

REPORT ON THE RESULTS OF THE BASELINE ANALYSIS CONDUCTED ON THE AGROECOLOGY AND LIVELIHOOD SYSTEMS IN UGANDA



Submitted to:

The Steering Committee
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EXECUTIVE SUMMARY

The main objective of the study was to assess the status of agroecology and livelihood skills gaps in Uganda. Specifically, the study examined the status of agroecological practices¹ among smallholder farmers in Uganda, assessed the capacity of agroecological value chains in stimulating the adoption of agroecological practices among smallholder farmers and the capacity of actors in influencing policies that affect agroecology. The study employed three data collection methods including: questionnaire, key informant interviews and document reviews. Triangulation of data collection methods and data sources and piloting of instruments was used as data quality control strategies.

Major results of the baseline study reveal that in the areas of *adoption of agroecological practices*, overall few smallholder farmers have adopted seed and water conservation practices such as cover cropping, mulching, composting, and intercropping among others. Adoption of seed and water conservation practices is low among youth aged 26-30, but increases among farmers aged 36-45 but starts declining after that then again increases for farmers aged 51 and above. This result complements EPRC (2013)'s finding that there is an increasing share of the youth joining the services sector (from 19.5 percent in 2005/6 to 27.3 percent in 2009/10) and this increase seems to be faster than that of their counterparts in prime age.

Use agro-chemicals both organic was at 46.2 percent and 56.6 percent respectively. The frequency of application of inorganic agro-chemicals was however slightly higher than organic chemicals at 57 percent and 48 percent respectively which indicates a rise in the use of inorganic fertilizers among farmers. 58.6 percent smallholder farmers are not comfortable using agro-chemicals (both organic and inorganic) because of their inability to meet identified needs.

Farm saved seed is the main source of seed for smallholder farmers at 92.4% and this consisted of a combination of certified, indigenous and quality declared seed. Other seed sources include Government, NGOs, community seed banks, and asking friends/ family members and well-wishers. However, the high level of seed saving was not complimented with seed multiplication

¹ For purposes of this study, these are defined as agricultural production practices that enhance the ecological integrity of the farm system and are socially and economically sound.



which stands at just 26.2% which leaves farmers vulnerable especially when faced with changes in climate. Additionally, livestock production and management is done on a small-scale of 35.4%. The goal of keeping livestock is mainly to produce sufficient food to for the family rather than sell to the market as seen in the limited number of livestock sold.

Management of pests and diseases is mainly through use of traditional methods (54.5%) and application of agro-chemicals-both organic and inorganic. Access to information services is high among other age categories other than the youth (ages 18-20). The implication of this is that smallholder farmers find it hard to adopt the above agroecological practices due to a lack of information and guidance. Knowledge and skills gaps were evident in areas including; irrigation and water harvesting, livestock management and pest and disease management.

In the area of *agro ecological value chains in stimulating the adoption of agroecological practices among smallholder farmers*, major results reveal limited number of smallholder farmers with organic certification (31%) and inadequate storage and post handling practices, low collective bulking and marketing (11%) and poor market linkages with other value chain actors (only 4.1% have signed agreements with these actors) as this would have facilitated adoption of agroecological practices. gaps in postharvest handling, acquiring organic certification, collective marketing were limitations to agroecological value chains stimulating adoption of agroecology.

In regards to the *capacity of actors in influencing policies that affect agroecology*, results indicate existence of a number of agroecology related policies whose implementation had affected the adoption of practices. Awareness of these policies is so low among smallholder farmers (15.2%) compared to 75% of the key informants. Smallholder participation in policy processes is at 41.4% and this is mainly around environmental issues such as bush burning, tree cutting and charcoal burning. A lack of information and awareness of existing advocacy platforms was identified as a key hindrance to participation in policy processes. Results also indicate gaps in land rights and policy influencing among smallholder farmers and other value chain actors.



The study makes five recommendations to Uganda Martyrs University as follows:

- Set up District level agroecology centers of excellence to facilitate easy access to information and transfer of knowledge and skills to the different agroecology stakeholders.
- Coordinate research and development of organic agro-chemicals that effectively help farmers in dealing with the ever emerging pests and diseases among crops and animals.
- Develop and offer tailor made short courses for different agroecology stakeholders to bridge the knowledge and skills gap.
- Develop value chains based on indigenous crops in order to promote their production, multiplication, preservation, value addition and marketing.
- Support dissemination of information, education and communication materials to help agroecology actors and stakeholders understand and adopt agroecology related issues such as climate change, soil and water conservation etc.



