cowpeas	Q609_12: Production of Cow peas in past the 12 months:
Q609_12aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_12a	(a) Quantity of crop produced
Q609_12b	(b) Quantity sold
Q609_12bc	State the units of measurement used for quantity
Q609_12c	(c) Main form in which you sell this crop
Q609_12d	(d) Total earnings from this crop in the last 12 months
Q609_12e	(e) How do you store the rest of produce?
Q609_12f	(f) Where do you Mainly sell the produce?
Q609_12g	(g) What is the distance from your farm to this place where you sell the produce?
Pulses	Q609_13: Production of Pulses in past the 12 months:
Q609_13aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_13a	(a) Quantity of crop produced
Q609_13b	(b) Quantity sold
Q609_13bc	State the units of measurement used for quantity
Q609_13c	(c) Main form in which you sell this crop
Q609_13d	(d) Total earnings from this crop in the last 12 months
Q609_13e	(e) How do you store the rest of produce?
Q609_13f	(f) Where do you Mainly sell the produce?
Q609_13g	(g) What is the distance from your farm to this place where you sell the produce?
Beans	Q609_14: Production of Beans in past the 12 months:
Q609_14aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_14a	(a) Quantity of crop produced
Q609_14b	(b) Quantity sold
Q609_14bc	State the units of measurement used for quantity
Q609_14c	(c) Main form in which you sell this crop
Q609_14d	(d) Total earnings from this crop in the last 12 months
Q609_14e	(e) How do you store the rest of produce?
Q609_14f	(f) Where do you Mainly sell the produce?

Q609_14g	(g) What is the distance from your farm to this place where you sell the produce?
Soybeans	Q609_15: Production of Soybeans in past the 12 months:
Q609_15aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_15a	(a) Quantity of crop produced
Q609_15b	(b) Quantity sold
Q609_15bc	State the units of measurement used for quantity
Q609_15c	(c) Main form in which you sell this crop
Q609_15d	(d) Total earnings from this crop in the last 12 months
Q609_15e	(e) How do you store the rest of produce?
Q609_15f	(f) Where do you Mainly sell the produce?
Q609_15g	(g) What is the distance from your farm to this place where you sell the produce?
Groundnuts	Q609_16: Production of Groundnuts in past the 12 months:
Q609_16aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_16a	(a) Quantity of crop produced
Q609_16b	(b) Quantity sold
Q609_16bc	State the units of measurement used for quantity
Q609_16c	(c) Main form in which you sell this crop
Q609_16d	(d) Total earnings from this crop in the last 12 months
Q609_16e	(e) How do you store the rest of produce?
Q609_16f	(f) Where do you Mainly sell the produce?
Q609_16g	(g) What is the distance from your farm to this place where you sell the produce?
Greengram	Q609_17: Production of Green gram in past the 12 months:
Q609_17aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_17a	(a) Quantity of crop produced
Q609_17b	(b) Quantity sold
Q609_17bc	State the units of measurement used for quantity
Q609_17c	(c) Main form in which you sell this crop
Q609_17d	(d) Total earnings from this crop in the last 12 months
Q609_17e	(e) How do you store the rest of produce?
Q609_17f	(f) Where do you Mainly sell the produce?
Q609_17g	(g) What is the distance from your farm to this place where you sell the produce?
Oil_Palm	Q609_18: Production of Oil Palm in past the 12 months:
Q609_18aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_18a	(a) Quantity of crop produced
Q609_18b	(b) Quantity sold
Q609_18bc	State the units of measurement used for quantity
Q609_18c	(c) Main form in which you sell this crop
Q609_18d	(d) Total earnings from this crop in the last 12 months
Q609_18e	(e) How do you store the rest of produce?
Q609_18f	(f) Where do you Mainly sell the produce?
Q609_18g	(g) What is the distance from your farm to this place where you sell the produce?
Sheanuts	Q609_19: Production of Shea nuts in past the 12 months:
Q609_19aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_19a	(a) Quantity of crop produced
Q609_19b	(b) Quantity sold
Q609_19bc	State the units of measurement used for quantity
Q609_19c	(c) Main form in which you sell this crop
Q609_19d	(d) Total earnings from this crop in the last 12 months
Q609_19e	(e) How do you store the rest of produce?
Q609_19f	(f) Where do you Mainly sell the produce?
Q609_19g	(g) What is the distance from your farm to this place where you sell the produce?

Sesame	Q609_20: Production of Sesame (simsim) in past the 12 months:
Q609_20aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_20a	(a) Quantity of crop produced
Q609_20b	(b) Quantity sold
Q609_20bc	State the units of measurement used for quantity
Q609_20c	(c) Main form in which you sell this crop
Q609_20d	(d) Total earnings from this crop in the last 12 months
Q609_20e	(e) How do you store the rest of produce?
Q609_20f	(f) Where do you Mainly sell the produce?
Q609_20g	(g) What is the distance from your farm to this place where you sell the produce?
Watermelon	Q609_21: Production of Watermelon in past the 12 months:
Q609_21aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_21a	(a) Quantity of crop produced
Q609_21b	(b) Quantity sold
Q609_21bc	State the units of measurement used for quantity
Q609_21c	(c) Main form in which you sell this crop
Q609_21d	(d) Total earnings from this crop in the last 12 months
Q609_21e	(e) How do you store the rest of produce?
Q609_21f	(f) Where do you Mainly sell the produce?
Q609_21g	(g) What is the distance from your farm to this place where you sell the produce?
cotton	Q609_22: Production of Seed cotton in past the 12 months:
Q609_22aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_22a	(a) Quantity of crop produced
Q609_22b	(b) Quantity sold
Q609_22bc	State the units of measurement used for quantity
Q609_22c	(c) Main form in which you sell this crop
Q609_22d	(d) Total earnings from this crop in the last 12 months
Q609_22e	(e) How do you store the rest of produce?
Q609_22f	(f) Where do you Mainly sell the produce?
Q609_22g	(g) What is the distance from your farm to this place where you sell the produce?
Tomatoes	Q609_23: Production of Tomatoes in past the 12 months:
Q609_23aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_23a	(a) Quantity of crop produced
Q609_23b	(b) Quantity sold
Q609_23bc	State the units of measurement used for quantity
Q609_23c	(c) Main form in which you sell this crop
Q609_23d	(d) Total earnings from this crop in the last 12 months
Q609_23e	(e) How do you store the rest of produce?
Q609_23f	(f) Where do you Mainly sell the produce?
Q609_23g	(g) What is the distance from your farm to this place where you sell the produce?
Cabbage	Q609_24: Production of Cabbage in past the 12 months:
Q609_24aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_24a	(a) Quantity of crop produced
Q609_24b	(b) Quantity sold
Q609_24bc	State the units of measurement used for quantity
Q609_24c	(c) Main form in which you sell this crop
Q609_24d	(d) Total earnings from this crop in the last 12 months
Q609_24e	(e) How do you store the rest of produce?
Q609_24f	(f) Where do you Mainly sell the produce?
Q609_24g	(g) What is the distance from your farm to this place where you sell the produce?
Onions	Q609_25: Production of Onions in past the 12 months:

Q609_25aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_25a	(a) Quantity of crop produced
Q609_25b	(b) Quantity sold
Q609_25bc	State the units of measurement used for quantity
Q609_25c	(c) Main form in which you sell this crop
Q609_25d	(d) Total earnings from this crop in the last 12 months
Q609_25e	(e) How do you store the rest of produce?
Q609_25f	(f) Where do you Mainly sell the produce?
Q609_25g	(g) What is the distance from your farm to this place where you sell the produce?
Cashewnut	Q609_26: Production of Cashew nut in past the 12 months:
Q609_26aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_26a	(a) Quantity of crop produced
Q609_26b	(b) Quantity sold
Q609_26bc	State the units of measurement used for quantity
Q609_26c	(c) Main form in which you sell this crop
Q609_26d	(d) Total earnings from this crop in the last 12 months
Q609_26e	(e) How do you store the rest of produce?
Q609_26f	(f) Where do you Mainly sell the produce?
Q609_26g	(g) What is the distance from your farm to this place where you sell the produce?
Banana	Q609_27: Production of Banana in past the 12 months:
Q609_27aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_27a	(a) Quantity of crop produced
Q609_27b	(b) Quantity sold
Q609_27bc	State the units of measurement used for quantity
Q609_27c	(c) Main form in which you sell this crop
Q609_27d	(d) Total earnings from this crop in the last 12 months
Q609_27e	(e) How do you store the rest of produce?
Q609_27f	(f) Where do you Mainly sell the produce?
Q609_27g	(g) What is the distance from your farm to this place where you sell the produce?
Tobacco	Q609_28: Production of Tobacco in past the 12 months:
Q609_28aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_28a	(a) Quantity of crop produced
Q609_28b	(b) Quantity sold
Q609_28bc	State the units of measurement used for quantity
Q609_28c	(c) Main form in which you sell this crop
Q609_28d	(d) Total earnings from this crop in the last 12 months
Q609_28e	(e) How do you store the rest of produce?
Q609_28f	(f) Where do you Mainly sell the produce?
Q609_28g	(g) What is the distance from your farm to this place where you sell the produce?
Sunflower	Q609_29: Production of Sunflower in past the 12 months:
Q609_29aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_29a	(a) Quantity of crop produced
Q609_29b	(b) Quantity sold
Q609_29bc	State the units of measurement used for quantity
Q609_29c	(c) Main form in which you sell this crop
Q609_29d	(d) Total earnings from this crop in the last 12 months
Q609_29e	(e) How do you store the rest of produce?
Q609_29f	(f) Where do you Mainly sell the produce?
Q609_29g	(g) What is the distance from your farm to this place where you sell the produce?
Coffee	Q609_30: Production of Coffee in past the 12 months:
Q609_30aa	What is the average acres of land planted with this crop in the last two seasons?

