



EVALUATION OF EAST WEST SEED KNOWLEDGE TRANSFER EXTENSION SERVICES IN THE VEGETABLE SECTOR IN NORTHERN UGANDA



Prepared by



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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	1
LIST OF TABLES.....	4
LIST OF FIGURES	4
EXECUTIVE SUMMARY	5
LIST OF ACRONYMS	8
1.0 INTRODUCTION	8
2.0 METHODOLOGY	9
3.0: EVALUATION FINDINGS.....	12
3.1 PRACTICES PROMOTED AND SUPPORTED.....	12
3.2 GOVERNANCE AND MEMBERSHIP OF THE GROUPS.....	12
3.3 RELEVANCE OF THE APPROACH.....	13
3.4 EFFECTIVENESS OF THE PROJECT	13
3.4.1 ACHIEVING PROJECT TARGETS/OBJECTIVES.....	13
3.5 EFFICIENCY OF EWS-KT APPROACH	14
3.6 IMPACT OF THE EWS-KT APPROACH	15
3.6.1 IMPACT OF EWS-KT APPROACH ON AVERAGE CROP ACREAGE, YIELDS AND INCOME	18
3.7 SUSTAINABILITY OF EWS-KT APPROACH	18
3.7.1 DIFFUSION OF PROJECT BENEFITS.....	19
4.0: LESSONS, CONCLUSIONS AND RECOMMENDATIONS.....	20
4.1 LESSONS (WHAT HAS WORKED, WHAT HAS NOT WORKED AND WHAT NEEDS TO BE UP SCALED)	20
4.1.1 WHAT HAS WORKED?	20
4.1.2 WHAT DID NOT WORK?.....	21
4.1.3 WHAT NEEDS TO BE DONE TO SCALE UP?	21
4.2: CONCLUSIONS AND RECOMMENDATIONS	22
4.2.1 CONCLUSIONS	22
4.2.2 RECOMMENDATIONS.....	22
REFERENCES	23
ANNEXES:	24
ANNEX 1: FARMER SUCCESS STORIES AS A RESULT OF THE INTERVENTION.....	24
ANNEX 2: QUESTIONNAIRE.....	27
ANNEX 3: TERMS OF REFERENCE	34

List of tables

Table 1: The effectiveness of the project in meeting targets	14
Table 2: Efficiency estimates of EWS-KT approach.....	15
Table 3: Changes attributed to participating in activities of EWS-KT Approaches	16
Table 4: Trend of income from vegetables after training	18
Table 5: Changes in yield crop income and acreage as a result of demonstration gardens approach.....	18
Table 6: Other institutions supporting farmers in vegetable growing	19

List of figures

Figure 1: Proportion of farmers using promoted technologies	12
Figure 2: Proportion of trained farmers who belong to a farmer group	13
Figure 3: Showing the percentage of training sites set up per crop	14
Figure 4: Showing trend of market of vegetables after training.....	18
Figure 5: Showing sources of information by farmers	20

EXECUTIVE SUMMARY

East-West Seed Knowledge Transfer (The non-profit foundation of East-West Seed), facilitates development and strengthening of the vegetable value chain through climate smart extension services that bring profitability to small holder farmers. This is done by combining better skills and technology with good seeds accompanied by engagement of the market and agro-input dealers. East-West Seed (EWS) has 38 years of experience in market-oriented plant breeding for vegetable seeds in the tropics. In 2017 EWS-KT teamed up with the University of Wageningen's Integrated Seed Sector Development (ISSD) to implement extension services in the vegetable sector in Northern Uganda (Lira and Gulu) to catalyze the emergence/strengthening of vegetable value chains in the districts. Using the strategy of utilising key farmers to establish field demonstrations (with each demo reaching 20-30 farmers) which align to the specific needs of each farming community, core group farmers were intensively trained to meet supply requirements focused on continuity, quantity and quality of products over at least two cropping seasons. This was complemented by allied engagement of agro-input dealers and marketers.

However, mixed results have been reported about the relevance, effectiveness and efficiency of EWS-KT approach in causing positive impact and sustainability among target groups. As such, EWS-KT commissioned a study to evaluate how and to what extent the approach has been in contributing to EWS business plan results, and to provide a guide on replication and/or improvement of the approach.

The objectives of the evaluation were to assess the effectiveness, impact (assess positive and negative changes produced by the project interventions, directly or indirectly, intended or unintended) through success stories and a detailed report; and formulate lessons learned and recommendations on what can be scaled up and necessary improvements.

The study was conducted in the districts of Gulu and Lira where the vegetable project was implemented from 2018 to mid-2020. Purposive, simple random and snowball sampling techniques were used to select the respondents where 383 respondents were interviewed of which 185 were trained vegetable farmers and 198 were non-trained vegetable farmers. A combination of data collection methods was employed which included individual interviews, key informant interviews and focus group discussions was used in data collection.

Mixed methods with both qualitative and quantitative techniques were used in data analysis. The overall analysis and presentation of results was made with reference to adapted OECD-DAC evaluation criteria for relevance, effectiveness, efficiency, impact and sustainability of projects. Results of the evaluation indicate that EWS-KT approach is relevant, effective and efficient. It has caused positive impact and to a large extent it is sustainable. The objective of EWS-KT approach of increasing incomes and food basket is in line with the national policy. The approach focuses on activities that directly address smallholders' needs of increased production and volumes marketed, and access to profitable markets. Farmers get trainings and extension services, access high price markets, and to some extent inputs. As such, the approach is considered relevant.

To a large extent, EWS-KT achieved its all objectives. Farmers accessed the promoted practices/technologies through participating in training. About 82.45% of farmers voluntarily participated in the training. Results reveal that farmers that participated in the training have adopted improved technologies compared to their counterparts who did not participate. Farmers are using improved seeds (62%), trellising tomatoes (50%), mulching (41%), use of fertilizers (47%) and planting on ridges (45%). With quite different with their counterparts who did not receive any training.

As for effectiveness, the project achieved all its targets exceedingly up to 115% of intended beneficiaries. The number of training sessions conducted and training sites set up were also achieved to the tune of 101% and 100% respectively. The number of varieties introduced were achieved up to 141% target. The approach is efficient with a benefit cost ratio of 7.35 as a viability index.

Additionally, the project has positively impacted the livelihoods of the community in the project areas. For example, about 62.24% of respondents confirmed increased food access at household level as contributed by the project. Also, 69.01% reported farm productivity, 70.05% reported farm profits, increased income sources (64.06%) and access to higher and better price (58.59%) among others.

Relatedly, there are notable changes in crop production acreages and yields. For example, both cabbages and tomatoes increased by 167% and 168% respectively after training while land size for tomatoes increased by 135% and cabbages by 118%.

In evaluating sustainability of the approach, we considered, among others, the strategies the approach used to ensure inclusion and how well the approach has integrated with national systems. Over 40 community-based volunteer trainers (CBVTs) trained in Gulu and Lira who are currently training and offering advice to farmers with in their communities on vegetable. These CBVTs have taken their own initiative to form vegetable associations to help them stick together, enable them lobby and also ensure there is continuity in what they are doing with or without external help. Other institutions supporting vegetable growing include; district local government/OWC among others

However, more trainings need to be conducted on production planning so that farmers are not frustrated by a problem of prices fluctuations that is currently observed as the major hindrance. This will help farmers, produce right quantities at the right time hence meeting better markets and returns on investment.

In order to improve the relevance, effectiveness, efficiency, impact and sustainability of EWS-KT approach, the following is recommended:

- i. The structure and legality of groups should be streamlined to allow them to operate as independent entities to manage and execute contracts with other organizations that may increase their leverage for sustainability.
- ii. There is need to engage local governments (specifically districts production departments) to incorporate vegetable production activities in their budget. This is important for scaling out and for sustainability but also for reducing cost of production specifically providing free inspection to vegetable growers.

- iii. Further sensitization with emphasis on demonstration gardens that exhibit the understanding of improved methods and varieties of vegetables could increase awareness and consequently adoption of technologies.
- iv. Formation of partnerships at local economy between local governments, NGOs and private sector players to sensitize farmers about the importance of growing improved vegetables and their marketability could improve livelihoods.
- v. Reliable markets for vegetables will encourage farmers to invest in vegetables production. There is need to develop the vegetables value chain by engaging key stakeholders and actors including NGOs, local agro-processing industries and schools that purchase vegetables with strict quality standards thus creating backward linkage for the sector.
- vi. Current and potential members of the approach should be continuously trained on good agronomic practices, post-harvest handling and business skills, and provision of key services such as access to credit facilities, timely market information and market for members' produce should be continuously supported.
- vii. Farmers should be encouraged to establish other income generating activities apart from farming so that they are able to obtain extra income that can supplement vegetable sales income
- viii. Finally, in order to ensure sustainability and a greater impact on effectiveness, efficiency, relevance and impact of EWS-KT approach all the stakeholders should be coordinated; EWS-KT and Ministry of agriculture animal industries and fisheries (MAAIF) could take lead in initiating the necessary coordination.