LIST OF ACRONYMS

| | |
|---------------|---|
| ACALISE | African Center of Excellence for Agroecology and Livelihood Systems |
| ACE | African Centre of Excellence |
| ARUWE | Action for Rural Women’s Empowerment |
| Caritas MADDO | Caritas Masaka Diocesan Development Organisation |
| DADO | Dadoth Agro Pastrolists Development Organisation |
| DFID | Department For International Development. |
| EADEN | Eastern Archdiocesan Development Network |
| ECO | Ecological Christian Organisation |
| EDF | Emesco Development Foundation |
| ESAFF | Eastern and Southern Africa Small-scale Farmers Forum |
| HODFA | Hoima District Farmers Association |
| KPOGT | Kalangala Palm Oil Growers Trust |
| NGO | Non-governmental Organisation |
| PELUM | Participatory Ecological Land Use Management |
| RUCID | Rural Communities in Development |
| SATNET | Sustainable Agriculture Trainers Network |
| SOCADIDO | Soroti Catholic Diocese Integrated Development Organization |
| VEDCO | Voluntary Efforts for Development Concerns |
| ZODFA | Zombo District Farmers Association |



DEFINITION OF KEY CONCEPTS

Agroecology: FAO defines agroecology as a scientific discipline, a set of practices and a social movement. As a science, it studies how different components of the agroecosystem interact; as a set of practices, it seeks sustainable farming systems that optimize and stabilize yields; as a social movement, it pursues multifunctional roles for agriculture, promotes social justice, nurtures identity and culture, and strengthens the economic viability of rural areas). The study adopted this definition of agroecology

Livelihood: Chambers & Conway (1991) define a livelihood as the capabilities, assets and activities required for a means of living. For purposes of this study, livelihood was defined as the sustained capabilities, assets and activities required to cope with and recover from stresses and shocks both now and in the future, while not undermining the natural resource base.

Agroecological practices: the study defined these as agricultural production practices that enhance the ecological integrity of the farm system and are socially and economically sound.



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CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 About PELUM Uganda

Since 1995, PELUM Uganda has been working to improve the livelihoods of smallholder farmers and the sustainability of rural communities, through the fostering of ecological land use management. We share; skills and knowledge about good practices and techniques, through a broad network of like-minded organizations; undertake research and demonstration projects; and advocate for policies that better support small-scale farmers. PELUM Uganda is part of a 12-country strong association of civil society organizations in Eastern, Central and Southern Africa.

Our **Vision** is, “Communities in Uganda sustainably utilizing their natural resources and the **Mission** is “To enhance the effectiveness of members in promoting ecological land use management among farming communities through capacity building, research and innovation, networking and advocacy.”

1.2 Background to the African Centre of Excellence (ACE II) Project

A project supported by the World Bank’s International Development Association (IDA) through the government of Uganda, ACALISE is a Regional /African Centre of Excellence in Agroecology and Livelihood Systems based at Uganda Martyrs University – Nkozi. Hosted by the Faculty of Agriculture at Nkozi, ACALISE’s main objective is to be an intervention that will better streamline the production of a high level and well-motivated, ethically oriented critical mass of Agroecology and livelihood systems experts to impact on prevailing agricultural, nutritional, and environmental challenges in the region. It is therefore an Impact Oriented Centre that will train local and regional top-notch personnel that are envisaged to be Job creators but also innovators toned with badly needed work and behavioral ethos. The objective is to be achieved through:

1. Training of a new breed of M.Sc. and PhDs envisioned to carry out relevant research in Agroecology and livelihood systems for innovation in the region and beyond
2. Integration of ecological approaches in Agriculture and related disciplines in the region to stimulate sustainable development and better livelihoods



3. Initiation of critical regional collaborations for strengthening multidisciplinary and multi-sectoral research for development.
4. Promotion of Public Private Partnerships (PPP) for innovation dissemination and impact enhancement in Agroecology for better livelihood strategies. ACALISE will promote action research, student-centered learning techniques including problem solving, experiential research but also experimental methods to foster innovations in the field.
5. Creation of demonstration farms to facilitate the provision of hands-on skills and sustainable agricultural methods and technologies to the communities, especially to the rural women, the youth, and the disadvantaged to advance sustainable livelihoods and improve standards of living and quality of life.

1.3 Main Objective of the Study

The main objective of the study was to assess the status of agroecology and livelihood skills gaps in Uganda.

1.4 Specific Objectives

The specific objectives of this study were:

1. To examine the status of agroecological practices² among smallholder farmers in Ugandan.
2. To assess the capacity of agroecological value chains in stimulating the adoption of agroecological practices among smallholder farmers.
3. To assess the capacity of actors in influencing policies that affect agroecology.

² For purposes of this study, these are defined as agricultural production practices that enhance the ecological integrity of the farm system and are socially and economically sound.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature reviewed in this chapter concerns the state of the agriculture sector in Uganda, the concept of agroecology and agroecology in practice in Uganda.