Q609_30a	(a) Quantity of crop produced
Q609_30b	(b) Quantity sold
Q609_30bc	State the units of measurement used for quantity
Q609_30c	(c) Main form in which you sell this crop
Q609_30d	(d) Total earnings from this crop in the last 12 months
Q609_30e	(e) How do you store the rest of produce?
Q609_30f	(f) Where do you Mainly sell the produce?
Q609_30g	(g) What is the distance from your farm to this place where you sell the produce?
Citrus	Q609_31: Production of Citrus in past the 12 months:
Q609_31aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_31a	(a) Quantity of crop produced
Q609_31b	(b) Quantity sold
Q609_31bc	State the units of measurement used for quantity
Q609_31c	(c) Main form in which you sell this crop
Q609_31d	(d) Total earnings from this crop in the last 12 months
Q609_31e	(e) How do you store the rest of produce?
Q609_31f	(f) Where do you Mainly sell the produce?
Q609_31g	(g) What is the distance from your farm to this place where you sell the produce?
Pepper	Q609_32: Production of Pepper in past the 12 months:
Q609_32aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_32a	(a) Quantity of crop produced
Q609_32b	(b) Quantity sold
Q609_32bc	State the units of measurement used for quantity
Q609_32c	(c) Main form in which you sell this crop
Q609_32d	(d) Total earnings from this crop in the last 12 months
Q609_32e	(e) How do you store the rest of produce?
Q609_32f	(f) Where do you Mainly sell the produce?
Q609_32g	(g) What is the distance from your farm to this place where you sell the produce?
Garden_peas	Q609_33: Production of Garden peas in past the 12 months:
Q609_33aa	What is the average acres of land planted with this crop in the last two seasons?
Q609_33a	(a) Quantity of crop produced
Q609_33b	(b) Quantity sold
Q609_33bc	State the units of measurement used for quantity
Q609_33c	(c) Main form in which you sell this crop
Q609_33d	(d) Total earnings from this crop in the last 12 months
Q609_33e	(e) How do you store the rest of produce?
Q609_33f	(f) Where do you Mainly sell the produce?
Q609_33g	(g) What is the distance from your farm to this place where you sell the produce?
Q607	Q607: In which year did you start growing this crop for agribusiness?
Q607_1	Wheat
Q607_2	Rice, paddy
Q607_3	Maize
Q607_4	Millet
Q607_5	Sorghum
Q607_6	Potatoes (Irish)
Q607_7	Sweet potatoes
Q607_8	Cassava
Q607_9	Cocoyam
Q607_10	Yams
Q607_11	Sugar cane
Q607_12	Cow peas

Q607_13	Pulses
Q607_14	Beans
Q607_15	Soybeans
Q607_16	Groundnuts
Q607_17	Choroko (Green gram)
Q607_18	Oil Palm
Q607_19	Shea nuts
Q607_20	Sesame seed (simsim)
Q607_21	Watermelon
Q607_22	Seed cotton
Q607_23	Tomatoes
Q607_24	Cabbage
Q607_25	Onions
Q607_26	Cashew nut
Q607_27	Banana
Q607_28	Tobacco
Q607_29	Sunflower
Q607_30	Coffee
Q607_31	Citrus
Q607_32	Pepper
Q607_33	Garden peas
Q608	Q608: What was/is your main source of start-up capital to start growing:
Q608_1	Wheat
Q608_2	Rice, paddy
Q608_3	Maize
Q608_4	Millet
Q608_5	Sorghum
Q608_6	Potatoes (Irish)
Q608_7	Sweet potatoes
Q608_8	Cassava
Q608_9	Cocoyam
Q608_10	Yams
Q608_11	Sugar cane
Q608_12	Cow peas
Q608_13	Pulses
Q608_14	Beans
Q608_15	Soybeans
Q608_16	Groundnuts
Q608_17	Choroko (Green gram)
Q608_18	Oil Palm
Q608_19	Shea nuts
Q608_20	Sesame seed (simsim)
Q608_21	Watermelon
Q608_22	Seed cotton
Q608_23	Tomatoes
Q608_24	Cabbage
Q608_25	Onions
Q608_26	Cashew nut
Q608_27	Banana
Q608_28	Tobacco
Q608_29	Sunflower

Q608_30	Coffee
Q608_31	Citrus
Q608_32	Pepper
Q608_33	Garden peas
Q602a	Q602: Are there crops that you wanted to grow for income generation but you failed?
Q602b	Q602: Which crops?
Q602c	Q603: Why are you not able to grow the following crop?
Q602d	Q604: Do you think training could be useful to enable you to grow these crops?
Q602e	Q605: What kind of training would you wish to have to grow:
Q610	Q610: Since you started crop production for sale, have you ever stopped commercial production of at least one
Q611	Q611: What was the main reason for this change?
Q612	Q612: Do you think that there are any opportunities for agribusiness in Soroti/Serere district?
Q613	Q613: Do you have any specific training in agri-business and related skills?
Q614	Q614: What kind of skills/knowledge do you have? [INTERVIEWER: Prompt if not mentioned]
Q614a	Agronomic skills: crop pest management
Q614b	Agronomic skills: weed management
Q614c	Agronomic skills: crop disease management
Q614d	Agronomic skills: soil fertility management
Q614e	Agronomic skills: post harvest handling
Q614f	Agronomic skills: storage
Q614g	Agronomic skills: making local herbicides
Q614h	Agronomic skills: making local pesticides
Q614i	Marketing skills
Q614j	Soft skills (e.g. customer care skills; communication, etc.)
Q614k	Packaging skills or value addition
Q614l	Processing skills or value addition
Q614m	Accounting/book keeping skills
Q614n	Organizational development/group dynamics
Q615	Q615: In which year did you undertake the skills training in agribusines?
Q615a	Agronomic skills: crop pest management
Q615b	Agronomic skills: weed management
Q615c	Agronomic skills: crop disease management
Q615d	Agronomic skills: soil fertility management
Q615e	Agronomic skills: post harvest handling
Q615f	Agronomic skills: storage
Q615g	Agronomic skills: making local herbicides
Q615h	Agronomic skills: making local pesticides
Q615i	Marketing skills
Q615j	Soft skills
Q615k	Packaging skills or value addition
Q615l	Processing skills or value addition
Q615m	Accounting/book keeping skills
Q615n	Organizational development/group dynamics
Q616	Q616: Where did you get these agribusiness skills from?
Q616a	Agronomic skills: crop pest management
Q616b	Agronomic skills: weed management
Q616c	Agronomic skills: crop disease management
Q616d	Agronomic skills: soil fertility management
Q616e	Agronomic skills: post harvest handling
Q616f	Agronomic skills: storage
Q616g	Agronomic skills: making local herbicides

Q616h	Agronomic skills: making local pesticides
Q616i	Marketing skills
Q616j	Soft skills
Q616k	Packaging skills or value addition
Q616l	Processing skills or value addition
Q616m	Accounting/book keeping skills
Q616n	Organizational development/group dynamics
Section_7	**SECTION 7: Crop husbandry agronomic skill needs**
Q701	Q701: State if you practice the following agronomic and related practices
Q701a	Correct spacing of the crops you grow
Q701b	Pest management using pesticides (inorganic)
Q701c	Pest management using pesticides (local)
Q701d	Weed management using herbicides (inorganic)
Q701e	Weed management using herbicides (local)
Q701f	Fertilizer application
Q701g	Manure application
Q701h	Seed preservation for planting
Q701i	Irrigation
Q701j	Spraying for disease control
Q702	Q702: What was your main source of seed/seedlings in the last 12 months for the following crop:
Q702_1	Wheat
Q702_2	Rice, paddy
Q702_3	Maize
Q702_4	Millet
Q702_5	Sorghum
Q702_6	Potatoes (Irish)
Q702_7	Sweet potatoes
Q702_8	Cassava
Q702_9	Cocoyam
Q702_10	Yams
Q702_11	Sugar cane
Q702_12	Cow peas
Q702_13	Pulses
Q702_14	Beans
Q702_15	Soybeans
Q702x	Q702: What was your main source of seed/seedlings in the last 12 months for the following crop:
Q702_16	Groundnuts
Q702_17	Choroko (Green gram)
Q702_18	Oil Palm
Q702_19	Shea nuts
Q702_20	Sesame seed (simsim)
Q702_21	Watermelon
Q702_22	Seed cotton
Q702_23	Tomatoes
Q702_24	Cabbage
Q702_25	Onions
Q702_26	Cashew nut
Q702_27	Banana
Q702_28	Tobacco
Q702_29	Sunflower
Q702_30	Coffee