List of Acronyms

CAN	Calcium Ammonium Nitrate
DAC	Development Assistance Committee
EWS	East West Seed
EWS-KT	East West Seed Knowledge Transfer
GAPs	Good Agronomic Practices
Ha	Hectares
ISSD	Integrated Seed Sector Development
MAAIF	Ministry of Agriculture Animal Industries and Fisheries
MOP	Muriate of Potash
MT	Metric Tons
NDPII	Second National Development Plan
NGOs	Non-Governmental Organizations
NPK	Nitrogen Potassium Phosphorous
ODK	Open Data Kit
OECD	Organisation for Economic Co-operation and Development
OWC	Operation Wealth Creation
SACCOs	Savings and Credit Cooperatives
SPSS	Statistical Package for Social Sciences
VSLAs	Village Saving and Lending Associations

1.0 INTRODUCTION

1.1 Background information

East-West Seed Knowledge Transfer (The non-profit foundation of East-West Seed), facilitates development and strengthening of the vegetable value chain through climate smart extension services that bring profitability to small holder farmers. This is done by combining better skills and technology with good seeds accompanied by engagement of the market and agro-input dealers. East-West Seed (EWS) has 38 years of experience in market-oriented plant breeding for vegetable seeds in the tropics. Working in emerging economies, EWS has a unique focus on smallholder farmers, who are the main clients of the company. EWS has developed lead positions in Southeast Asia as well as rapidly expanding markets in India, Africa and Latin America. Recognizing that farmers need access to quality seeds and knowledge on how to grow crops, EWS has supported intensive farmer training programs since 2000 - as an essential core to its business model.

In 2017 EWS-KT teamed up with the University of Wageningen's Integrated Seed Sector Development (ISSD) to implement extension services in the vegetable sector in Northern Uganda (Lira and Gulu.) to catalyze the emergence/strengthening of vegetable value chains in the districts. Using the strategy of utilising key farmers to establish field demonstrations (with each demo reaching 20-30 farmers) which align to the specific needs of each farming community, core group farmers were intensively trained to meet supply requirements focused on continuity, quantity and quality of products over at least two

cropping seasons. This was complemented by allied engagement of agro-input dealers and marketers.

1.2 Project Background

Northern Uganda, with a population of 5.8 million people, is an area that needs a major boost in its struggling economy. The area has a large rural population and historically known as the "Wild North" where rebel activity only ended less than two decades ago, it is an area that is slowly finding its feet. Over 70% the population is rural and relies on subsistence farming. The majority of the people are poor, living on less than USD1 a day. The area has a history of importing vegetables from other regions and yet it can become a vegetable hub that can supply the region and the rest of this country.

1.3 Objectives of the study

The purpose of the study to evaluate the effectiveness and impact of EWS-KT interventions implemented in Gulu and Lira from the years 2017 to 2020. The focus will be on assessing the effectiveness, impact (assess positive and negative changes produced by the project interventions, directly or indirectly, intended or unintended) through success stories and a detailed report.

1.4 Scope of work

The review covered following tasks:

- i. Efficiency – Assess how economically resources/inputs (funds, expertise, time, etc) are converted to results/outputs)
- ii. Effectiveness – The extent to which the project's objective have been achieved taking the limited operational time period into consideration

- iii. Impact – Assess if possible, the project’s positive and negative impacts - primary and secondary, directly or indirectly, intended or unintended
- iv. Relevance – Assess to which extent the objectives of the project are consistent with beneficiaries’ requirements, country needs, global priorities and partners’ and donor’ priorities)
- v. Sustainability – Assess if possible, if the project’s benefits will continue after the development assistance has been stopped - the probability of continued long-term benefits)
- vi. What success stories emerged from the project?

1.5 Indicators to evaluate the intervention

The following key indicators were used to the intervention;

- i. Number of vegetable producers that received training at the training sites
- ii. Number of training sites set up
- iii. Number of vegetable farmers who attended field days
- iv. Number of varieties introduced per crop from June 2017 to June 2020
- v. Estimated Number of vegetable producers using advanced varieties
- vi. Difference in productivity as a result of varieties and technologies promoted and those previously used (yield benefit in MT/Ha) for; Tomatoes, Onions, Cabbage and Egg plants
- vii. Income (net benefits) per household per crop cycle: difference between cost of production and price
- viii. Additional costs incurred from using advanced technologies versus previously used technologies

- ix. Trends/Changes in business flow since start of the project

2.0 METHODOLOGY

The evaluation team employed a multi-sponged approach that captured both qualitative and quantitative data. The research methodology included review of published un- published data, bi-annual project reports, seasonal reflection reports as well as conducting key informant interviews, farmer surveys and focus group discussions. This was in addition to cross sectional walks within the locations whilst making observations to the existing socio economic and farm technologies adopted.

2.1 Literature Review

Internal EWS-KT documents were consulted and thoroughly reviewed and the following documents were reviewed between June 2017 and June 2020; Project key performance indicators, Project Proposal; End of season reflection reports available; Implementation reports (Bi-Annual reports), Project baseline reports (2018). Also, published materials including government statistics and reports such as Uganda Bureau of statistics report, government strategic plans and budget allocations. District reports and statistics such as annual reports were also reviewed.

2.2 Area covered by the study

The study was conducted in the districts of Gulu and Lira where the vegetable project was implemented from 2018 to mid-2020. Gulu district is located in the Northern region of Uganda, and it is bordered by Lamwo district to the north, Pader district and Omoro district to the east, Oyam district to the south, Nwoya district to the southwest, and Amuru district to the west. While Lira district is bordered

by Pader district to the north, Otuke district to the northeast, Alebtong district to the east, Dokolo district to the southeast, Apac district to the southwest and Kole district to the west. The main municipal, administrative and commercial centre in the district, Lira, is located 110 kilometres (68 ml), by road, southeast of Gulu, the largest city in Northern Uganda.

2.3 Sampling and Selection of Participants

The evaluation employed both probability and nonprobability sampling techniques, with probability sampling a simple random sampling technique was employed. A list of all key farmers from 2018 to 2020 who hosted training sites was provide and this list was subjected to random sampling by Ms Excel where 185 were trained farmers selected while with nonprobability sampling, snowball sampling was employed where referrals were given to enumerators of non-trained vegetable farmers within the same location as the key farmer being interviewed. A total of 383 farmers were interviewed in both Lira and Gulu districts with 185 being trained farmers and 198 being non-trained farmers.

Focus group discussions involved key informants such as farmers, district leaders, sub county local leaders, extension and community workers operating in the districts.

In addition to farmer surveys and focus group discussions, field observations were made through trans-sectional village walks and recording of the various salient issues in selected villages.

2.4 Type of data collected

The standard evaluation elements were given due consideration while taking into consideration the time and resources available. The following aspects were considered;

- Changes to policies, practice and attitudes of decision and policy makers to benefit the project’s target beneficiaries as reflected in the national and local government plans and programs.
- Measurable project contributions to the achievement of broader national and international policies, conventions, targets etc. in Uganda, Gulu and Lira districts where the project was implemented.
- Extent of the achievement of targets due to the changes/outcomes having been influenced by external context and other factors.
- The extent to which the project has achieved an economically vital/sustainable agriculture business based on the present national framework for agriculture development – independence from external assistance.

Further analysis explored aspects that reflect how the project made differences among the beneficiaries and non-beneficiaries.

- Overall theory of change for this project. Has it been effective in bringing about lasting change? Were there any gaps?
- The most effective methodologies and approaches the EWS-KT used to bring about changes to people’s lives. What has worked and what has not? Lessons learned.
- Effectiveness of the project’s management, monitoring, learning and financial systems. How have they helped or hindered the delivery of lasting change?
- Has the project been cost effective?

2.5 Data collection methods

Methods of collecting primary data included individual interviews through surveys, Focus

Group Discussions, Key Informant Interviews and field observations.

(a) Individual interviews

Using a pre-tested questionnaire, face-to-face interviews with the sampled individuals were conducted by the trained enumerators and the staff of the Consultant team. He/she was interviewed upon consent, otherwise the

(b) Focus Group Discussions

The selected respondents for the group discussions were mobilized and met at agreed time and venue of convenience. Using a checklist, the discussions were facilitated/led by one of the Consultant team members/enumerators, with at least one other member recording the discussions. As much as possible, the discussions were conducted in the (local) language well understood by the respondents.

(c) Key Informants Interviews

In the two districts where farmer groups were supported, key informants' interviews were conducted by the key staff of the Consultant team on appointments with the Informants.

(d) Field observations

As much as possible, field observations were made partly to collect information that could not have been captured by the data collection tools, and partly to validate the responses given by the interviewees.

2.6 Data processing and analysis

Data were cleaned before processing for analysis, MS Excel, SPSS (Version 25), and

individual would be replaced. The interviews were supervised by the key staff of the Consultant team. As much as possible, the respondent was interviewed in the language he/she is most comfortable with. This necessitated an interpreter in cases where the enumerator and respondent did not have a common language of communication.

STATA 13 computer software were used for analysis. Different analytical approaches were used depending on the study parameters as indicated in the subsequent sections. Descriptive statistics such as percentages, means, chi-square and t-tests were used to assess changes in outcome indicators at farmer level as a result of the project. Regression analysis was done to help us in assessing the adoption driving factors. Qualitative data from FGD and KII were analysed using content and narrative analysis. From each district we identified common responses and patterns in answering the specific research questions.

2.7 Data Quality Assurance

The evaluation team took a number of measures so that data is collected, managed and analyzed in a manner that guarantees quality. The first step was to ensure that the objectives and hence reasons for collection of data are clear to all involved (evaluators and enumerators). Second was training of persons involved to ensure common understanding of questions to be asked and how sections in the questionnaires are linked and what the questions mean. The third step was the piloting phase and finally, clear protocols to be followed in data collection were developed.