2.2 State of the agriculture sector in Uganda

Uganda is regarded as an agriculture-based economy comprises of food and cash crop production, livestock, forestry and fishing subsectors. These sub-sectors contributed 62, 8, 17 and 13 percent respectively to agricultural Gross Domestic Product (GDP) in 2011/12 (Uganda Bureau of Statistics-UBOS, 2012). Agriculture is the most dominant sector that employs 73 percent of all workers in the country and contributed 23.7 percent to GDP in 2011/12. Although Uganda has generally enjoyed good economic growth in the last ten years—averaging seven per cent per year³—real growth in the agricultural output has been steadily declining over the years. The poor performance of the sector is reflected in the sector’s declining contribution to Gross Domestic Product (GDP) from 39.9 per cent in 2001/02 to only 23.7 per cent in 2008/09.⁴ In spite of the sluggish performance, the sector is very strong and has abundant opportunities for investment with its strengths leveraged on the National Agricultural Policy 2013; a large pool of agricultural scientists; underutilized factors of production; the National Agriculture Extension Policy and National Agriculture Extension Strategy; the draft Agriculture Sector Strategic Plan 2015/16-2019/29) and the active involvement of Non-State Actors among others.

Smallholder farmers are the major players of the agriculture sector contributing over 80% of agriculture production. The sector employs 72% of all employed women and 90% of all rural women work (FOWODE, 2012). In rural areas, it is estimated that women’s workloads considerably exceed those of men with the latter more involved in planting, weeding, land preparation and food processing activities (FAO, 2000). However, decisions to market are mainly made by men (70%), or jointly (15%).

³ See generally The Republic of Uganda (2010), National Development Plan (NDP) 2010/11 – 2014/15, Ministry of Finance, Planning and Economic Development, Kampala, para. 26.

⁴ Ibid.



The agriculture sector is characterized by smallholder farming with hand hoes as the major production tool and production mostly for own consumption (UBOS, 2012). Furthermore, despite their immense contribution to agricultural GDP, smallholder farmers experience a number of production challenges including; lack of transport, inputs and technology to help them increase their production and reduce pests and diseases; limited access to financial services, to give them capital for improving and expanding their productivity (IFAD, 2013; DSIP 2010/11-2014/15). For this and more reasons, many African governments and development actors have placed renewed emphasis on agricultural modernization in recent years. This is the case in Uganda, where aspirations to support agricultural development in the form of modern technology transfer and increased market-orientation are a core part of the broader “poverty eradication” agenda.

More recently, Uganda’s attention has shifted towards an approach that favors larger land holders. This move rhymes with Henderson and Casey’s (2018) assertion that current approaches to agricultural development have boosted productivity through the application of modern technologies, synthetic inputs, and economies of scale across large farms. Critics of this approach however point to detrimental effects on the environment and failure to address the needs and tap in to the productive potential of smallholder farmers. Such critiques echo global concerns about unsustainable and inequitable outcomes of agricultural modernization that have prompted calls for rethinking agriculture and searching for more desirable alternatives (Isgren and Ness, 2017). One such alternative that is gaining ground is agroecology, an approach that utilizes ecological principles in the design and management of farming systems to make them productive, resilient and sustainable.

2.3 An overview of Agroecology

FAO defines agroecology as a scientific discipline, a set of practices and a social movement. As a science, it studies how different components of the agroecosystem interact; as a set of practices, it seeks sustainable farming systems that optimize and stabilize yields; as a social movement, it pursues multifunctional roles for agriculture, promotes social justice, nurtures identity and culture, and strengthens the economic viability of rural areas. Agroecology is gaining ground within the debate on how to address systemic social and environmental problems in agriculture (Isgren and Ness, 2017).



For many farmers around the world, agroecology is the only way to access and control natural and productive resources (such as land, water, seeds, etc.) and produce healthy food for people in harmony with the environment. In a study conducted by UNCTAD/UNEP (2008), agroecology was found to have multiple benefits for smallholders, food and nutrition availability and the environment – leading to a buildup of natural, human, social, financial and physical capitals in farming communities. The study revealed that agroecology leads to an increase in food availability and improved nutrition, increase in household income, increase in education, skills, health, infrastructure improvements such as transport and communications leading to greater access to markets and improved natural environment e.g. soil fertility, water retention and supply, flood control and biodiversity. However, it remains marginalized in agricultural research and development plans around the world. Nevertheless, agro-ecology is highly knowledge-intensive and context specific, and is based on techniques that are not delivered top-down but are co-constructed and co-developed by farmers and researchers and scientists on the basis of farmers’ indigenous and traditional knowledge and experimentation in diverse local ecological contexts (ActionAid, 2012).

2.4 Agroecology in Uganda

Uganda’s agricultural production system is diversely spread within 14 Agro-ecological Zones (AEZs) which are characterized by different farming systems determined by soil types, climate, landforms, socio-economic and cultural factors (MAAIF, MWE Uganda Climate Smart Agriculture Programme (2015 – 2025)). However, poor agricultural land management, increased extreme weather events and population pressure have escalated land degradation in all the AEZs which are now experiencing varying levels of vulnerability to climate-related hazards which include drought, floods, storms, and pests and diseases. In their paper that analyzed agroecology as a socio-technical niche in Uganda, Isgren and Ness (2017), found out that in Uganda, agroecology is practiced as a smallholder-centric approach that champions collective action, locally appropriate technologies, participatory methods in research and extension and calls for more active state guidance of agricultural change along specific principles.