Q702_31	Citrus
Q702_32	Pepper
Q702_33	Garden peas
Q703	Q703: What do you consider in selecting the right type of seed/seedlings to use? (Interviewer ask for at least thr
Q704	Q704: Are you aware of the following kinds of seeds/seedlings?
Q704a	Q704a: Organic/Traditional
Q704b	Q704b: Improved (not genetically modified)
Q704c	Q704c: Improved (genetically modified)
Q705	Q705: Has this household ever used improved seed?
Q706	Q706: What are the reasons for not using improved seed?
Q707	Q707: Do you know the nearest place where you can buy improved seed?
Q708	Q708: How far is this shop (for improved seed) from your farm (distance in miles) [kilo meters into miles by dividing by 1.6)
space	Planting spacing and planting time: Let us talk briefly about planting season and required spacings
postharvest	***Postharvest handing of the crop produce***
Q731	Q731: Do you have knowledge of the post-harvest handling of perishable commodities?
Q732	Q732: Do you have knowledge of the post-harvest handling of non-perishable commodities?
Q733	Q733: Have you ever received any extension messages on postharvest handling?
Q734	Q734: Was these messages useful on the following yardsticks?
Q734a	Storage /cold strorage
Q734b	Packaging
Q734c	Transportation
Q734d	Processing
Q734e	Preservation
Q734f	Harvesting
measures	***Measures of controlling postharvest losses***
Q747	Q747: Do you package your produce before selling?
Q748	Q748: Do you have knowledge of product packaging?
Q749	Q749: Where did you get the knowledge from?
Q750	Q750: Do you process your produce?
Q751	Q751: Do you have knowledge of product processing?
Q752	Q752: Do you dry some of your produce before sale?
Q753	Q753: Where do you dry it from
Q754	Q754: What problems do you encounter during drying?
Q755	Q755: Are there any measures taken to control postharvest losses?
Q756	Q756: What measures do you normally take?
Q757	Q757: Do these measures give any improvement in controlling postharvest losses?
fertuse	***Fertilizer and Manure/Compost Expenditure (or Credit) Past 12 months***
Q775	Q775: Did you obtain fertilizer or manure/compost in past 12 months?
Q776	Q776: Which of the following fertilzers did you use in the last 12 months?
Q776a	Animal Manure (Dry form)
Q776b	Green Manure
Q776c	Compost
Q776d	DAP
Q776e	UREA
Q776f	NPK
Q776g	CAN
Q776h	MAP
Q776i	TSP
Q776j	SSP
Q776k	ASN (26:0:0)

Q776l	Household refuse/crop residual
Q776m	Other (Specify):
Q776n	Other (Specify):
Q776o	Other (Specify):
Q777a	Animal Manure (Dry form)
Q777a_1	In which month did you obtain the fertilizers
Q777a_2	How did you obtain it?
Q777a_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777a_4	Did you pay for transportation?
Q777a_5	If fertilizer was obtained on credit; from whom?
Q777b	Green Manure
Q777b_1	In which month did you obtain the fertilizers
Q777b_2	How did you obtain it?
Q777b_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777b_4	Did you pay for transportation?
Q777b_5	If fertilizer was obtained on credit; from whom?
Q777c	Compost
Q777c_1	In which month did you obtain the fertilizers
Q777c_2	How did you obtain it?
Q777c_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777c_4	Did you pay for transportation?
Q777c_5	If fertilizer was obtained it on credit; from whom?
Q777d	DAP
Q777d_1	In which month did you obtain the fertilizers
Q777d_2	How did you obtain it?
Q777d_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777d_4	Did you pay for transportation?
Q777d_5	If fertilizer was obtained it on credit; from whom?
Q777e	UREA
Q777e_1	In which month did you obtain the fertilizers
Q777e_2	How did you obtain it?
Q777e_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777e_4	Did you pay for transportation?
Q777e_5	If fertilizer was obtained it on credit; from whom?
Q777f	NPK
Q777f_1	In which month did you obtain the fertilizers
Q777f_2	How did you obtain it?
Q777f_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777f_4	Did you pay for transportation?
Q777f_5	If fertilizer was obtained it on credit; from whom?
Q777g	CAN
Q777g_1	In which month did you obtain the fertilizers
Q777g_2	How did you obtain it?
Q777g_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777g_4	Did you pay for transportation?
Q777g_5	If fertilizer was obtained it on credit; from whom?
Q777h	MAP
Q777h_1	In which month did you obtain the fertilizers
Q777h_2	How did you obtain it?
Q777h_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777h_4	Did you pay for transportation?

Q777h_5	If fertilizer was obtained it on credit; from whom?
Q777i	TSP
Q777i_1	In which month did you obtain the fertilizers
Q777i_2	How did you obtain it?
Q777i_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777i_4	Did you pay for transportation?
Q777i_5	If fertilizer was obtained it on credit; from whom?
Q777j	SSP
Q777j_1	In which month did you obtain the fertilizers
Q777j_2	How did you obtain it?
Q777j_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777j_4	Did you pay for transportation?
Q777j_5	If fertilizer was obtained it on credit; from whom?
Q777k	ASN (26:0:0)
Q777k_1	In which month did you obtain the fertilizers
Q777k_2	How did you obtain it?
Q777k_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777k_4	Did you pay for transportation?
Q777k_5	If fertilizer was obtained it on credit; from whom?
Q777l	Household refuse/crop residual
Q777l_1	In which month did you obtain the fertilizers
Q777l_2	How did you obtain it?
Q777l_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777l_4	Did you pay for transportation?
Q777l_5	If fertilizer was obtained it on credit; from whom?
Q777m	Other (Specify): [SKIP if no "other" fertilizer was mentioned"]
Q777m_1	In which month did you obtain the fertilizers
Q777m_2	How did you obtain it?
Q777m_3	Quantity obtained (Interviewer: indicate units of measurement as well)
Q777m_4	Did you pay for transportation?
Q777m_5	If fertilizer was obtained it on credit; from whom?
rpt	New Section
nid	nid
Section_8	**SECTION 8: Animal husbandry and agribusiness 2017-2020 in the last 12 months**
Q801	Q801: Do you own any of the following animals or birds?
Q801_1	Cows – Local
Q801_2	Bulls – Local
Q801_3	Young bulls-Local
Q801_4	Heifer –Local
Q801_5	Calves –Local
Q801_6	Cows – Improved
Q801_7	Bulls – Improved
Q801_8	Young Bulls - Improved
Q801_9	Heifer –Improved
Q801_10	Calves –Improved
Q801x	Q801: Do you own any of the following animals or birds?
Q801_11	Goat – Local
Q801_12	Goat – Improved
Q801_13	Sheep
Q801_14	Chicken – Local
Q801_15	Chicken –Improved

Q801_16	Pigs – Local
Q801_17	Pigs – Improved
Q801_18	Donkeys
Q801_19	Ducks
Q801_20	Turkey
Q801_21	Guinea fowls
Q801_1x	Do you own any of the following: Cows – Local
Q801_1a	Number owned 12 month ago
Q801_1b	Total value (Shs) 12 month ago
Q801_1c	Number Consumed at home in the last 12 months
Q801_1d	Number bought during the last 12 months
Q801_1e	Number sold during the last 12 months
Q801_1f	Number lost during the last 12 months
Q801_1g	Number Owned Now
Q801_1h	Total value in Shs Now
Q801_2x	Do you own any of the following: Bulls – Local
Q801_2a	Number owned 12 month ago
Q801_2b	Total value (Shs) 12 month ago
Q801_2c	Number Consumed at home in the last 12 months
Q801_2d	Number bought during the last 12 months
Q801_2e	Number sold during the last 12 months
Q801_2f	Number lost during the last 12 months
Q801_2g	Number Owned Now
Q801_2h	Total value in Shs Now
Q801_3x	Do you own any of the following: Young bulls-Local
Q801_3a	Number owned 12 month ago
Q801_3b	Total value (Shs) 12 month ago
Q801_3c	Number Consumed at home in the last 12 months
Q801_3d	Number bought during the last 12 months
Q801_3e	Number sold during the last 12 months
Q801_3f	Number lost during the last 12 months
Q801_3g	Number Owned Now
Q801_3h	Total value in Shs Now
Q801_4x	Do you own any of the following: Heifer –Local
Q801_4a	Number owned 12 month ago
Q801_4b	Total value (Shs) 12 month ago
Q801_4c	Number Consumed at home in the last 12 months
Q801_4d	Number bought during the last 12 months
Q801_4e	Number sold during the last 12 months
Q801_4f	Number lost during the last 12 months
Q801_4g	Number Owned Now
Q801_4h	Total value in Shs Now
Q801_5x	Calves –Local
Q801_5a	Number owned 12 month ago
Q801_5b	Total value (Shs) 12 month ago
Q801_5c	Number Consumed at home in the last 12 months
Q801_5d	Number bought during the last 12 months
Q801_5e	Number sold during the last 12 months
Q801_5f	Number lost during the last 12 months
Q801_5g	Number Owned Now
Q801_5h	Total value in Shs Now