3.0: EVALUATION FINDINGS

3.1 Practices promoted and supported

East-west seed knowledge transfer facilitated implementation of extension services in the vegetable sector in Northern Uganda (Lira and Gulu) to promote the use of advanced vegetable varieties, aimed at improving household nutrition and increasing earnings from vegetable production. This has been done through training of different farmer groups to meet supply requirements focused on continuity, quantity and quality of products over at least two cropping seasons. Farmers access the promoted practices through regular participation in trainings offered by different institutions. Across the study area, our findings indicate that 82.45% of the farmers voluntarily participate in the trainings in the last 2 years. Before trainings, farmers mainly practiced good agronomic practices (GAPs) like mulching (19.72%), timely planting (14.08%), and constructing raised ground nurseries (11.27%). The results clearly show that farmers who participated in the trainings have adopted improved technologies compared to non-trained farmer (control group). Through regular participation, farmers learnt GAPs and have now adopted practices and technologies like using improved seeds (62%), Trellising tomatoes (50%), Mulching (41%), Using of fertilizers like CAN, MOP or NPK (47%), and Planting on ridges (45%) as shown Figure 1.

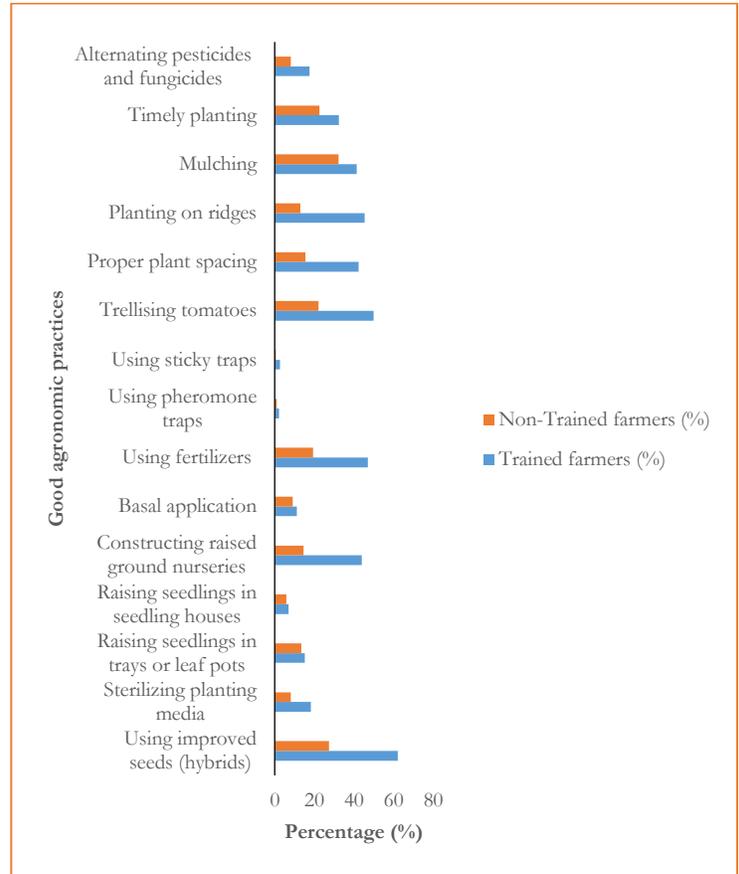


Figure 1: Proportion of farmers using promoted technologies

3.2 Governance and membership of the groups

Results show that 60.75% of the farmers that were trained were members of farmer groups and they meet weekly for meetings. The groups have well-structured administrative leadership. Each group has at least the chairperson, vice chairperson, the secretary and the treasurer among others. Each of the respective positions on the structure has defined roles but the chairperson is meant to coordinate and mobilize other members. Figure 2 below indicates the proportion of farmers interviewed that belonged to the groups.

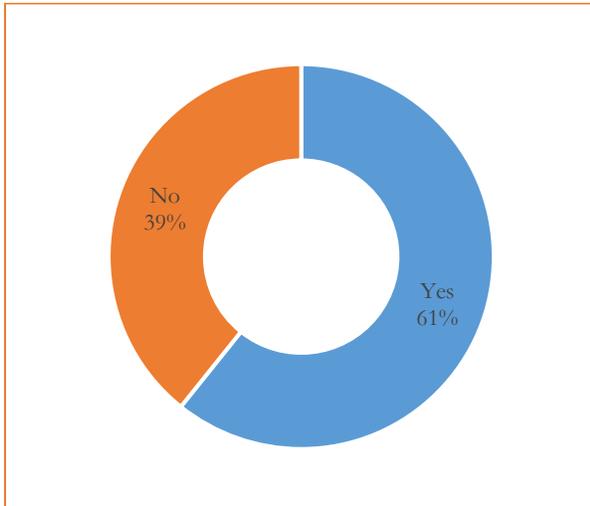


Figure 2: Proportion of trained farmers who belong to a farmer group

3.3 Relevance of the approach

Review of project documents and interactions with key stakeholders indicate that the project;

- **Has a high national priority;** this project is consistent with the second National Development plan (NDPII) 2014/15 – 2019/20 that has identified increasing agricultural production and productivity and increase access to critical farm inputs as most important for period of five years. The plan involves improving access to fertilizers at affordable prices, in addition to providing high yielding varieties and agriculture mechanization. This is in addition to strengthening extension services. Furthermore, this project fits properly in the plan for modernization of agriculture (PMA); this holistic and multi sector framework for agriculture and rural development. PMA is anchored on 7 pillars namely; research and technology development, national agricultural advisory services, rural

finance, agro-processing and marketing, agricultural education, physical infrastructure and sustainable natural resource utilization and management.

- **Is relevant to the needs of farmers:** Introduction of climate resilient crop varieties to enhance yield, requires effective and sustained adoption of the preferred varieties involves dissemination of information about innate potential of the varieties (diseases resistance and yield) and skilling farmers with the appropriate growing techniques to enable them realize the full potential of the varieties. This project promoted the use of superior varieties through in-depth farmer training to equip farmers with skills to enable them adopt improved varieties successfully.

3.4 Effectiveness of the project

3.4.1 Achieving project targets/objectives

Effectiveness was measured as the extent to which the project's objective has been achieved with regard to set targets. A number of objectives were set at the start of this project, activities were implemented and the level of success and achievements to attain these objectives assessed as represented in Table 1.

All the project objectives were achieved and the extent of performance was exceptionally good. For instance, the project reached out to 19,255 direct beneficiaries (M= 8,826, F= 10,429), through organized trainings in Gulu and Lira districts and beyond (in Albetong, Kole and Otuke district). The target of the project has been achieved and exceeded up to 115% of

intended beneficiaries of which 54.2% were women thus indicating strong consideration of gender mainstreaming by EWS-KT used approach in implementing the project. This is a high level of achievement since most developments that achieve 60% of the intended targets are normally considered successful

(Kalyebara, 2003). It’s also worth noting that number of training sites set up and number of training sessions conducted were all achieved as originally set targets at 101% and 100% respectively.

Table 1: The effectiveness of the project in meeting targets

Indicators	Target	Achieved	Remark
Number of farmers that received training	16,750	19,255	115% exceeded target
Number of training sites set up	670	673	101% exceeded target
Training topics conducted	5	5	100% achieved
Number of varieties introduced per crop from June 2017 to June 2020	7	10	141% achieved

Although the table above (Table 1) shows that the project exceeded the targeted number of demos set up, Figure 2: below shows that 63% of the training site up were tomato demos, 12% were cabbages, 9% were eggplants and the remaining 16% was shared amongst onions, watermelon, pumpkins and sweet pepper. Tomatoes taking a lion share of demos can be attribute to majorly two facts; first is because tomatoes fetch more income compared to other crops and therefore farmers tended prefer growing tomatoes to other crops and secondly, the technical field officers might seem more comfortable and knowledgeable in tomatoes growing and this influenced farmers’ choice. Even if this was to be the case, the crop selection criteria as per the project objectives would not have been followed because a key farmer is supposed to host a different crop/enterprise for each of the two seasons, they are hosting a training site. Figure 3 below indicates crops that were mainly demonstrated by key farmers.

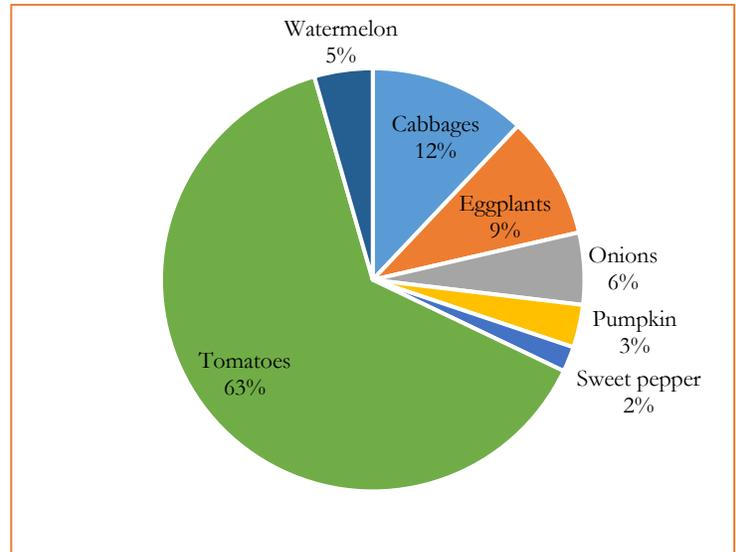


Figure 3: Showing the percentage of training sites set up per crop

3.5 Efficiency of EWS-KT Approach

The efficiency in farm production provides the basis of decision making on which farm enterprises to pursue or to abandon. The economic performance of the enterprises or systems derives from the types and quantities of

inputs used as well as the levels of innovations applied. Many tools have been developed to aid decision-making and these include gross margins, profitability, and costs. However, due to the limited availability of detailed information on farm production in rural settings, tools such as profitability are rendered incapable for comparing farm enterprises. To overcome such deficiencies, gross margin is always preferred over the other tools in assessing the efficiency of enterprises and the systems. The most appropriate way to assess the efficiency of the EWS-KT approach is to do a benefit cost analysis. The results show a benefit

cost ratio of 7.35 suggesting that the EWS-KT approach is viable, which means that with every 1 UGX of costs a benefit of 7.35 UGX is attained. To measure efficiency of the approach, we used the percentage of farmers in the different areas of the projects who reported positive change in incomes and average production costs incurred per acre. A higher positive change indicates that the project was very efficient. The results in Table 2 indicate that the approach was efficient. It is important to note that the figures were not discounted over time, given the short time of project implementation.