Despite its endowment with abundant natural resources, Uganda’s environment has been eroded significantly during the past several decades. The country is subject to several environment-



related worrying trends which put economic, environmental and social development at risk⁵. These include; soil degradation, deforestation, drainage of wetlands, and loss of biodiversity, pollution and unsanitary conditions. Soil nutrient depletion is among the highest in sub-Saharan Africa. Soil fertility is declining due to nutrient mining and little replenishment of nutrients. The country's forest cover stands at only 24%, compared to 52% about a century ago (NEMA 2002). The estimated deforestation rate is 2.2% per year. The loss of vegetation cover adversely affects the ecological zone which includes maintenance of water balance, catchment and filtration which obstruct the formation of ground and surface water.

Whereas pesticide use in Africa accounts for 2-4% of the global pesticide market, the national rate of inorganic fertilizer application is relatively low in Uganda (only 17 kg/ha) and is largely controlled by the cost of the materials and low profitability of farming for the small scale farmer (Semalulu, Hecky & Muir, 2005; Bonabana-Wabbi & Taylor, 2008). However, with a growing population and crop production, the import of pesticides is increasing despite the fact that these are of concern if used inappropriately even at low national rates of application.

⁵National Environmental Action Plan for Uganda (1995).



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology upon which the study was executed. The research adopted mixed methods involving both qualitative and quantitative approaches which were useful in triangulating data.

3.2 Area of study

This was a nationwide study carried out in 16 districts representing the four regions of Uganda i.e. Central, Western Eastern and the North. The districts covered include; Zombo, Nebbi, Gulu, Masaka, Kabale, Kasese, Kalangala, Kapchorwa, Soroti, Kabong, Mityana, Kiboga, Hoima, Kibaale, Iganga and Nakasongola.

3.3 Population and Sampling for the study

The population of the study comprised of smallholder farmers from Zombo, Nebbi, Gulu, Masaka, Kabale, Kasese, Kalangala, Kapchorwa, Soroti, Kabong, Mityana, Kiboga, Hoima, Kibaale, Iganga and Nakasongola Districts. The farmers were empowered by the NGOs and other partners to adopt various agroecological practices. Other respondents included the District Agricultural and Production Officers (12), staff from Non-governmental organisations (16), agroecology trainers (10), processors and input dealers (9). These were valuable to the study because of the offices they hold, their experiences and technical knowledge on existing agricultural livelihood systems, markets and farming in general.

The population of the study was drawn from smallholder farmers affiliated to 16 Non-Governmental organisations (NGOs) of which 10 were PELUM Uganda members and 6 were other NGO partners. By January 2018, PELUM Uganda had a membership of 56 members who together work with approximately 3,000,000 smallholder farmers (PELUM Uganda Annual report 2017). This means that each member works with an average of 53,571 smallholder farmers. Using this average number of farmers reached by each PELUM Uganda member, the research was able to assume that together, the 16 NGOs that participated in the research reached



857,136 smallholder farmers, which figure was used as the study population from which the sample of 384 was drawn as indicated below.

$$N = (Zscore)^2 * SD * \frac{1 - SD}{e^2}$$

Where N= Size of sample;

SD=Standard deviation

e= acceptable error (margin of error)

Z= standard variate at a given confidence level.

A confidence level of 95% was used leaving an acceptable error of 5%. The z-value under normal curve is 1.96

$$N = (1.96)^2 * 0.5 * \frac{1 - 0.5}{(0.05)^2}$$

$$N = 384$$

Considering the magnitude and scope of the ACALISE project, 384 was a viable and realistic sample. However, due to time and resource constraints, the research team could not reach all 384 smallholder farmers hence the decision to assume 384 as both the sample (N) and the study population (n) from which a new sample was drawn. In calculating the new sample size, the study considered a minimum number of respondents that could give a confidence interval of 95% as indicated below.

$$Ts = \frac{(N * n)}{n + (N - 1)}$$

$$Ts = \frac{(384 * 384)}{384 + (384 - 1)}$$

$$Ts = 192$$

192 was therefore the sample size considered for the study. Purposive sampling was then employed to select 145 smallholder farmers and 47 key informants.

3.4 Data collection methods and instruments

Data for this study was collected mainly through Questionnaire, Key Informant Interviews and Documents Review. Data collection entailed using both primary and secondary data as follows.



3.5.1 Questionnaires

The primary source for gathering data was the questionnaire which was administered among smallholder farmers. A total of 145 questionnaires were administered among women, men and youth to glean adequate and unbiased data for the study.