Q801_6x	Cows – Improved
Q801_6a	Number owned 12 month ago
Q801_6b	Total value (Shs) 12 month ago
Q801_6c	Number Consumed at home in the last 12 months
Q801_6d	Number bought during the last 12 months
Q801_6e	Number sold during the last 12 months
Q801_6f	Number lost during the last 12 months
Q801_6g	Number Owned Now
Q801_6h	Total value in Shs Now
Q801_7x	Bulls – Improved
Q801_7a	Number owned 12 month ago
Q801_7b	Total value (Shs) 12 month ago
Q801_7c	Number Consumed at home in the last 12 months
Q801_7d	Number bought during the last 12 months
Q801_7e	Number sold during the last 12 months
Q801_7f	Number lost during the last 12 months
Q801_7g	Number Owned Now
Q801_7h	Total value in Shs Now
Q801_8x	Young Bulls - Improved
Q801_8a	Number owned 12 month ago
Q801_8b	Total value (Shs) 12 month ago
Q801_8c	Number Consumed at home in the last 12 months
Q801_8d	Number bought during the last 12 months
Q801_8e	Number sold during the last 12 months
Q801_8f	Number lost during the last 12 months
Q801_8g	Number Owned Now
Q801_8h	Total value in Shs Now
Q801_9x	Heifer –Improved
Q801_9a	Number owned 12 month ago
Q801_9b	Total value (Shs) 12 month ago
Q801_9c	Number Consumed at home in the last 12 months
Q801_9d	Number bought during the last 12 months
Q801_9e	Number sold during the last 12 months
Q801_9f	Number lost during the last 12 months
Q801_9g	Number Owned Now
Q801_9h	Total value in Shs Now
Q801_10x	Calves –Improved
Q801_10a	Number owned 12 month ago
Q801_10b	Total value (Shs) 12 month ago
Q801_10c	Number Consumed at home in the last 12 months
Q801_10d	Number bought during the last 12 months
Q801_10e	Number sold during the last 12 months
Q801_10f	Number lost during the last 12 months
Q801_10g	Number Owned Now
Q801_10h	Total value in Shs Now
Q801_11x	Goat – Local
Q801_11a	Number owned 12 month ago
Q801_11b	Total value (Shs) 12 month ago
Q801_11c	Number Consumed at home in the last 12 months
Q801_11d	Number bought during the last 12 months
Q801_11e	Number sold during the last 12 months

Q801_11f	Number lost during the last 12 months
Q801_11g	Number Owned Now
Q801_11h	Total value in Shs Now
Q801_12x	Goat – Improved
Q801_12a	Number owned 12 month ago
Q801_12b	Total value (Shs) 12 month ago
Q801_12c	Number Consumed at home in the last 12 months
Q801_12d	Number bought during the last 12 months
Q801_12e	Number sold during the last 12 months
Q801_12f	Number lost during the last 12 months
Q801_12g	Number Owned Now
Q801_12h	Total value in Shs Now
Q801_13x	Sheep
Q801_13a	Number owned 12 month ago
Q801_13b	Total value (Shs) 12 month ago
Q801_13c	Number Consumed at home in the last 12 months
Q801_13d	Number bought during the last 12 months
Q801_13e	Number sold during the last 12 months
Q801_13f	Number lost during the last 12 months
Q801_13g	Number Owned Now
Q801_13h	Total value in Shs Now
Q801_14x	Chicken – Local
Q801_14a	Number owned 12 month ago
Q801_14b	Total value (Shs) 12 month ago
Q801_14c	Number Consumed at home in the last 12 months
Q801_14d	Number bought during the last 12 months
Q801_14e	Number sold during the last 12 months
Q801_14f	Number lost during the last 12 months
Q801_14g	Number Owned Now
Q801_14h	Total value in Shs Now
Q801_15x	Chicken –Improved
Q801_15a	Number owned 12 month ago
Q801_15b	Total value (Shs) 12 month ago
Q801_15c	Number Consumed at home in the last 12 months
Q801_15d	Number bought during the last 12 months
Q801_15e	Number sold during the last 12 months
Q801_15f	Number lost during the last 12 months
Q801_15g	Number Owned Now
Q801_15h	Total value in Shs Now
Q801_16x	Pigs – Local
Q801_16a	Number owned 12 month ago
Q801_16b	Total value (Shs) 12 month ago
Q801_16c	Number Consumed at home in the last 12 months
Q801_16d	Number bought during the last 12 months
Q801_16e	Number sold during the last 12 months
Q801_16f	Number lost during the last 12 months
Q801_16g	Number Owned Now
Q801_16h	Total value in Shs Now
Q801_17x	Pigs – Improved
Q801_17a	Number owned 12 month ago
Q801_17b	Total value (Shs) 12 month ago

Q801_17c	Number Consumed at home in the last 12 months
Q801_17d	Number bought during the last 12 months
Q801_17e	Number sold during the last 12 months
Q801_17f	Number lost during the last 12 months
Q801_17g	Number Owned Now
Q801_17h	Total value in Shs Now
Q801_18x	Donkeys
Q801_18a	Number owned 12 month ago
Q801_18b	Total value (Shs) 12 month ago
Q801_18c	Number Consumed at home in the last 12 months
Q801_18d	Number bought during the last 12 months
Q801_18e	Number sold during the last 12 months
Q801_18f	Number lost during the last 12 months
Q801_18g	Number Owned Now
Q801_18h	Total value in Shs Now
Q801_19x	Ducks
Q801_19a	Number owned 12 month ago
Q801_19b	Total value (Shs) 12 month ago
Q801_19c	Number Consumed at home in the last 12 months
Q801_19d	Number bought during the last 12 months
Q801_19e	Number sold during the last 12 months
Q801_19f	Number lost during the last 12 months
Q801_19g	Number Owned Now
Q801_19h	Total value in Shs Now
Q801_20x	Turkey
Q801_20a	Number owned 12 month ago
Q801_20b	Total value (Shs) 12 month ago
Q801_20c	Number Consumed at home in the last 12 months
Q801_20d	Number bought during the last 12 months
Q801_20e	Number sold during the last 12 months
Q801_20f	Number lost during the last 12 months
Q801_20g	Number Owned Now
Q801_20h	Total value in Shs Now
Q801_21x	Do you own any of the following: Guinea fowls
Q801_21a	Number owned 12 month ago
Q801_21b	Total value (Shs) 12 month ago
Q801_21c	Number Consumed at home in the last 12 months
Q801_21d	Number bought during the last 12 months
Q801_21e	Number sold during the last 12 months
Q801_21f	Number lost during the last 12 months
Q801_21g	Number Owned Now
Q801_21h	Total value in Shs Now
diary	Dairy Production and Expenditures on Cattle Management
Q803	Q803: In the last 12 months have you had cows for milk production? If Yes, which:
Q803_1	Local cows
Q803_2	Improved cows that are mainly stall fed
Q803_3	Improved cows that are mainly grazed
Q804	Q804: In the last 12 months, how many of these cows did you own?
Q804_1	Local cows
Q804_2	Improved cows that are mainly stall fed
Q804_3	Improved cows that are mainly grazed

milk	Q805: Milk produced
Q805a	How much milk per month (average) did the local cows produce in DRY season (in liters):
Q805b	How much milk per month (average) did the local cows produce in WET season (in litres):
Q806a	How much milk per month (average) did the stall-fed improved cows produce in DRY season (in liters):
Q806b	How much milk per month (average) did the stall-fed improved cows produce in WET season (in litres):
Q807a	How much milk per month (average) did the grazed improved cows produce in DRY season (in liters):
Q807b	How much milk per month (average) did the grazed improved cows produce in WET season (in litres):
milksale	Q805: Milk produced
Q808a	What is the total amount of milk (in litres) you sold in the dry season:
Q808b	How much was the average sales price per litre (Ushs)
Q808c	For how many months did you produce milk in the DRY season?
Q808d	What is the total amount of milk (in litres) you sold in the wet season:
Q808e	How much was the average sales price per litre (Ushs)
Q808f	For how many months did you produce milk in the WET season?
Q809	Q809: In the last 12 months did you incur any costs on the following:
Q809_1	Purchase of animal feeds
Q809_2	Artificial Insemination
Q809_3	Bull service
Q809_4	Veterinary services (drugs, vaccines, pestcides, etc.)
Q809x	What was your total expenditure on:
Q809_1x	Purchase of animal feeds
Q809_2x	Artificial Insemination
Q809_3x	Bull service
Q809_4x	Veterinary services (drugs, vaccines, pestcides, etc.)
other	**Other farm Products Production 2017-2020**
Q810	Q810: Did you produce any of the following within the past 12 months?
Q810_1	Eggs
Q810_2	Honey
Q810_3	Ghee
Q810_4	Goat milk
Q810_5	Hides and skin
Q810_6	Meat
Q810_7	Other_specify (if respondents reports significant income from this product):
Q811	Q811: What was the amount produced (on average) per month of:?
Q811_1	Eggs (No. of trays)
Q811_1a	Amount produced per month (No. of trays)
Q811_1b	Amount sold per month
Q811_1c	Price per unit/Price would have sold the product if the household had chosen to
Q811_2	Honey (No. of KGs or litres)
Q811_2a	Amount produced per month (In litres or Kgs)
Q811_2b	Amount sold per month
Q811_2c	Price per unit/Price would have sold the product if the household had chosen to
Q811_3	Ghee (No of KGs)
Q811_3a	Amount produced per month (In litres or Kgs)
Q811_3b	Amount sold per month
Q811_3c	Price per unit/Price would have sold the product if the household had chosen to
Q811_4	Goat milk (No. of liters)
Q811_4a	Amount produced per month (In litres)
Q811_4b	Amount sold per month
Q811_4c	Price per unit/Price would have sold the product if the household had chosen to
Q811_5	Hides and skin (Number)