Table 2: Efficiency estimates of EWS-KT approach

Variables	Costs
Average production costs per acre (UGX)	534,517.0
Average income (UGX)	3,928,396
Benefit cost ratio	7.35

3.6 Impact of the EWS-KT approach

Using a scale, in reference to the various outcome indicators farmers were asked to what extent they agreed that there were perceived changes as result of training in demonstration gardens and farmer field days. Table 3 presents farmers responses to their perceived changes as result of project contribution. About 62.24%, agreed that trainings contributed to increased food in the community (increased food in my household (61.46%), adoption of improved crop varieties in the community (60.94%), protection and improvement of natural resources for example growing of trees (68.23%), use of better farming practices (65.63%), Increased credit access (53.91%), Increased savings (57.81%), Improved farm profits (70.05%), Increased income sources (64.06%), Increased income in your household (64.84%), Increased acreage for major crops (64.32%), Improved farm output (67.71%), Improved farm productivity (69.01%), Improved volumes sold (64.06%), Reduced post-harvest losses (55.47%), Increased asset accumulation (54.95%), educating your children (61.98%), maintaining good health for you and for other household members (70.57%), marketing/selling your produce at a higher price (58.59%), peace and harmony in your household (73.18%), Demonstration gardens in your area have also benefited those who did not participate (54.69%). Respondents also revealed that participation in training sessions and farmer field days did not contribute towards increased the number of workers a farmer employs (34.38%).

Table 3: Changes attributed to participating in activities of EWS-KT Approaches

<i>Statement: Your membership in a group supported by the EWS-KT has contributed to...</i>	Pooled sample (% of farmers)					Trained farmers (% of farmers)					Non-trained farmers (% of farmers)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Contributed to increased food in the community?	0.00	1.30	4.17	62.24	32.29	0.00	1.08	3.23	52.69	43.01	0.00	1.52	5.05	71.21	22.22
Contributed to increased food in my household?	0.00	1.30	3.39	61.46	33.85	0.00	0.54	2.69	51.61	45.16	0.00	2.02	4.04	70.71	23.23
Contributed to adoption of improved crop varieties in the community?	0.26	3.13	6.51	60.94	29.17	0.54	1.61	2.69	55.91	39.25	0.00	4.55	10.10	65.66	19.70
Contributed to protection and improvement of natural resources e.g growing of trees	0.78	3.91	7.29	68.23	19.79	0.54	3.76	4.84	62.90	27.96	1.01	4.04	9.60	73.23	12.12
Contributed to use of better farming practices	0.52	2.34	5.47	65.63	26.04	0.00	0.54	2.15	60.75	36.56	1.01	4.04	8.59	70.20	16.16
Increased credit access	7.29	14.32	11.72	53.91	12.76	1.61	7.53	12.90	56.45	21.51	12.63	20.71	10.61	51.52	4.55
Increased savings	2.34	5.99	7.81	57.81	26.04	1.08	2.69	5.38	52.69	38.17	3.54	9.09	10.10	62.63	14.65
Improved farm profits	0.52	3.39	11.46	70.05	14.58	0.54	1.08	6.45	68.82	23.12	0.51	5.56	16.16	71.21	6.57
Increased income sources (specify)	2.60	3.91	9.38	64.06	20.05	0.00	3.76	8.06	58.06	30.11	5.05	4.04	10.61	69.70	10.61
Increased income in your household?	0.78	2.86	8.33	64.84	23.18	1.08	1.08	4.30	55.91	37.63	0.51	4.55	12.12	73.23	9.60
Increased acreage for major crops	3.91	8.07	13.02	64.32	10.68	1.61	2.69	9.68	72.04	13.98	6.06	13.13	16.16	57.07	7.58
Improved farm output	1.30	4.69	12.76	67.71	13.54	0.54	0.54	6.99	72.04	19.89	2.02	8.59	18.18	63.64	7.58
Improved farm productivity	1.04	3.65	9.90	69.01	16.41	0.54	1.08	6.45	66.67	25.27	1.52	6.06	13.13	71.21	8.08
Improved volumes sold	0.26	3.39	10.42	64.06	21.88	0.00	1.08	3.23	65.05	30.65	0.51	5.56	17.17	63.13	13.64
Reduced post-harvest losses	4.17	11.46	16.67	55.47	12.24	2.69	6.45	13.98	54.84	22.04	5.56	16.16	19.19	56.06	3.03
Increased number of workers you employ (skilled)	19.53	26.04	9.90	34.38	10.16	14.52	24.73	7.53	38.17	15.05	24.24	27.27	12.12	30.81	5.56
Increased asset accumulation	3.91	7.29	12.24	54.95	21.61	2.15	3.76	6.45	56.45	31.18	5.56	10.61	17.68	53.54	12.63
Contributed to educating your children?	1.56	1.56	8.59	61.98	26.30	0.54	1.08	4.30	57.53	36.56	2.53	2.02	12.63	66.16	16.67
Contributed to maintaining good health for you and for other	0.26	0.00	5.73	70.57	23.44	0.54	0.00	3.23	64.52	31.72	0.00	0.00	8.08	76.26	15.66

household members															
Contributed to marketing /selling your produce at a higher price?	0.26	6.25	16.93	58.59	17.97	0.00	3.76	9.68	58.60	27.96	0.51	8.59	23.74	58.59	8.59
Contributed to peace and harmony in your household?	0.26	1.04	5.47	73.18	20.05	0.54	0.00	4.30	63.98	31.18	0.00	2.02	6.57	81.82	9.60
Contributed to misunderstanding between you and your spouse?	40.63	42.19	6.25	9.90	1.04	46.24	40.86	2.15	9.68	1.08	35.35	43.43	10.10	10.10	1.01
Demonstration gardens in your area have also benefited those who did not participate	0.78	1.04	4.69	54.69	38.80	0.54	0.00	1.61	54.30	43.55	1.01	2.02	7.58	55.05	34.34

Note: A 5-likert scale of 1=strongly disagree 2=I disagree 3= neither disagree nor agree 4.=agree 5= strongly

The evaluation also attempted to assess the contribution of the training to farmer's income, Table 4 indicates that 94.09% who were trained reported the trend of their income having increased.

Furthermore, Figure 4 shows about 85.48% of the trained farmers reported that the market for vegetables has increased due to trainings received.

Table 4: Trend of income from vegetables after training

Trend of income	Pooled sample (%)	Trained farmers (%)	Non-trained farmers (%)
Increased	83.07	94.09	72.73
Not changed	9.38	2.69	15.66
Decreased	0.78	0.54	1.01
Keeps fluctuating	6.77	2.69	10.61

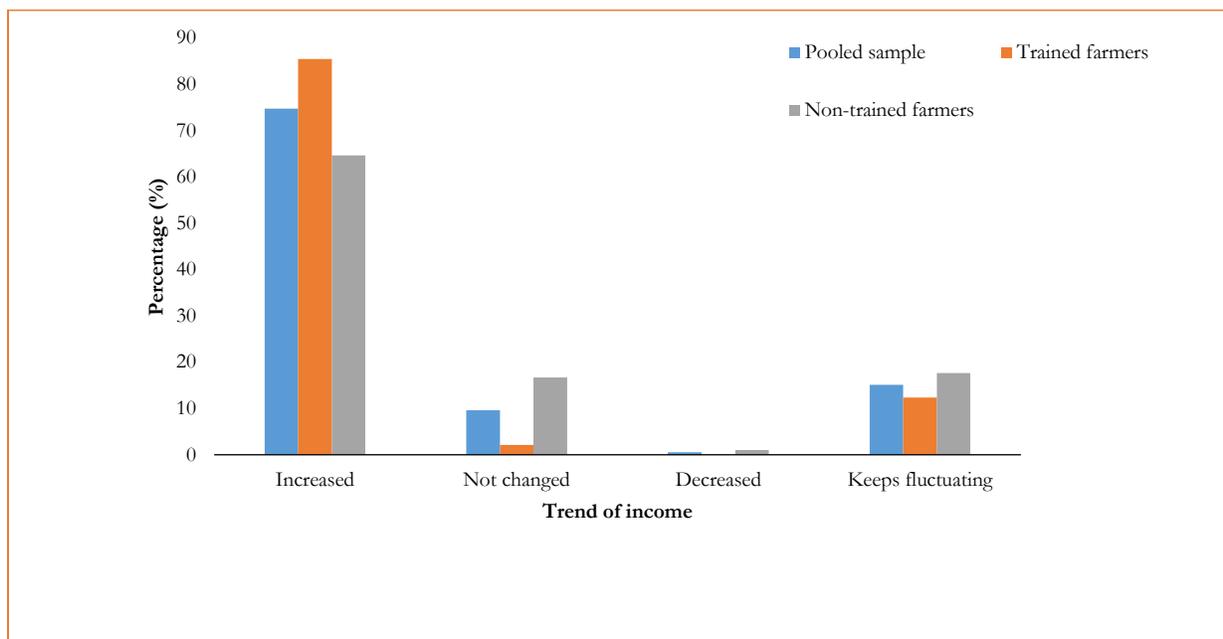


Figure 4: Showing trend of market of vegetables after training

3.6.1 Impact of EWS-KT approach on average crop acreage, yields and income

Following adoption of improved technologies and good agronomic practices, crop yields are expected to increase. We asked farmers to estimate the yield of crops before and after the training and the results are summarised in Table 5. The results reveal that yields for both cabbage and tomatoes increased by 167% and 168%, respectively, after training while the land size for tomatoes increased by 135% and cabbages increased by 118%.