3.5.2 Key Informant Interviews

Another primary source of data was key informant interviews where data on individuals' personal histories, perspectives and experiences was gathered. Key Informant Interview guides (see Appendices 2, 3 and 4) were used with questions relevant to this study to allow for a logical flow of conversation between the researcher and the interviewee. 47 other interviews were conducted among District, NGO officials, agricultural processors and agroecology trainers.

3.5.3 Documents Reviews

This was the main source of secondary data. The reviewed literature included; project documents, articles, reports and studies of a several publishers (see list of references). These provided information about many things that could not be observed and also provided stimulus for paths of inquiry that were pursued through the key informant interviews.

3.5 Data Validity and Reliability

The test-retest method was carried out among a few selected stakeholders and Research assistants with the latter being done during the training of Research assistants. Tools here were cleaned and essential corrections made to fine tune them before actual data collection.

3.6 Data analysis and interpretation

Quantitative data from the questionnaires was analyzed using SPSS software which allowed results to be shown in descriptive detail, using tables, graphs and charts. Quantitative results were also presented with descriptive statements. The qualitative method used in this study for analysing data was constant comparative analysis which according to Pickard (2007), involves taking one piece of data and comparing it with all others that may be similar or different in order to develop conceptualisations of the possible relations between various pieces of data. Extensive scrutiny was done into the meaning of the data provided and verbatim quotations from key



informants were used. The integration of tools went a long way to support the work flow of the research. Based on this information, the conclusions were made and possible recommendations identified.

3.7 Ethical Issues

The researcher ensured respect for the respondents and kept confidential the information that was provided. Consent was sought from respondents prior to data collection and nothing harmful was done to them. The researcher also maintained objectivity and ensured that results observed were reported in an accurate way.

3.8 Limitations of the Study

Smallholder farmers do not keep records to which they can refer. Therefore data collected on some areas such as quantity of yields harvested or sold and the income earned were based on memory and assumptions. This made it challenging to triangulate findings on food produced and income earned.

Use of incentives to collect data in Uganda has become a practice. Many of the participants taking part in this study anticipated financial recompense for taking part in the study. To deal with this issue information was gathered from willing respondents who were informed beforehand the purpose of the research. Smallholder farmers were however provided with some refreshments during the data collection exercise. Use of Research Assistants from the same place was helpful in mobilizing the participants for the study.



CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents results of the baseline study which aimed at assessing the status of agroecology and livelihood skills gaps in Uganda. Data is presented as per the following specific objectives;

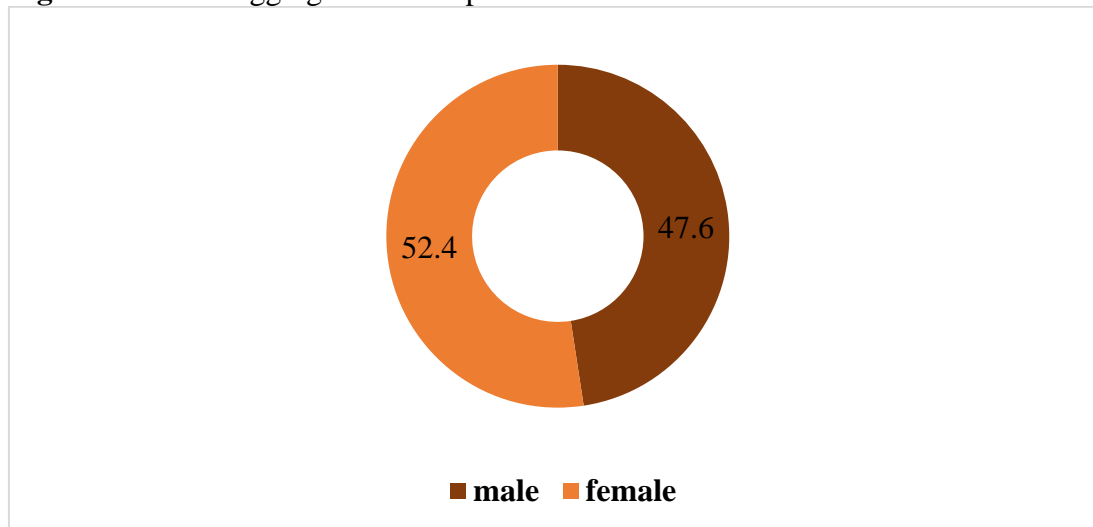
1. To examine the status of agroecological practices among smallholder farmers in Uganda.
2. To assess the capacity of agroecological value chains in stimulating the adoption of agroecological practices among smallholder farmers.
3. To assess the capacity of actors in influencing policies that affect agroecology.

4.2 Social Demographic Characteristics of the smallholder farmers

4.2.1 Sex disaggregation of the smallholder farmers

Knowing the sex of the smallholder farmers has a greater bearing on easily understanding the underlying gender issues related to agroecology. Data was collected from both women and men as presented in **Figure 1**. 17.2% of the respondents were youth⁶.