Q811_5a	Amount produced per month (Number)
Q811_5b	Amount sold per month
Q811_5c	Price per unit/Price would have sold the product if the household had chosen to
Q811_6	Meat (No of KGs)
Q811_6a	Amount produced per month (In Kgs)
Q811_6b	Amount sold per month
Q811_6c	Price per unit/Price would have sold the product if the household had chosen to
Section_9	SECTION 9: FARMING DETAILS
Q901	Q901: Have you ever received training in:
Q901_1	Management of diary cows
Q901_2	Disease and pest management in cattle
Q901_3	Pasture growing
Q901_4	Poultry management for meat
Q901_5	Poultry management for eggs
Q901_6	Value addition - poultry
Q901_7	Piggery
Q901_8	Value addition - piggery
Q901_9	Marketing
Q901_10	Goats production
Q902	Q902: Who provided the training?
Q904	Q904: Did the training result in an increase in your turnover?
Q905	Q905: Did the training result in an increase in your turnover in?
Q905_1	Milk production
Q905_4	Poultry meat production
Q905_5	Eggs production
Q905_7	Piggery production
Q905_10	Goats production
Q906	Q906: By how much did your turnover increase in?
Q906_1	Milk production
Q906_4	Poultry meat production
Q906_5	Eggs production
Q906_7	Piggery production
Q906_10	Goats production
Q930	Q930: List three factors (in order of their importance/effect) pose the most significant risk to your agricultural ac factors]
Q930_1	Weather-related event (drought, floods, late rains)
Q930_2	Power failure/shortage
Q930_3	Poor road network
Q930_4	Bad roads in rainy season
Q930_5	Market price volatility/flactuations
Q930_6	Lack of market
Q930_7	Lack of seeds/poor quality seeds
Q930_8	Pests and diseases
Q930_9	Contracts not being honored
Q930_10	Failure to sell the farm produce
Q930_11	Perils and accidents (e.g. fire) or theft
Q930_12	Health (your own, your family's or your workers')
Q930_13	Land tenure system not favourable/ informal ownership
Q930_14	Land fragmentation
Q930_15	Breakdown of equipment
Q930_16	Input quality

Q930_17	Fuel prices or availability
Q930_18	Exploitation by middlemen
Q930_19	Lack of skills/training in agronomy
Q930_20	Lack of marketing/customer care skills
Q930_21	Lack of fertilizers/pestcides
Q930_22	Lack of Extension workers
Q930_23	Other (Specify):
Q940	**Have your agricultural activities been seriously affected by any of the following events in the past three years?**
Q940a	Weather-related event (drought, floods, late rains)
Q940b	Pests / diseases
Q940c	Accidents (e.g. fire) or theft
Q940d	Unexpected price fluctuation in the market
Q940e	Unexpected price fluctuation of inputs (such as seeds, fertilizer, or pesticides)
Q940f	Contracts not being honored
Q940g	Market downturn / crops or livestock not able to be sold
Q940h	Breakdown of equipment
Q940i	Health (your own, your family's, or your workers')-related event
Q940j	Death in the family
Q940k	Political unrest or war
Q941	**Q941: How did you mainly cope when this happened?**
Q941a	Weather-related event (drought, floods, late rains)
Q941b	Pests / diseases
Q941c	Accidents (e.g. fire) or theft
Q941d	Unexpected price fluctuation in the market
Q941e	Unexpected price fluctuation of inputs (such as seeds, fertilizer, or pesticides)
Q941f	Contracts not being honored
Q941g	Market downturn / crops or livestock not able to be sold
Q941h	Breakdown of equipment
Q941i	Health (your own, your family's, or your workers')-related event
Q941j	Death in the family
Q941k	Political unrest or war
Section_10	**SECTION 10: Extension and Training in Last Two Years**
Q1001	Have you received any training or had contact with extension agents since August 2019?
Q1002	Was this a training or extension services
Q1003	Provider of training or extension
Q1004	Type/Areas of training/ extension
Q1005	Number of days of training/ number of visits of extension since August 2007
Q1006	Have you applied what you learned in practice
Q1007	Will you apply what you learned again next season?
Q1008	Did you pay fee?
Q1009	How much did you pay (Ush)?
Section_11	**SECTION 11: Consumption and Expenditure on Major Items (Non-Durable Goods) in the Past 12 Months**
Q1101	**During the last 6 days, did you eat any of the following:**
Q1101a	Maize grain
Q1101b	Maize meal/flour
Q1101c	Millet/Sorghum
Q1101d	Wheat flour
Q1101e	Rice
Q1101f	Cassava (Fresh form)
Q1101g	Cassava (Processed)

Q1101h	Sweet potatoes (Fresh)
Q1101i	Sweet potatoes (Processed)
Q1101j	Irish potatoes
Q1101x	**During the last 6 days, did you eat any of the following:**
Q1101k	Matoke
Q1101l	Other staples (any)
Q1101m	Chicken
Q1101n	Meats (any)
Q1101o	Fish
Q1101p	Beans
Q1101q	Peas (any)
Q1101r	Gnuts
Q1101s	Vegetable/Fruits (any)
Q1101u	Eggs (#number)
Q1101v	Milk: liquid (litre)
Q1102	**During the last 6 days, what amount did you consume of the following:**
Q1102a	Maize grain
Q1102b	Maize meal/flour
Q1102c	Millet/Sorghum
Q1102d	Wheat flour
Q1102e	Rice
Q1102f	Cassava (Fresh form)
Q1102g	Cassava (Processed)
Q1102h	Sweet potatoes (Fresh)
Q1102i	Sweet potatoes (Processed)
Q1102j	Irish potatoes
Q1102x	**During the last 6 days, what amount did you consume of the following:**
Q1102k	Matoke
Q1102l	Other staples (any)
Q1102m	Chicken
Q1102n	Meats (any)
Q1102o	Fish
Q1102p	Beans
Q1102q	Peas (any)
Q1102r	Gnuts
Q1102s	Vegetable/Fruits (any)
Q1102u	Eggs (#number)
Q1102v	Milk: liquid (litre)
Section_12	**ACCESS TO CREDIT**
Q1201	Q1201: Do you keep any records regarding your production?
Q1202	Q1202: Have you ever applied for a loan?
Q1203	Q1203: Did you get the loan?
Q1204	Q1204: Did you have to prepare a proposal for this loan?
Q1205	Q1205: After submission of application, how many days required for loan sanctioning process?
Q1206	Q1206: What was the total value of this loan when it was taken out in UGX?
Q1207	Q1207: What was the month and year in which the household received this loan? (Record MM/YY)
Q1208	Q1208: What was the interest rate on this loan when it began?
Q1209	Q1209: What is the mode of repayment?
Q1210	Q1210: Did you/are you repaying the loan?
Q1211	Q1211: Why have you not begun to repay this loan/failed to repay on schedule?
Q1212	Q1212: Was the loan amount sanctioned by lender sufficient as per project /estimation?