Table 5: Changes in yield crop income and acreage as a result of demonstration gardens approach

Variables	Cabbage		Tomatoes	
	Pre- training	Post- training	Pre- training	Post- training
<i>Pool sample</i>				
Yield (kg)	2369.55 (6098.84)	4147.39 (9043.77)	623.14 (923.44)	1177.38 (1243.67)
Acreage	0.26 (0.23)	0.32 (0.22)	0.30 (0.17)	0.39 (0.13)
<i>Non-Trained farmers</i>				
Yield (kg)	963.18 (1341.33)	1989.00 (1873.96)	528.79 (769.83)	1153.61 (1216.88)
Acreage	0.25 (0.23)	0.30 (0.24)	0.30 (0.20)	0.38 (0.13)
<i>Trained farmers</i>				
Yield (kg)	3842.90 (8471.55)	6408.57 (12553.02)	716.43 (1049.70)	1200.89 (1276.07)
Acreage	0.28 (0.23)	0.33 (0.19)	0.29 (0.15)	0.39 (0.14)

3.7 Sustainability of EWS-KT Approach

Projects contribute significantly to growth in areas in which they are executed. However, often times achieving a systemic change of the intervention becomes difficult. When funding of a project stops, often the communities are not able to continue with the innovations. We asked farmers engaged in EWS-KT methodologies, key informants and the farming communities whether EWS-KT approach is sustainable after the EWS-KT project.

A majority of our respondents believe that some of the groups formed and their EWS-KT approach will continue to evolve. Moreover, farmers have gained skills of producing quality vegetables, there is accessible market of the vegetable and the driver of vegetables as the income source will keep the spirit. The fact that EWS-KT approach objectives are well aligned with the national priorities by producing vegetables of national and farmer priority crops provides them a sustainable market. It has also attracted support from various institutions

which can help them to sustainably produce for the market. However, to ensure sustainability and a greater impact, all the stakeholders will need coordination which is currently offered by EWS-KT.

Additionally, over 40 community-based volunteer trainers (CBVTs) trained in Gulu and Lira who are currently training and offering advice to farmers with in their communities on vegetable. These CBVTs have taken their own initiative to form vegetable associations to help them stick together, enable them lobby and also ensure there is continuity in what they are doing with or without external help.

Table 6 shows the different institutions currently supporting farmer groups involved in vegetable production. Most of the institutions/NGOs are involved in training farmers in good agronomic practices while a few offer inputs.

Table 6: Other institutions supporting farmers in vegetable growing

Institution	Crop supported	District	Support provided
District local governments, NAADS, OWC	All crops	All Districts	Seed inspection and extension services (training in GAPs), provides market for seed
Action Aid	All crops	Northern Uganda	Train youth on agriculture products
JICA	All crops	Northern Uganda	Vegetable production training
VEDCO	Indigenous crops	Gulu	Support indigenous vegetable production
Save the children	Tomatoes	Amuru, Nwoya, Gulu	Train youth on vegetable production

The farmer groups we interacted with believe that they have acquired sufficient knowledge to enable them to continue producing vegetables. However, they maintain that continuous training will be required. Further, we noted that farmer groups have established governance structures including committees with different responsibilities within the groups. For example, they have quality assurance, record keeping and marketing committees. Our findings reveal that there is increased awareness on the importance of vegetables among the communities. Although there is still need for sensitization, a considerable proportion of farmers, above 50% across the various districts, appreciate the vegetable business. This has been attributed to training by a well-equipped team under the project.

3.7.1 Diffusion of project benefits

Farming families leave and make decisions with regard to resource allocation in a complex environment driven by both internal and external factors (Walaga et al, 2000; Doppler, 2001; Regassa, 2002). For example, decisions

regarding investments in new technologies like fertilizers use and initiatives such as commercialization agriculture take into consideration several other factors. The underlying theory on factors that are thought to influence the decision to adopt is based on the understanding that farmers are rational. They form an impression of the potential costs and benefits of a candidate technology usually through their own research either by experimenting with the technology or through analysis of secondary information from early adopters and key informants in the community (Kalyebara, 1999). In economic theory the farmer is thought to optimize an objective function such as expected utility or net present value of benefits from adopting a given technology (Katwujukye, 2005). Unfortunately, these variables are unobserved by the researchers (latent). The fact that most adoption studies are done ex-ante makes the measurement problem more difficult. Even in the ex-post situation, correct measurement of these variables is problematic due to difficulties in estimating the farmer's perceptions of utility

or profit, his/her level of risk aversion, and the weights he/she puts on profitability, risk, and subsistence requirements.

The adoption decision variable is therefore cast in a framework that predicts the probability of adoption as a function of proxy factors that are likely to predict the expected values of the farmer's objective function. In this study attempts were made to understand the diffusion of conservation agriculture, and fertilizer technology in project areas. Results in Figure 5, indicate that 67.6% of the non-trained farmer got information on technologies and markets from fellow farmers which is a clear indicator that technology diffusion is easier from trained farmers of which 50% acquired information from EWS and 34.6% get their information from radios.

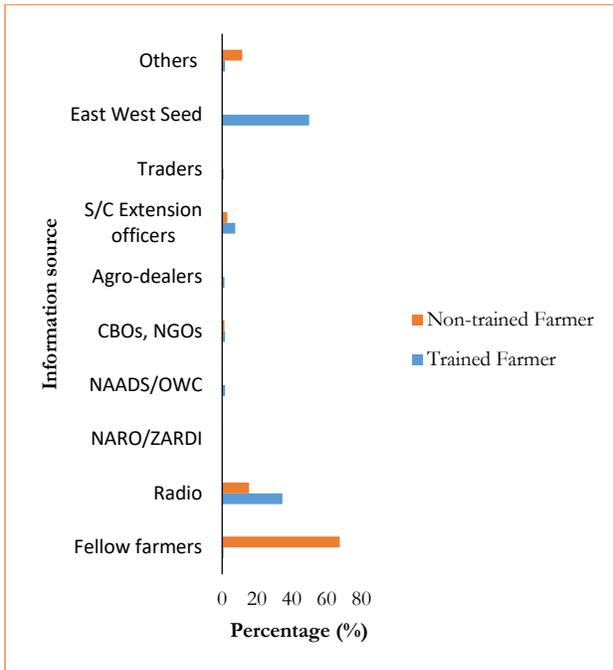


Figure 5: Showing sources of information by farmers

4.0: LESSONS, CONCLUSIONS AND RECOMMENDATIONS

4.1 Lessons (what has worked, what has not worked and what needs to be up scaled)

4.1.1 What has worked?

EWSKT has a well thought out demonstration host selection criteria which ensures proper siting and visibility of training sites thus making them more attractive and accessible to neighbouring farmers for continued learning throughout the crop cycle hence increasing chances of technology adoption by farmers.

Well elaborate training manuals like crop guides, training banners and sign boards on the demonstration gardens produced by EWS were key in delivering the right message to the farmers and in the most right way possible.

Proper preparation of technical field officers with an on-boarding programme with theoretical training by EWS academy on vegetable production and an intensive practical session on the learning plots has tremendously equipped TFOs with both practical and theoretical knowledge on vegetable production which is ably transferred to farmers.

The company embark on creative ways of reaching out to farmers and potential vegetable farmers through news feeds on local television stations, radios and print media like popularly read newspapers which tremendously increased it indirect out thus creating more awareness on vegetable production with the use of modern technologies to increase household income and nutrition

The demonstration training ratio to technical field officers (TFOs) of 1 TFO:20 demos and the working radius of 15 km with a TFO allocated a subcounty, has led to minimizing movements and creating more time for

interaction with farmers in training, mobilization and field monitoring

Breaking down contracted training sites into manageable numbers throughout the project period, increased efficiency among staff to produce quality demonstration sites and also enhanced their ability to mobilize farmers for trainings thus helping the company achieve and even exceed its contracted obligations in relation to key deliverables

Proper activity scheduling like key farmer selection, orientation, site verification, and timely planting and demonstration site monitoring has enabled the project meet all reporting deadlines set by the donors without fail.

4.1.2 What did not work?

Training sites were not evenly distributed mostly throughout Gulu district with the project intervention concentrating only in the eastern sub counties of the district. This might result into unequal distribution of knowledge in the project area, thus impeding the projects long term objectives

Results from review of literature revealed that 63% of training sites set up by the project were tomato demos, this significantly limited beneficiaries of the project to learning about one crop yet the project required farmers to be exposed to different crops per crop cycle thus breaking monotony of selecting specific crops During implementation of the intervention more emphasis on vegetable production training to improve productivity but neglected crucial subjects how to acquire credit to engage to scale up production, saving and reinvesting in farming or other undertakings in order diversify sources of income

Project implementation documents lacked important aspects like a theory of change and/or log frame that is important in describing how the project would lead to results, and help implementers think critically about this. Due to this shortfall evaluation of the intervention was also difficult

4.1.3 What needs to be done to scale up?

More trainings need to be conducted on production planning, this will enable farmers produce at the right time and cost in order to solve the problem of prices fluctuations as a result of over production thus attaining higher returns from their investment.