Figure 1: Sex disaggregation of respondents



Source: Primary Data, 2018

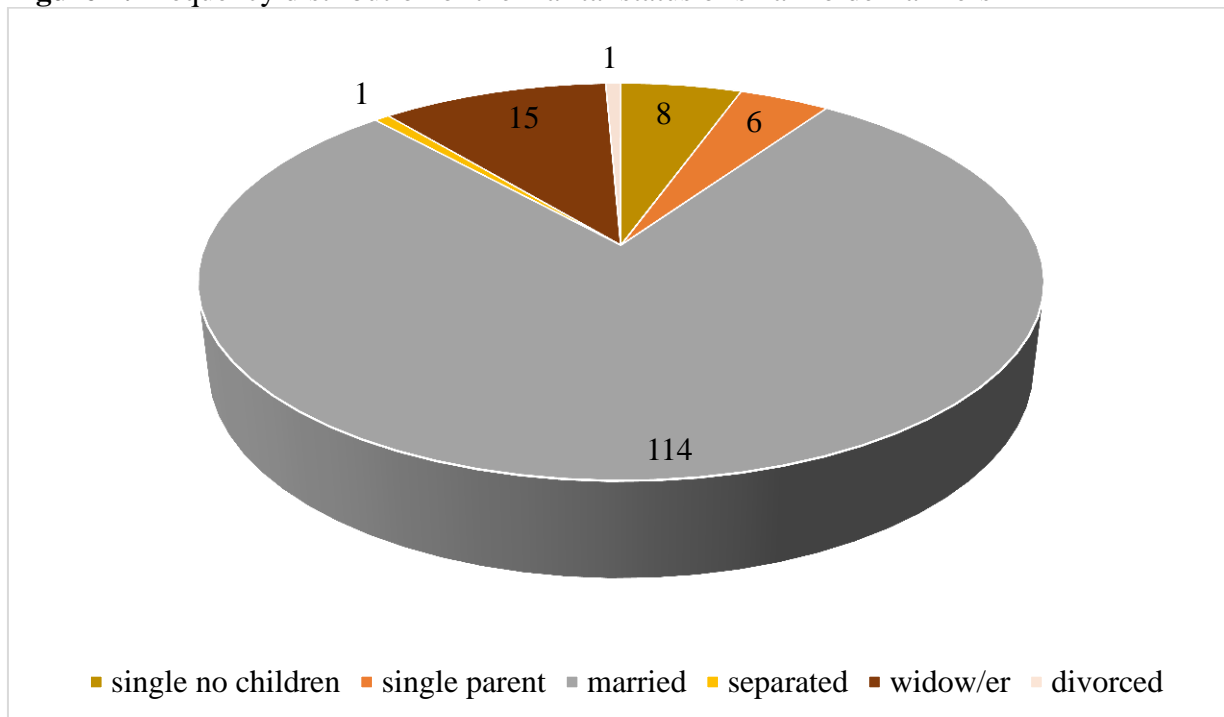
⁶ While the UN and ILO define youth as those aged 15-24, the study adopts the national definition of youth as those aged 18 -30 years



4.2.2 Marital status of the Respondents

This information was deemed necessary because their ability to give satisfactory information on the study variables greatly depended on their background that determined their understanding of the phenomena under study. Data in **Figure 2** shows that majority of the smallholder farmers that participated in the study (78.6%) were married and therefore had all the social-economic conditions that affect livelihoods in an African societal setting, that is, family responsibility, cultural practices, family provision and the need for independence (Mwobobia, 2012). This helped the study in obtaining diverse but appropriate information in relation to agroecology and livelihood skills gaps.

Figure 2: Frequency distribution of the marital status of smallholder farmers



Source: Primary Data, 2018

4.3 Social Demographic Characteristics of Key Informant Interviewees

The sample description in this presentation is based on the interview guides administered to respondents in the 3 categories of Non-Governmental Organisations (NGOs)/local leaders, trainers in agroecology and private sector companies. Data was collected from 47 key informants as presented in **Table 1**. Data was solicited from these respondents because of their direct contact



with smallholder farmers either through building their capacities in agroecology or offering information services in the area.

Table 1: Frequency Distribution for the Key informants interviewed

| Organisation/location | Number |
|--|--------|
| Non-Governmental Organisations (NGOs) | 16 |
| Local leaders | 12 |
| Trainers in agroecology | 10 |
| Private sector companies | 9 |
| Total | 47 |

Source: Primary Data, 2018

4.4 Study Results and Discussion

This section presents study results in order of the specific objectives. Each specific objective is treated separately and themes raised are supported by verbatim voices from the interviews followed by the discussion of the findings with the help of related literature where necessary.