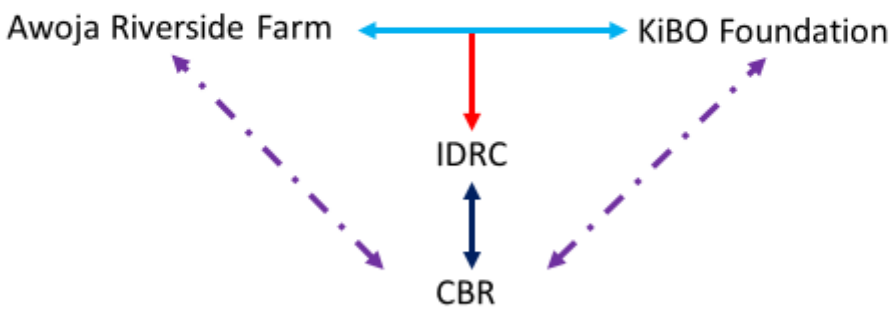
Q1213	Q1213: Why did they sanction less amount?
Q1214	Q1214: What property you have mortgaged for loan?
Q1215	Q1215: Did you borrow this money as part of a group?
Q1216	Q1216: Was this a loan from the Food Security Program?
Q1217	Q1217: From what source was the money borrowed/applied for?
Q1218	Q1218: What was the money from this loan mainly used for?
Q1219	Q1219: Was the loan amount used entirely for the purpose applied for?
Q1220	Q1220: What is the duration for repayment of loan?
Q1221	**Q1221: When the household member received this loan, if s/he could have borrowed more money with the same interest rate and repayment period, how much more in UGX would s/he have borrowed**
Q1222	**Q1222: For this loan, who in the household made/makes decisions on how the loan was spent? List up to two ID#s**
Q1230	Q1230: Have any other member of your household ever applied for a loan?
Q1231	Q1231: Did they get the loan?
Q1232	Q1232: Did they borrow this money as part of a group?
Q1233	Q1233: From what source was the money borrowed/applied for?
Section_13	**SECTION 13: SAVINGS**
Q1301	Q1301: Do you have a bank account or an account with MFI?
Q1302	Q1302: Is it a joint or group account?
Q1303	Q1303: Do you have any cash savings in the account?
Q1304	Q1304: Do you have any cash savings in an institution other than an MFI?
Q1305	Q1305: How much savings do you have on this account?
Q1306	Q1306: Are you a member of a Rural Savings and Credit Cooperative or VSLA?
Q1308	Q1307: Have you received training on credit management?
Q1309	Q1308: What is the quantity of savings in this account? (UGX)
Q1310	Q1309: Have any other member of the household received training on credit management?
Q1311	*Q1311: Does any member of the household have a bank account or an account with MFI?*
Q1312	*Q1312: List names of up to 3 members of the household who have cash savings account*
Q1313	*Q1313: Is this bank account or account with MFI, a joint account?*
Q1314	*Q1314: Does the household have any cash savings in an institution other than an MFI?*
Q1315	*Q1315: List names of up to 3 members of the household who have cash savings in another institution; (use semi-colons to separate the names)*
Q1316	*Q1316: Is there any member of your household a member of a Rural Savings and Credit Cooperative?*
Q1317	*Q1317: List names of up to 3 members of the household who are members of a Rural Savings and credit*
Section_14	**SECTION 14: GROUP PARTICIPATION**
g	I would like to ask you about the groups you participate in within your community
Q1401	Q1401: Do you participate in any groups for example, farming groups, credit groups, church groups, women's groups?
grp	**Group details**
Q1402	Q1402: What type of group is it? (Your main group)
Q1403	Q1403: How many members are in the group?
Q1404	Q1404: How many members are female?
Q1405	Q1405: What is your level of participation in the group?
Q1406	Q1406: How many hours per month do you spend on activities with his group?
grpx	**Group details**
Q1407	Q1407: Was the group formed based on community initiative or was it organized by the government, a church, or other organization?
Q1408	Q1408: What is your role in the group?
Q1409	Q1409: How often do you typically meet with this group?
grpxx	**Group details**
Q1411	Q1411: Did you contribute anything (in cash or kind) to this group during the past 12 months? [STATE total

	amount of money contributed]
Q1412	Q1412: If someone in the group asked to borrow 50,000 UGX and you had the money, would you loan the group member the money?
Q1413	Q1413: Do you think people in your group generally cooperate well, or do you think there are some conflicts or many conflicts among members?
Q1414	Q1414: How many people in the group did you know before the group formed?
Q1415	Q1415: Do group members live up to their responsbility ingroups?
Q1416	Q1402: What other types of groups do you belong to?
Q1417	Q1417: What are some of the key income generating activities undertaken by your group in the last 12 months?
Q1418	Q1418: How did the group raise funds to start these activities?
Q1418b	Roughly, what is the total value of the following enterprises/activities your group owns?
Q1418i	Poultry farming
Q1418ii	Piggery
Q1418iii	Horticulture
Q1418iv	Maize growing
Q1418v	Diary cattle
Q1418vi	Trading in agricultural produce
Q1418vii	Other: specify both activity and value:
Q1419	Q1419: What would you say has been the most important help from a team at Kibo and Riverside to your group
Section_16	**Section 16: Marketing**
Q1601	**Q1601: State whether you do the following agribusiness activities to fullfil the contracts; as an individual or as a group**
Q1601a	Q1601a: Crop production
Q1601b	Q1601b: Fruit production
Q1601c	Q1601c: Vegetable production
Q1601d	Q1601d: Fish farming
Q1601e	Q1601e: Piggery
Q1601f	Q1601f: Poultry
Q1601g	Q1601g: Diary cattle farming
Q1601i	Q1601i: Apiculture
Q1601j	Q1601j: Trade in on-farm produce
Q1601k	Q1601k: Agroforestry
Q1601l	Q1601l: Provision of on-farm inputs
Q1601n	Q1601n: Goats production
Q1602	Q1602: Does your contractor/processor support you in any way?
Q1603	Q1603: How does he or her support you?
Section_17	**SECTION 17: Value addition**
Q1701	Q1701: Do you add value to your produce?
Q1702	Q1702: Do you think you would earn more if you added value to your produce?
Q1703	Q1703: What kind of value addition do you engage in?
Q1704	Q1704: Do you think skilling can improve your ability to add value?
Section_18	**SECTION 18: Local Farmer Training Center**
Q1801	Q1801: Do you know of any local Farmer Training Centre (FTC)?
Q1802	Q1802: How far is your local FTC (Record answer in walking minutes from your home)?
Q1803	Q1803: Have you ever been to your local Farmer Training centre (FTC)?
Q1804	Q1804: Why not?
Q1805	Q1805: Are you a member of the FTC management committee?
nt	Thank you for your cooperation and time!

ANNEX 13: Dr. Ibrahim Mike Okumu's presentation

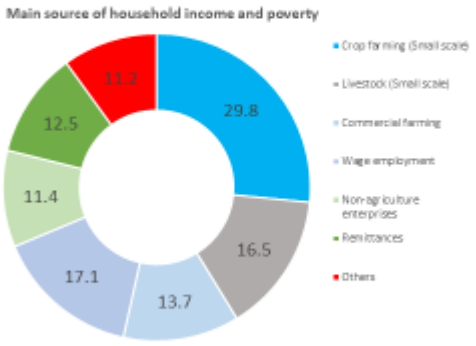
Enhancing Agribusiness Economic Opportunities of Rural Women and Youths in Uganda. IDRC Project Grant No.: 108808-001

Introduction



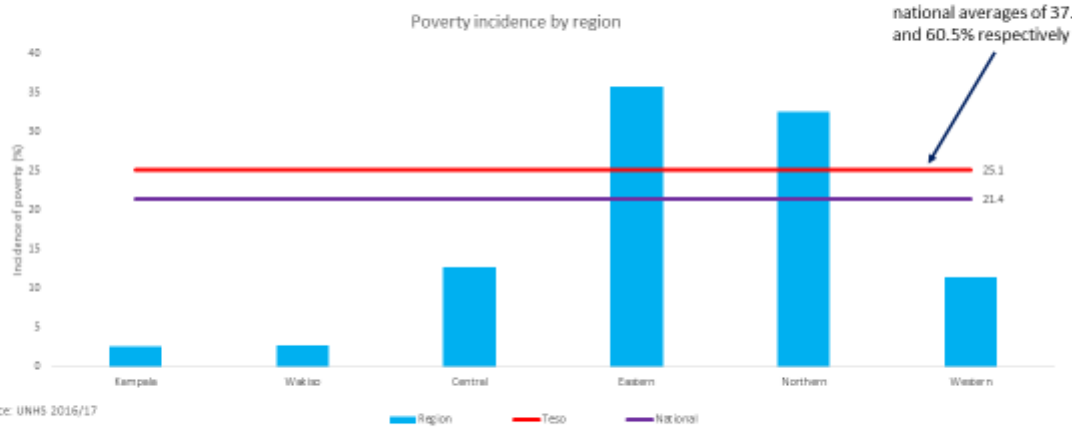
Why agriculture?

Source: UNHS 2016/17



Why Eastern Uganda ➔ Teso Region

In relation to blanket and shoes ownership, 7.6% and 30.2% compared to national averages of 37.7% and 60.5% respectively



Source: UNHS 2016/17

Broad objectives of the research project

- Provide training and business advisory services to women and youths with the aim of providing:
  - Knowledge
  - Skills
  - Change in attitudes towards agribusiness
  - Consequently, improving their livelihoods

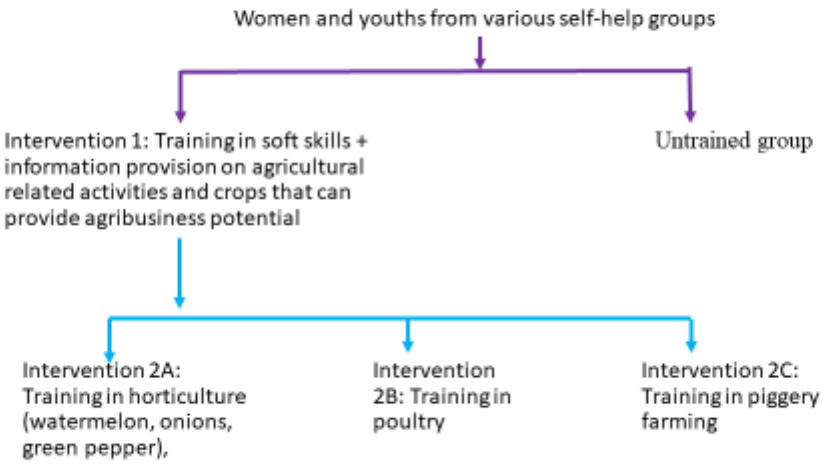
Baseline

- This was undertaken across all groups in 2018
- Data captured demographic characteristics, household enterprises, enterprises that can provide agribusiness potential, level of soft and agronomical skills, value addition engagement among others.
- This data guided the training content and choice of enterprises for training.