Dispersing areas of operation proportionately to avoid clustering of demonstration training site in one side of the parish, Sub County or district to ensure better outreach distribution. This can be achieved through proper planning through seasonal reflectional meetings with technical field officers and proper demonstration site verification before onset of the season.

Strategies need to be put in place and adhered too, to guarantee that farmers are exposed to knowledge of different vegetable crop families. This will help farmers diversify production to minimize effects of price reductions during over production buy also this will enable small holder farmers with small pieces of land to easily practice crop rotation.

More focus on gender mainstreaming in East West Seed Knowledge Transfer outreach activities can be achieved by targeting women village saving and lending association to host vegetable training sites, this will tremendously increase engagement of women participation in vegetable in project operation areas and beyond.

As evident in the rate of promoted technology adoption more time needs to be allocated to practical trainings in crop protection and fertilization to enable farmers understand these topics better since they play a vital role in enabling farmers improve their production efficiency

A special program should be designed for agro-input dealers as a strategy of enhancing crop protection to farmers indirectly since agro-input dealers play an integral part in advising farmers on which chemicals and fungicides to use yet most of them have insufficient knowledge on pesticides and fungicides mode of action, active ingredients and how to alternate them.

There is need to intensify collaboration with farmer groups at sub-county, parish and village level. This can help in increasing outreach since those groups already have the numbers and can easily mobilize the community members of where they operate from as compared to what the technical field officers working in these areas. In addition, it is paramount that proper due diligence is undertaken of who is doing what where to enable the company to properly partner with like-minded NGO's or companies in ensuring that vegetable production knowledge is properly disseminated to the right audiences which has been lacking in the previous project.

4.2: CONCLUSIONS AND RECOMMENDATIONS

4.2.1 Conclusions

This report presents evidence from various data sources to answer the key questions on effectiveness, relevance, sustainability and impact EWS-KT approach.

Based on the fact that EWS-KT approach objectives are well aligned with the national

priorities of improving the quality and quantity of food basket, the steadily increasing number of farmers producing vegetables, and the increasing participation of various institutions in the vegetable growing model, we conclude that the approach is sustainable. However, the impact will be greater if all the stakeholders are coordinated to offer a service currently offered by EWS.

However, more training needs to be conducted on understanding the market and value chain by the farmers so that they are not frustrated by problems like price fluctuations that is currently observed as the major hindrance. This will help farmers produce right quantities at the right time hence meeting better markets and returns on investment.

4.2.2 Recommendations

Based on the findings of our evaluation, we recommend the following in order to improve the efficiency, effectiveness, relevance and impact of EWS-KT approach among the farming communities:

- i. The structure and legality of farmer groups should be streamlined to allow them to operate as independent entities to manage and execute contracts with other organizations that may increase their leverage for sustainability.
- ii. There is a need to engage local governments (specifically Districts Production Departments) to incorporate vegetable production activities in their budget. This is important for scaling out and for sustainability but also for reducing cost of production specifically providing free inspection to vegetable growers.
- iii. Further sensitization with emphasis on demonstration gardens that exhibit the

- understanding of improved methods and varieties of vegetables could increase
- iv. Formation of partnerships at local economy between local governments, NGOs and private sector players to sensitize farmers about the importance of growing improved vegetables and their marketability could improve their livelihood.
 - v. Reliable markets for vegetables will encourage farmers to invest in vegetables production. There is need to develop the vegetables value chain by engaging key stakeholders and actors including NGOs, local agro-processing industries and schools that purchase vegetables with strict quality standards thus creating backward linkage for the sector.
 - vi. Current and potential members of the approach should be continuously trained on awareness and consequently adoption of technologies.
 - vii. Farmers should be encouraged to establish other income generating activities apart from farming so that they are able to obtain extra income that can supplement vegetable sales income
 - viii. Finally, in order to ensure sustainability and a greater impact on effectiveness, efficiency, relevance and impact of EWS-KT approach all the stakeholders should be coordinated; EWS and MAAIF could take lead in initiating the necessary coordination.

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ANNEXES:

Annex 1: Farmer success stories as a result of the intervention



Mr. Okwera John Bosco a 50-year-old farmer in Cet-kana Te-okuto village, Atiaba parish, Bungatira sub-county in Gulu district is a risk taker. "I will grow tomatoes and watermelon even when drought hits said the farmer". The married father of ten children owns 10 acres of land. He further narrates "I cultivated cereals, grains and tubers for over ten years but haven't realized satisfactory benefits". He added that in his ten years of production of the above crops, he faced challenges of low yields, pest and disease invasion, intensive farm labor, low market prices, long maturity periods and lack of knowledge on proper

agronomic practices.

When knowledge transfer met him in 2018 and got trained in vegetable production protocol, he developed a passion for vegetable production. Ever since he has changed his production lifestyle from cereals, grains and tubers to vegetables due to its short maturity periods, high yields realized from hybrid/superior seeds, high market demand, dietary purpose and short income generating period.

In just on and half year of vegetable production he was able to buy 4 (four) Oxen (bulls), ox- plough. Bosco added that in 5 years to come of producing vegetables, he sees himself buying a walking tractor for scaling up vegetable cultivation, vehicle for transporting his farm produce and constructing a good house for his family. He appreciated East west seed and the donors for the knowledge transfer at grassroot level that enabled the community and himself benefit directly through trainings that has led to knowledge acquisition, improved income and livelihood.

Another interesting story is from Mrs. Adyero Nancy and her husband residents of Owoo Subcounty, Pabwo parish, Kulukeno village who in the last two seasons of producing cabbages and tomatoes thanks to the training offered by EWS-KT under the ISSD Plus vegetable project in Gulu have managed to attain return on investments worth 4,240,000/= which is far beyond than they have ever earned from farming before. The couple has also realized that off-season production attracts better prices of their produce so the couple has acquired a manual water pump with 740,000/= to help them in irrigating their field during the dry season





Meet Mr. Obong Moses a resident of Otongo village, Anyomorem parish, Ngetta sub-county, in Lira District of Uganda. He is 37 years old, married with one wife and 4 children.

Moses worked as a security guard in Kampala for 10 years, earning an annual salary of UGX 1,800,000 which were sometimes not paid timely, causing serious financial stress on him and the family. Moses' life was so miserable that his wife eventually separated with him and threatened divorce because

he wasn't able to meet the responsibility of adequately taking care of his family – in which they could barely eat two meals a day, nor afford proper medication and school fees for the children.

Moses eventually decided to quit the security guard job and returned to the village to among others rebuild his broken relationship with his wife and also engage in farming - basically growing food crops on subsistence basis.

“In 2018, East West Seed's Knowledge Transfer Officer came and trained me on basic vegetables production, and on the use of improved seeds and modern farming methods. Now I am growing vegetables all year round, with better technology and improved seeds which enabled me realize higher profits – earning an average of UGX 6,000,000 every year”, said Moses.



“With this increased income, I have built a new house, bought a pair of oxen, a cow, a motorcycle to ease marketing, and I am very glad that my family is now food-secure”, Moses added. Moses appreciates ISSD plus vegetable project for playing a great role in changing the lives of smallholder farmers like him and concludes by saying “In the coming year, I plan to save enough money to start an agro-input business, and an agricultural produce business for my wife”.

The story of Mr. Ayok Denis is a resident of Apedi village, Ongura parish, Ngetta sub-county in Lira district, Uganda, a father of 2 children goes beyond his personal development. He has been growing tomatoes, cabbages, maize, soybean and beans on a total of 1 acre of land – which earned him UGX 2,000,000 per season – the proceeds of which he used to return to school in 2014 to further his education. He completed school in 2017, and joined Ongica Health Centre as a volunteer health worker, earning UGX 200,000 per month – which was not sufficient to adequately take care of his family. While he also continued with subsistence farming to supplement his meagre earnings from the Health Centre, Denis faced additional challenges of inadequate knowledge of fertilizers and its application, nursery bed preparation, crop protection and safe use of pesticide.



“I met an East West Seed’s Knowledge Transfer Officer in 2018, and participated in a training conducted for smallholder farmers on vegetable growing. I gained a lot of knowledge which built my skills on better use of pesticides and enabled me to adopt modern farming methods, and even host a demo plot”, Denis said.

“I bought 3 packets of Padma F1 seeds which earned me UGX 4,800,000 in the first season. I also bought 1 packet of 5gms of Arjani F1 and an additional 1 packet of Padma F1 which I planted on 500sqm of land and earned me UGX 2,400,000 in the second season. I used these proceeds to buy an acre piece of land for my family, rent a premise for my clinic business, registered the clinic with the National Drug Authority, and bought drugs and medical kits”, Denis added. “With increased earnings from both the clinic and the farm, I am now able to employ 2 casual laborers to help with the farm work, and another Nursing Aide to handle my second branch of the clinic”, Denis assured. *(Mr. Ayok Denis working on a patient at his clinic in Ngetta, Lira in the photo above)*

“In 10 years’ time, I am confident that I will be a proud owner of a Fuso truck to transport produce on a commercial scale, build some rental houses, and own a permanent residence. Denis became a Key Farmer and has been supporting a number of local farmers, including his friend Odongo Geoffrey who also bought 3 packets of Padma F1 seeds that earned him UGX 4,500,000 that he used to buy a Bajaj Boxer motorcycle. Denis is now a well sought-after trainer on vegetable growing in his community, supporting a number of women and men. “I am very happy for East West Seed’s opportunity that has completely transformed my life. I look forward to sharing my skills and experiences with more people in my community to keep the legacy East West Seed has established”, Denis concluded.