4.4.1 Objective 1: Status of agroecological practices among smallholder farmers in Uganda.

This objective examined the status of agroecological practices among smallholder farmers in Ugandan. In order to get a clear standing of these agroecological practices, the study sought to first determine the status of 2 factors of production i.e. land and labour because of their importance to the adoption of agroecological practices. The study then looked at the existing agroecological practices and whether smallholder farmers had adopted them.

4.4.1.1 Status of land and labour as factors of production

Family size

Results show ample human capital (labour) with an average household consisting of 8 persons and the average age of the household head being 46years, a figure that falls within the 15-64 years working age population of Uganda (National Population Council, 2017). This is a large family size which has an implication on the quantity of food produced, consumed and sold as well as the household's vulnerability to agricultural related risks. Indeed, results indicate that households consume an average of 2 meals per day but these were likely to reduce among 25.2% smallholder farmers especially when faced with changes in climate. It is also likely that the children within these households are used as sources of manual labour (Adebayo (2012) to ensure growth and survival of farms by intensifying land use and expanding land holdings. Results show



that women, men and youth participate in economic activities both on-farm and off-farm including land preparation, weeding, pruning, harvesting, making organic manure, pest and disease management, soil fertility management, soil and water conservation and livestock management among others.

Land ownership and use

The average size of land owned by a household is 4.123 acres on which households cultivate crops (4.965 acres) and keep livestock. 78.9% of the respondents own less than 5 acres of land with. This suggests that majority of the respondents are smallholder farmers whose food production is at subsistence level. Customary land ownership dominates the available land tenure system at 75.9 percent with freehold and mailo land ownership at 14.5 percent and 3.4 percent respectively (See Table 2). In addition, a high number of respondents (35.9 percent) reported that the land was registered in the names of the husband, 15.2 percent reported that the land was jointly registered (husband and wife) and only 9.0 reported that the land was registered in the woman's name (See Table 3).

Results further indicate that for 50.3% of the smallholders decisions on land are made jointly as a household while for 33.8% they are done by men (husband) and wife (13.1). In regards to decision making on how revenue from land is utilised, majority of the farmers (59.3%) made joint decisions, for 27.6 percent the husband was the decision maker while for 13.1% it was the wife.

Table 2: Existing Land Tenure and ownership

| Land Tenure System | Responses by Sex | | Total |
|--------------------|------------------|--------|-------|
| | Male | Female | |
| Government | 2 | 1 | 3 |
| Customary | 58 | 52 | 110 |
| Freehold | 7 | 14 | 21 |
| Leasehold | 0 | 3 | 3 |
| Mailo | 1 | 4 | 5 |
| Don't know | 1 | 2 | 3 |
| Total | 69 | 76 | 145 |



Table 3: Land registration status among the respondents

| Registration | Responses by sex | | Total |
|---|------------------|--------|-------|
| | Male | Female | |
| Husband | 28 | 24 | 52 |
| wife | 2 | 11 | 13 |
| Both husband and wife | 11 | 11 | 22 |
| someone else male in or outside household | 5 | 7 | 12 |
| Someone else female in or outside household | 0 | 1 | 1 |
| Not registered | 21 | 18 | 39 |
| Don't know | 2 | 4 | 6 |

The implication of this result is that, with most land registered in the husband's name, women are at risk of becoming landless because they only have access rights but not ownership (PELUM Uganda, 2012). They can access land for farming but they cannot sell it off or offer it as collateral to access credit. In majority of cases where ownership of land comes into dispute, the name on the land title is what carries weight in court of law⁷. Just like women, youth's land rights were limited to access with about 80 percent of the youth (18-30years) using land under the customary tenure system (**Table 4**). The implication of this is that youth are faced with hindrances associated with this tenure system such as: insecurity of tenure for land owners; impediment to development because the tenure does not allow the advancement of land markets, through which, those who need land for development can acquire it (EPRC, 2013). This hinders their level of decision making on how land is utilized.

Table 4: Existing Land Tenure by age

| Age | Government | Customary | Freehold | Leasehold | Mailo | Don't know | Total |
|--------------|------------|-----------|----------|-----------|-------|------------|-------|
| 20-25 | 0 | 9 | 1 | 0 | 0 | 0 | 10 |
| 26-30 | 0 | 11 | 3 | 0 | 1 | 0 | 15 |
| 31-35 | 0 | 19 | 2 | 1 | 4 | 0 | 26 |
| 36-40 | 1 | 12 | 6 | 0 | 0 | 0 | 19 |
| 41-45 | 2 | 8 | 2 | 0 | 0 | 1 | 13 |
| 46-50 | 0 | 15 | 2 | 0 | 0 | 0 | 17 |
| 51 and above | 0 | 36 | 5 | 2 | 0 | 2 | 45 |
| Total | 3 | 110 | 21 | 3 | 5 | 3 | 145 |

⁷ Sections 56, 60 and 184 of the Registration of Titles Act).