Intervention

- This was at two levels
- KiBO Foundation provided soft skills training and information on enterprises that have agribusiness potential in Teso region.
    - This was given to all the treated 532 subjects
- Awoja Riverside Farm provided agronomical skills training plus information on enterprises that have agribusiness potential in Teso region.
    - This was given the treated only 532 subjects

Summary of the RCT design



Details of the training

- Agronomical skills training
  - Horticulture (Watermelon, Onions and Green Pepper), Poultry and Piggery
  - Horticulture: site selection, nursery bed preparation, spacing, watering, manure application, weeding and weed management, pest identification and pest management, harvesting and post harvest handling - 5 Groups
  - Poultry: housing structure, carrying capacity, feeding, feed mixture, hygiene, disease control and management - 10 Groups
  - Piggery: housing structure, carrying capacity, feeding, feed mixture, hygiene and disease control and management – 1 Group

Details of the training cont'

- Soft skills training
  - Delegation
  - Saving skills
  - Budgeting skills
  - Self-awareness skills
  - Negotiation skills
  - Planning skills
  - Record keeping skills
  - Team building skills
  - Record keeping
  - Team building skills
  - Communication skills
  - Marketing skills
  - Book keeping skill
  - Leadership skills

Midline Survey

- After the treatment, but before the evaluation a midline survey was conducted with a rationale of assessing the implementation of the training intervention.

What was the training IMPACT?

ANNEX 14: Prof. Edward Bbaale's presentation

Enhancing Agribusiness Economic Opportunities of Women and Youths in Rural Uganda. The Impact of Agronomic and Soft Skills Training

Presented

By

Prof. Edward Bbaale and Dr. Ibrahim Mike Okumu

CENTRE for BASIC RESEARCH

IDRC · CRDI

KIBO FOUNDATION

Riverside Farm & Leisure

Outline.....

- *Introduction*
- *Objectives*
- *Data and methods*
- *Results*
- *Conclusion and Recommendations*

Introduction and motivation

- Uganda' total population is estimated at 40 Million with females accounting for 51% and males 49% (UBOS, 2019).
- A large proportion of this population is dominated by the young (0 – 14 years) followed by youths below 30 years.
- Of the country's active labour force, majority of the unemployed are youths and mainly females; estimated at about 13% (UBOS, 2019).

Intro…….

- 55% of the young people are employed in agriculture with the females standing at 60% (UBOS, 2019).
- However, many youths are increasingly withdrawing from the sector (Ahaibwe, et al., 2013) due to observing agriculture as merely farming that is perceived as being hard, boring and an activity that requires physical labor which makes it stressful (Holz-Clause and Jost, 1995).

Intro…….

- Because Uganda is endowed with numerous agribusiness opportunities, it is possible to change the disinterest of the youths for agriculture and fight unemployment through investing in other agricultural related activities like marketing (White, 2012) — agribusiness comes in limelight.

- Agribusinesses extends beyond agriculture to service provision and manufacturing — through agro-processing and can act as an engine to economic growth (Panda and Sreekumar, 2012) and aid employment creation (Bairwa, et al., 2014).

Intro…….

- However, due to individual, community or institutional weaknesses, Uganda's agribusiness potential has not been fully exploited, and one of the possible explanations for this is limited skills and information owned by farmers.

- To address this constraint and embrace agribusiness, we organised a training to rural women and youths in the Teso region of Eastern Uganda.

Training objectives

- To build capacity of rural women and youths for purposes of developing sustainable economic activities within their localities.
- To provide information to rural women and youths about the various agribusiness enterprises (activities and crops) that can provide them with agribusiness potentials.

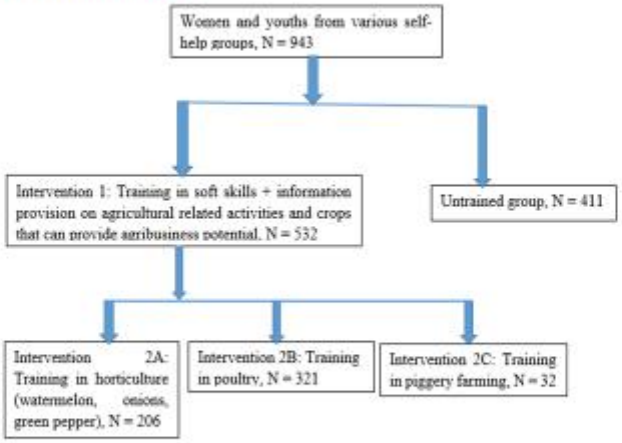
Data and methods

- Data used in this study was collected at end-line after exposing the treated/trained to a training.
- The study was conducted in conjunction with Awoja Riverside farm and KIBO foundation.
- KIBO trained participants in soft skills and also provided information on agribusiness enterprises that can provide agribusiness potentials.

- Awoja Riverside farm trained participants in agronomic skills (horticulture, poultry, piggery) and also provided information on agribusiness enterprises that can provide agribusiness potentials.
- 944 subjects participated in the survey but, '1' subject was dropped due to missing data for most variables.
- From the remaining 943 subjects, 532 subjects had been exposed to training and 411 subjects received no training at all (untrained/control arm).

- Also, within the trained group,
  - 206 subjects had received extra training in horticulture (onions and green pepper),
  - 321 subjects had received additional training in poultry and,
  - 32 subjects had received extra training in piggery.
- Note that some 27 trainees crossed from their specialised training groups and also received some training in other agronomic fields.

Study design summarised



- 27 trainees crossed from their specialised training groups to other groups

Analytical strategy

- We used T-test estimation strategy in which we compare the mean outcomes for the trained group to the untrained group.
- ***Say;***

(1) For soft skills training + information provision, we compare the mean outcomes for 532 members to 411 members.

(2) For a supplementary training in horticulture, we compare the mean outcomes for 206 members against 737 members.

Analytical strategy…….

(3) For a supplementary training in poultry, we compare the mean outcomes for 321 members against 622 members.

(4) For a supplementary training in piggery, we compare the mean outcomes for 32 members against 911 members.

Results

R1: soft skills training + information provision increases participation in poultry keeping, goats rearing and trade in farm produce

Agribusiness activities	Trained N = 532	Non-Trained N = 411	Differences	P-values
Fruits	0.158	0.127	-0.031	0.174
Vegetable	0.171	0.158	-0.013	0.398
Piggery	0.273	0.228	-0.046	0.105
Poultry	0.545	0.426	-0.119	0.000
Cattle rearing	0.156	0.161	0.005	0.849
Goats rearing	0.164	0.124	-0.039	0.089
Trade in farm produce	0.019	0.005	-0.014	0.059
Sale of farm inputs	0.006	0.007	0.002	0.751

Does a training in agronomic skills impact on agribusiness uptake and household turnover?

- R2a: Supplementary training in horticulture increased participation of women and youths in the growing of watermelon and onions.

Crops	Trained in horticulture N = 286	Non-Trained N = 757	Differences	P-values
Watermelon	0.092	0.007	-0.085	0.000
Onions	0.126	0.012	-0.114	0.000
Green peppers	0.019	0.009	-0.01	0.242

- ***Still……..***

- R2b: Earnings from the sale of watermelon and onions increased significantly for women and youths who received supplementary training in horticulture.

Crops	Trained N = 206	Non-Trained N = 737	Differences	P-values
Watermelon	41,019.42	108.55	-40,910.87	0.000
Onions	44,495.15	1,492.55	-43,002.61	0.000
Green pepper	-	1,088.46	1,088.46	0.450

R2c: But, their participation in the growing of fruits and vegetables, poultry keeping, goats rearing and trading in farm produce and inputs also increased.

Agribusiness activities	Trained N = 206	Non-Trained N = 737	Differences	P-values
Fruits	0.184	0.120	-0.064	0.021
Vegetables	0.252	0.141	-0.111	0.000
Piggery	0.291	0.242	-0.050	0.147
Poultry	0.553	0.476	-0.077	0.050
Cattle rearing	0.160	0.157	-0.003	0.923
Goats rearing	0.204	0.130	-0.074	0.008
Trade in farm produce	0.024	0.009	-0.015	0.095
Sale of farm inputs	0.015	0.004	-0.010	0.094

- R3: Supplementary training in poultry significantly: 1) increased poultry meat and eggs production (Upper table) and

Poultry products	Trained N = 321	Non-Trained N = 622	Differences	P-values
Poultry meat production	0.109	0.045	-0.064	0.000
Eggs production	0.115	0.045	-0.07	0.000

2) changed the poultry farmers' earnings (Lower table)

Poultry products	Trained N = 321	Non-Trained N = 622	Differences	P-values
Poultry meat	0.212	0.092	-0.120	0.003
Eggs production	0.202	0.088	-0.114	0.006

- R4: Supplementary training in piggery significantly increased pork production and piggery farmers' earnings

Piggery	Trained N = 32	Non-Trained N = 911	Differences	P-values
Piggery (pork) production	0.188	0.033	-0.155	0.000
Turnover from piggery	0.313	0.079	-0.233	0.012

Which crops are engaged more after providing simple information?