Annex 2: Questionnaire

Farmer Survey Questionnaire

Consent

Hello, my name is _____, and I am working with East west seed company.

East west is implementing a *project for increasing the vegetable knowledge* in the district of Gulu and Lira. The project is designed to contribute towards improved vegetable production in the region.

The purpose of the survey is to generate data and provide contextualized recommendations and input to inform the planning processes for East West Seed supporting farmers in Gulu and Lira

We would therefore like to ask you a few questions regarding your present situation. The information you provide will be kept confidential. I realize how limited your time is and greatly appreciate you for taking the time to speak with me.

Name of the enumerator: Contact:

Date of interview:

Respondent Identification	
Location	
District	Sub county/town council:
Parish	Village/Cell
GPS location
Category of farmer	1. Trained farmer 2. Non-trained farmer
Phone number	

Section A: Farmer Information

1.1	1. Gender of the respondent	1. Female 2. Male												
1.2.	2. What is the highest level of education attained by the farmer?	1. Primary 2. Secondary 3. Tertiary 4. Vocational 5. Functional Adult Literacy 6. No Formal Education 7. Other (specify)												
1.3.	3. Age of the farmers	4.												
1.4.	2. How many people live in your household including yourself _____?													
	<table border="1"> <thead> <tr> <th>Category</th> <th>Number</th> <th>Category</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Children 0-5 years</td> <td></td> <td>Adult males (above 18 years)</td> <td></td> </tr> <tr> <td>Children 5-18 years</td> <td></td> <td>Adult females (above 18 years)</td> <td></td> </tr> </tbody> </table>	Category	Number	Category	Number	Children 0-5 years		Adult males (above 18 years)		Children 5-18 years		Adult females (above 18 years)		
Category	Number	Category	Number											
Children 0-5 years		Adult males (above 18 years)												
Children 5-18 years		Adult females (above 18 years)												
1.5	6. How many people are supporting the work in the farm in the household? -----													
2.1.	7. How many years has the farmer been producing vegetables?.....													

2.2.	<p>8. In the past 12 months, what were your <i>Three</i> most important sources of income?¹</p> <p>9. Please rank the top 3 using the figures 1,2,3 (1 for highest, 3 for lowest based on the codes below)</p>	<p>10. 1st _____</p> <p>11. 2nd _____</p> <p>12. 3rd _____</p>
2.3.	<p>13. Approximate income over the past 12 months (UGX) from the three sources</p> <p>14. (Select the one relevant to the household)</p> <p>15.</p>	<p>1. Less than 500,000</p> <p>2. between 500,000 - 1,000,000</p> <p>3. More than 1,000,000</p>

¹Source of income: 1. No specific economic activity 2. Farming 3. Employed for salary 4. Owns a (small) business/ Trade 5. Skilled Trade/ Artisanry 6. Casual labour 7. Other (specify).....

Section B: Farmer Training

2.4. Do u belong to any farmer group? 1. Yes 2. No

2.5. How often do you meet as a group? (1- Weekly 2-Monthly, 3-Quarterly), 4-Others (specify) -----

2.6. What are those groups and what services/support have you received from the groups?

Group Name	Services received (Use codes below the table- consider multiple responses)	Supporting Institution (use codes below the table)

Service codes 1. Seed 2. Other agro inputs 3. Training 4. Extension/ advisory services 5. Produce marketing 6. Savings and credit 7. Agricultural loans 8. Post-harvest handling 9. Agricultural tour 10. Others specify..... **Institution codes:** 1. East West Seed 2. Fellow farmers. 3. Other NGOs 4. NARO 5. Government Extension officer 6. NAADS/OWC 7. ISSD 8. Others (specify).....

Group Codes: 1. Community group (s) 2. SACCOs 3.VSLA 4. Others (Specify).....

2.7. Has anybody in your household participated in vegetable training in the last 2 years,

1. Yes 2. No

2.8. How many members in your household have attended vegetable training in the last 2 years?

.....

2.9. Which subjects were discussed during the vegetable trainings you participated in as a group and who supported the training (specify the crop and use codes for the subject)?

Crop	Subject / agronomic practice/ technology	Supporting Institution <i>(use codes below the table)</i>

Subject codes: 1. Choosing a variety 2. Seedling production 3. Line planting 4. Fertilization 5. Soil and water conservation 6. Post harvest handling 7. Safe use of agro-chemicals 8. Trellising 9. Disease and pest management 10. Production planting 11. Others (specify).....

Institution codes: 1. Fellow farmers 2. East West Seed 3. Other NGOs 4. Government Extension officer 5. NARO 6. NAADS/OPWC 7. Others (specify)...

2.10. For what duration was your farmer group/you trained? ----- (seasons)

2.11. Which crops were show-cased?

Crop	Number of technologies show cased
1. Tomatoes	
2. Egg plants	
3. Cabbages	
4. Pumpkin	
5. Onions	
6. Green pepper	
7. Watermelon	

2.12. What improved varieties were used at the site per crop? (for key farmers only)

1. -----
2. -----
3. -----

2.13. What other methods were used to increase outreach apart from trainings (for key farmers only)

1.
2.
3.
4.

Section C: Technologies and agronomic Practices

2.14. Do you practice any form of modern agronomic practices in vegetable growing?

1. Yes 2. No

2.15. How did you get information about Good Agronomic Practices? (Circle the answers mentioned by farmers)

1. Fellow farmers 2. Radio 3. District farmers association 4. Research/NARO/ZARDI 5. NAADS/DLGs/OWC 6. CBOs, NGOs
7. Seed companies and agro-dealers 8. Sub county extension officers 9. Traders 10. Trainings by East West Seed 11. Others, specify

2.16. Were you practicing vegetable production technologies (GAPs) before 2017?

1. Yes 2. No

2.17. If yes, what GAPs were you practicing? 1. Using improved seeds (hybrids) 2. Sterilizing planting media 3. Raising seedlings in trays or leaf pots 4. Raising seedlings in seedling houses 5. Constructing raised ground nurseries 6. Transplanting with inorganic or organic fertilizers (MOP or Farmyard manure) 7. Using fertilizers like CAN, MOP or NPK 8. Using pheromone traps 9. Using sticky traps 10. Trellising tomatoes 11. Proper plant spacing 12. Planting on ridges 13. Mulching 14. Timely planting 15. Alternating pesticides and fungicides MOA and AI 16. Others (specify).....

2.18. If No, what agronomic practice did you learn from the training?

1. Using improved seeds (hybrids) 2. Sterilizing planting media 3. Raising seedlings in trays or leaf pots 4. Raising seedlings in seedling houses 5. Constructing raised ground nurseries 6. Transplanting with inorganic or organic fertilizers (MOP or Farmyard manure) 7. Using fertilizers like CAN, MOP or NPK 8. Using pheromone traps 9. Using sticky traps 10. Trellising tomatoes 11. Proper plant spacing 12. Planting on ridges 13. Mulching 14. Timely planting 15. Alternating pesticides and fungicides MOA and AI 16. Others (specify).....

2.19.1. What agronomic practices did you learn from other farmers?

1. Using improved seeds (hybrids) 2. Sterilizing planting media 3. Raising seedlings in trays or leaf pots 4. Raising seedlings in seedling houses 5. Constructing raised ground nurseries 6. Transplanting with inorganic or organic fertilizers (MOP or Farmyard manure) 7. Using fertilizers like CAN, MOP or NPK 8. Using pheromone traps 9. Using sticky traps 10. Trellising tomatoes 11. Proper plant spacing 12. Planting on ridges 13. Mulching 14. Timely planting 15. Alternating pesticides and fungicides MOA and AI 16. Others (specify).....

2.19. What practices are you able to perform without instructions?

1. Using improved seeds (hybrids) 2. Sterilizing planting media 3. Raising seedlings in trays or leaf pots 4. Raising seedlings in seedling houses 5. Constructing raised ground nurseries 6. Transplanting with inorganic or organic fertilizers (MOP or Farmyard manure) 7. Using fertilizers like CAN, MOP or NPK 8. Using pheromone traps 9. Using sticky traps 10. Trellising tomatoes 11. Proper plant spacing 12. Planting on ridges 13. Mulching 14. Timely planting 15. Alternating pesticides and fungicides MOA and AI 16. Others (specify).....

2.20. For how long have you been practicing the technologies mentioned (above)

Technology	Proportion adopted	Period using the technology (years)

2.21. What social factors affect the use of East West Seed promoted vegetable technologies in this community?

1. Group leadership 2. Trust in training providers 3. Cultural values 4. Land use 5 others Specify -----

Section D: Production and Marketing (include crop codes)

2.22. Please describe the trend of yields from your crops since you received training

	crop	Acreege	¹ Varieties before Training	Yield per acre/season before Training (kg)	acreege	Varieties After Training	Yield per acre/season after Training (kg)	² Trend (use codes above)
1								
2								
3								
4								

¹Codes for varieties 1. Improved 2. Local 3. Mixed

²Codes for trend 1. Increasing 2. Decreasing 3. Constant

Section E: Sales/Marketing

2.23. Do you have a ready market for your produce? 1. Yes 2. No

2.24. What are your marketing strategies?

.....

2.25. What is the cost of production of the vegetables grown pre-season? (UGX)

Crop	Total cost off-season	Total cost on season
1. Tomatoes		
2. Egg plants		
3. Cabbages		
4. Watermelon		
5. Onions		
6. Green pepper		
7. Other (specify)		

2.26. What is the quantity sold in a season per crop grown? (UGX)

Crop	Quantity (kg)	Total income off-season	Total income on season	Where or who ² buys
1. Tomatoes				
2. Egg plants				
3. Cabbages				
4. Watermelon				
5. Onions				

6. Green pepper				
7. Other (specify)				

Code for buyers: 1= Local markets, 2= Neighbours & surrounding community, 3=Local Traders, 4= Roadside markets, 5 = Kampala traders, 6= Supply to hotels & restaurants, 7= Supply to schools/ universities 8= Other (specify) -----

7.3. Please describe the trend of income from vegetables since you received training:

1. Increased
2. Not changed
3. Decreased
4. Keeps fluctuating

7.4. How do you describe the market of your vegetables since you received training?

1. Increased
2. Not changed
3. Decreased
4. Keeps fluctuating

Section F: Environmental Conservation

7.5. Are you aware of environmental conservation?

1. Yes 2. No

7.6. If yes, what environmental conservation practices do you carry out?

1. Agro-forestry 2. Possession of a soak pit for waste management 3. Shed trees 4. Not washing from water sources 5. Biogas 6. Others (specify).....

7.7. What benefits have you obtained from carrying out environmental conservation?

.....

7.8. Have you received any support for conserving the environment? 1. Yes 2. No

7.9. If yes, what kind of support did you receive for environmental conservation?

Institution providing support	Type of support

7.10. How do you agree with the statement that; Training in demonstration gardens and farmer field days has:

Response codes: 1. strongly disagree 2.I disagree 3. neither disagree nor agree 4. Agree 5. Strongly agree

Indicator	Response (codes)	Explanation for your response
Contributed to increased food in the community?		
Contributed to increased food in my household?		
Contributed to adoption of improved crop varieties in the community?		
Contributed to protection and improvement of natural resources e.g growing of trees		
Contributed to use of better farming practices		

Increased credit access		
Increased savings		
Improved farm profits		
Increased income sources (specify)		
Increased income in your household?		
Increased acreage for major crops		
Improved farm output		
Improved farm productivity		
Improved volumes sold		
Reduced post-harvest losses		
Increased number of workers you employ (skilled)		
Increased asset accumulation		
Contributed to educating your children?		
Contributed to maintaining good health for you and for other household members		
Contributed to marketing /selling your produce at a higher price?		
Contributed to peace and harmony in your household?		
Contributed to misunderstanding between you and your spouse?		
Demonstration gardens in your area have also benefited those who did not participate		

2.35. In your view, what are some of the problems that hinder people from adopting some the improved vegetables production technologies?

.....

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.....

.....

2.36. What should be done to encourage the adoption vegetable production technologies in this area?

.....

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.....

2.37. What are your future plans in vegetable production for the next 3 years?

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.....

.....

Thank you

Annex 3: Terms of Reference

CALL FOR EXPRESSIONS OF INTEREST FROM SURVEY CONSULTANTS TO CARRY OUT AN END OF PROJECT EVALUATION OF EAST-WEST SEED KNOWLEDGE TRANSFER INTERVENTIONS IN NORTHERN UGANDA**1. Background****1.1. About East-West Seed Knowledge Transfer (EWSKT)**

As East-West Seed Knowledge Transfer (The non-profit foundation of East-West Seed), facilitates development and strengthening of the vegetable value chain through climate smart extension services that bring profitability to small holder farmers. This is done by combining better skills and technology with good seeds accompanied by engagement of the market and agro-input dealers. East-West Seed (EWS) has 38 years of experience in market-oriented plant breeding for vegetable seeds in the tropics. Working in emerging economies, EWS has a unique focus on smallholder farmers, who are the main clients of the company. EWS has developed lead positions in Southeast Asia as well as rapidly expanding markets in India, Africa and Latin America. Recognizing that farmers need access to quality seeds and knowledge on how to grow crops, EWS has supported intensive farmer training programs since 2000 - as an essential core to its business model.

In 2018 EWSKT teamed up with the University of Wageningen's Integrated Seed Sector Development and NIGI and Bioversity to implement extension services in the vegetable sector in Northern Uganda (Lira and Gulu.) to catalyse the emergence/strengthening of vegetable value chains in the districts. Using the strategy of utilising key farmers to establish field demonstrations (with each demo reaching 20-30 farmers) which align to the specific needs of each farming community, core group farmers were intensively trained to meet supply requirements focused on continuity, quantity and quality of products over at least two cropping seasons. This was complemented by allied engagement of agro-input dealers and marketers.

1.2 Project context

Northern Uganda, with a population of 5.8 million people, is an area that needs a major boost in its struggling economy. The area has a large rural population of a large number of refugee camps where Sudanese, Rwandan and Congolese refugees are permanently settled. Historically known as the "Wild North" where rebel activity only ended less than two decades ago, it is an area that is slowly finding its feet. Over 70% the population is rural and relies on subsistence farming. The majority of the people are poor, living on less than USD1 a day. The area has a history of importing vegetables from other regions and yet it can become a vegetable hub that can supply the region and the rest of this country. Key limiting factors include poor infrastructure, poor skills, low productivity and production, quality, food safety and counterfeit inputs especially seeds. Small-scale rain-fed farms dominate a dispersed sub-sector. The area was and still is therefore ripe for knowledge transfer.

2. Scope of the assignment

2.1 objective of the call

The purpose of the call is to evaluate the effectiveness and impact of EWSKT interventions implemented in Gulu and Lira from the years 2017 to 2020. The focus will be on assessing the effectiveness, impact (assess positive and negative changes produced by the project interventions, directly or indirectly, intended or unintended) through success stories and sustainability.

2.2 Description of tasks

The Purpose/objectives of the Final Evaluation:

- a) To provide a systematic and objective assessment of the implementation of the project and assess its evolution.
- b) Provide a mixture of both qualitative and quantitative data as part of the project successes and challenges experienced.
- c) To involve key project stakeholders in the assessment.
- d) To provide feedback to our donors and implementing partners with regards to meeting the intended purpose, objective and results of the project.

Scope of Work

The consultant is expected to evaluate/identify the following:

- i. The extent the project was implemented in comparison with the agreed implementation schedule.
- ii. The extent the objectives, expected results and activities of the project were attained/realised.
- iii. The extent to which the project implementation was aligned to the agreed procedures.
- iv. The extent to which the partner was involved in the planning, implementation and evaluation of the project.
- v. What success stories emerged from the project?
- vi. The impact (positive or negative) that changes (if any) in the operating environment had on the implementation of the project
- vii. Recommendations to be considered for improvement for future projects.
- viii. What have the strengths and weaknesses of the partnership with Wageningen ISSD been?

3. The Methodology

The consultant will be expected to use the following methods:

- i. Undertake a comprehensive review of all the available literature /reports on the project.
- ii. Undertake a performance assessment of each activity proposed in the project.
- iii. Conducting Interviews with key stakeholders.

- iv. Produce an Evaluation Report and allied video (with testimonies) based on the information gathered and analysis completed.
- v. Present the evaluation report to stakeholders, including the KT Manager, Head of EWSKT in Africa and EWSKT Director

4. **Deliverables**

The consultant will deliver the following outputs:

- i. Inception report (proposal). The Inception report should also include evaluation tools and clear work plan and methodology (2 hard copies and 1 electronic).
- ii. Draft report for comments by the KT Manager, Head of EWSKT in Africa and EWSKT Director
- iii. Final Report - 2 hard copies, 1 electronic copy, 1 video.

5. **Schedule: The Evaluation is expected in to be completed over a period of one and half months as follows:**

Sign agreement	Third week of July 2020
Field work	Fourth week of July and first week of August 2020
Draft Report and feedback:	Third week of August 2020
Final Report from consultant:	By 31 August 2020

6. **Eligibility criteria**

The Consultant outsourced for this assignment should have the following:

- a) Be a legally recognized consultant in Uganda, which has demonstrated a sound operational record of accomplishment of at least 3 years of operational activities in Uganda.
- b) Track record of at least 5 years of data collection, data entry, data analysis and reporting of which at least 3 large household surveys in the field of agriculture, especially in seed sector
- c) No legal processes ongoing; director not convicted/court case
- d) Good facilitation skills using a number of participatory methods in training
- e) Experienced in use of real time data collection software like Open data Kit (ODK)
- f) Fluency in English language is essential
- g) Evidence of similar or related work done
- h) Knowledge of the Uganda's vegetable sub-sector will be an added advantage

7. **Minimum criteria for implementation of assignment**

The consultant needs to consider the following while preparing technical proposal:

- a) Enumerators should be undergraduates' students with an education background in agriculture and previous experience in data collection for at least three different agricultural surveys.
- b) Selection of enumerators should also depend on language spoken basing on the regions of EWS-KT influence in greater Lira (Lira, Albetong, Otuke and Kole) and Gulu in Northern Uganda

- c) Data collection needs to be done in such a way that it can withstand scientific rigor. The consultant is responsible for providing rigorous quality checks of enumerators on a daily

8. Proposal submission

8.1. Technical proposal

The technical proposal should include:

- a) Showing understanding of the assignment
- b) Methodology of the assignment
- c) Work plan
- d) Training plan for the enumerators

9. Appendix

The Appendix of the Evaluation Report should contain information not directly useful in the text of the report but needed for reference or detailed review by technical experts. These could include (but not limited to the following):

- The terms of reference for the study
- Sources of data and information
- All individuals and agencies consulted for specialist information or knowledge used in the report referred to in the text.
- Any written opinions received from outside specialists
- Field data collection completed during the Evaluation process.
- Any detailed data reduced for use in the main body of the report
- Any detailed location plan and technical maps, designs, drawings, photographs, flow diagrams, etc.
- Names, qualifications and roles of the team members who carried out the Evaluation.
- Any other relevant information.