- R5: Providing simple information increased participation of women and youths in the growing of millet, sweet potatoes, cassava, cow peas, beans, ground nuts, choroko, tomatoes and citrus.

Crops	Trained N = 332	Non-Trained N = 421	Differences	P-values
Rice	0.107	0.105	-0.003	0.901
Maize	0.827	0.786	-0.041	0.111
Millet	0.479	0.418	-0.061	0.063
Sorghum	0.468	0.467	-0.001	0.978
Sweet potatoes	0.532	0.455	-0.077	0.019
Cassava	0.769	0.642	-0.126	0.000
Cow peas	0.222	0.148	-0.073	0.004
Beans	0.291	0.170	-0.121	0.000
Soya beans	0.152	0.129	-0.023	0.310
Groundnuts	0.425	0.302	-0.123	0.000
Choroko (Green grams)	0.376	0.273	-0.103	0.001
Sim sim	0.286	0.282	0.004	0.883
Tomatoes	0.117	0.068	-0.048	0.012
Citrus	0.083	0.051	-0.032	0.058

Conclusions and Recommendations

- With a high unemployment of close to 13% percent of the active labour force in the country, developing agriculture beyond farming becomes a prerequisite for the nation's prosperity.
- This requires not only mechanising of the sector but also unlocking agribusiness opportunities to full potential.
- However, developing and promoting agribusiness activities in the country is still constrained by the narrow stock of agronomic skills, soft skills and information owned by farmers more especially in rural areas.

- In this study, we tested, using a RCT for the impact of agronomic skills training, soft skills training and information provision (information relating to activities and crops that can provide a potential for agribusiness) to agribusiness uptake in rural Uganda.
- We find evidence that training people in agronomic and soft skills increases their uptake of agribusiness activities.

We also find evidence that mere provision of information relating to activities and/or crops that can provide a potential for agribusiness can also raise thier participation in agribusiness

This far, to unlock the agribusiness opportunities in the country, we recommend for:

- Increased sensitization among farmers about the potential of agriculture beyond farming.

- Increased investment in agronomic skills and soft skills training so as to boost agribusiness uptake.
- Increased investment in value addition practices as this will help to increase on the farmers' turnover.
- Persistent guidance to farmers about the changing agribusiness opportunities — location specific .

ANNEX 15: Speech from the Permanent Secretary Ministry of Agriculture Animal Husbandry Industry and Fisheries

The Republic of Uganda

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

PERMANENT SECRETARY'S WRAP UP AT THE DISSEMINATION WORKSHOP ON

"ENHANCING AGRIBUSINESS ECONOMIC OPPORTUNITIES OF WOMEN AND YOUTH IN RURAL UGANDA. THE IMPACT OF AGRONOMICAL AND SOFT SKILLS TRAINING"

VENUE: CENTRE FOR BASIC RESEARCH,
15 BASKERVILLE AVENUE,KOLOLO

05 MARCH, 2021

(Protocol)

Background of MAAIF

The main objectives of the Agricultural chapter in Third National Development Plan (NDP III) can be summarized as:

i. The need to increase production and productivity for each of the national priority commodities
ii. Create an integration between production systems and players with value addition for each value chain for export promotion and import substitution.
iii. Encouraging the entrepreneur class to join the integration.

This can contribute to the attainment of the middle-income status for our country and to ensure that all the population is food secure and can attain enough household income through Agriculture. All these can be attained through transformation of agriculture from subsistence to commercial farming (MAAIF mission). This agricultural production has to be competitive, profitable and sustainable (MAAIF vision).

The NDPIII has a target of reducing the level of farmers under subsistence Agriculture from the current 68% to 55% in five (5) years; time, then from 55% to 35% in the next ten (10) years. Therefore, there is need to focus on issues that commercialize Agriculture per value chain.

MAAIF IN THE AGRO INDUSTRIALIZATION PROGRAM

Agro-industrialization is key in NDPIII. The Ministry of Agriculture; Animal

Industry and Fisheries will play a leading role in the AgroIndustrialization Program Implementation. MAAIF is hosting the Secretariat for the Agro Industrialisation Programme.

Priority commodities under the Agro-Industrialisation Programme

Implementation of the strategic objectives in the Agro-industrialisation programme will entail an all-inclusive approach that provides support to both the public and private sectors to spur growth across identified

Agricultural commodity value chains. These commodities include

- Bananas,
- Cassava,
- Beans,
- Maize,
- Irish potatoes,
- Sweet potatoes,
- Millet,
- Cattle for beef and leather,
- Cattle for dairy products,
- Fish,
- Coffee,
- Tea,
- Cocoa,
- Textiles (cotton),
- Fruits and vegetables,
- Cashew nuts
- Hass Avocado and Macadamia.

THE STRATEGIC DIRECTION FOR MAAIF UNDER NDP III

The general direction of MAAIF under the NDP III is to assist Ugandans to move from subsistence to commercial farming as already stated above and also de-risking Agribusiness to support commercialisation of Agriculture.

In order to commercialize farming; MAAIF under NDP III will focus on **two** main issues of making the agribusinesses more profitable and attractive for investment;

i. **De-risking Agriculture enterprises at all levels** which will only be achieved by addressing the following;

- Dependence on nature for production despite climate changes (supporting irrigation, fertilizer use)

- Lack of adequate quantities of quality agriculture inputs on the market (supporting research in improved breeding, supporting seed multiplication by the private sector, enhancing inspection, certification and other quality assurance initiatives for agriculture inputs)

- Lack of adequate farming skills for farmers at all production levels

ii. **Supporting the creation of adequate markets for various priority enterprises** (emphasis in all our interventions need to follow a commodity approach).

Issues that will create adequate markets for farmers' produce that Government will focus on are:

- Creation of enabling environment for value chain focused national, regional, Sub County, and parish bulking centres.

All the above will be solved through creating incentives that are value chain focused; these will include production support incentives in the following areas:

- Research,
- Input breeding,
- Input multiplication,
- Input quality assurance,

- Production enhancement support initiatives (irrigation, fertilizers etc.),
- Commodity focused mechanization at all levels of the value chains,
- Standards support and quality assurance initiatives,
- Farmer mobilization for production and collective marketing,
- Value chain focused agriculture financing and insurance packages recognizing finance needs for the different categories of farmers; and
- Supporting the creation of a robust farm management and value chain focused artisan training programs for both extension workers and famers to improve the skills of farmers, farm workers, agribusiness owners and other participants in the various value chains.

WRAP UP

The Centre for Basic Research (CBR) under the funding of International Development Research Centre (IDRC) carried out a research to establish the setbacks of women and youths in agribusiness and also provide training and hands-on skills in developing profitable and sustainable agribusiness enterprises. It is noted that the key findings from this research are:

- Training of women and youth in improved agronomic skills and soft skills increases their engagement in agribusiness enterprises and also increases their earnings from the sale of their farm produce.
- Providing of simple information about specific activities and crops that can provide agribusiness opportunities also increases their participation in such activities and crop growing.

I would like to bring to your attention that these findings are in line with MAAIF vision and mission. The increased investment in training of farmers to get better knowledge in farming as a business, increased investment in value addition for higher turnover is key in the agroindustrialization of the NDPIII.

As a Ministry, we are supposed to provide an enabling environment and policy guidance for the business community and the farming community in general to engage in production, value addition and marketing of Agriculture produce.

Possible Areas of Collaboration between MAAIF & Center for Basic Research (CBR)

1. Research

MDAs can cooperate with CBR in areas of research. The two can have areas which need to be researched on and the duo can partner that way.

2. Dissemination of Research:

The CBR may have researched areas and they can up with findings that can be disseminated in the Ministry. At Ministry level this dissemination is possible through the Extension Department. The areas of research may include but not limited to issues like; -Poverty, Food nutrition and security, -Yield enhancing technologies to increase productivity, -Participation of women, youth and marginalized groups in agricultural production

-Agricultural Value chain production

-Water for Agricultural production

-Post harvest handling and marketing strategies

-Agricultural Mechanization

-Sustainable Land Management

3. MAAIF training institutions

MAAIF has institutions where training can be carried out. These include; Fisheries Training Institute, National Agricultural Research Laboratories (NaRL), Kawanda and National Farmers Leadership Centre (NFLC), Kampiringisa.

Exchange visits would be another opportunity to learn from by the Center for Basic Research (CBR).

4. Memorandum of Understanding

A Memorandum of Understanding between MAAIF and Centre for Basic Research (CBR) can be set up for the collaboration

THANK YOU

ANNEX 16: Policy Brief