4.4.1.2 Objective 1: status of adoption of agroecological practices among smallholder farmers

For purposes of analysis, practices were grouped into five categories, that is, practices related to soil and water conservation, seed security management, livestock production and management, pest and disease management and climate change adaptation. For each category, status of existing and adopted agroecological practices is discussed.

Soil and water conservation practices

Figure 3 shows the soil conservation practices that farmers have adopted on their farms. These include practices such as cover cropping, mulching, composting, intercropping, irrigation and water harvesting. Overall adoption of these practices is so low with the highest practices adopted by 64 out of the 145 respondents that participated in the study. Women generally show higher levels of adoption of soil and water conservation practices than men.

Figure 3: Soil and water conservation practices adopted by smallholder farmers

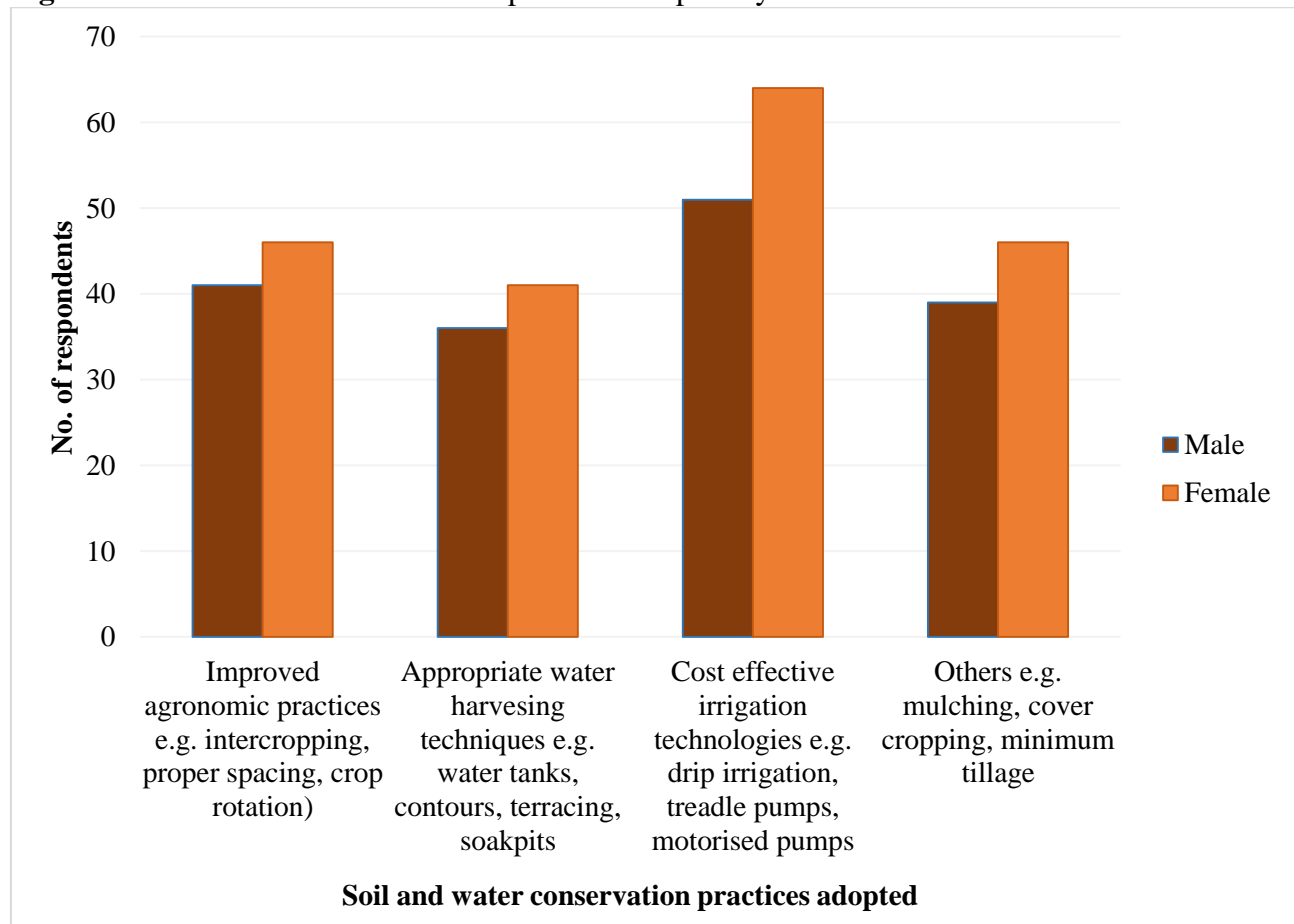


Table 5 further indicates adoption of these practices which is low among youth aged 26-30, but increases among farmers aged 26-35 but starts declining after that then again increases for farmers aged 51 and above. This result complements EPRC (2013)'s finding that there is an increasing share of the youth joining the services sector (from 19.5 percent in 2005/6 to 27.3 percent in 2009/10) and this increase seems to be faster than that of their counterparts in prime age.

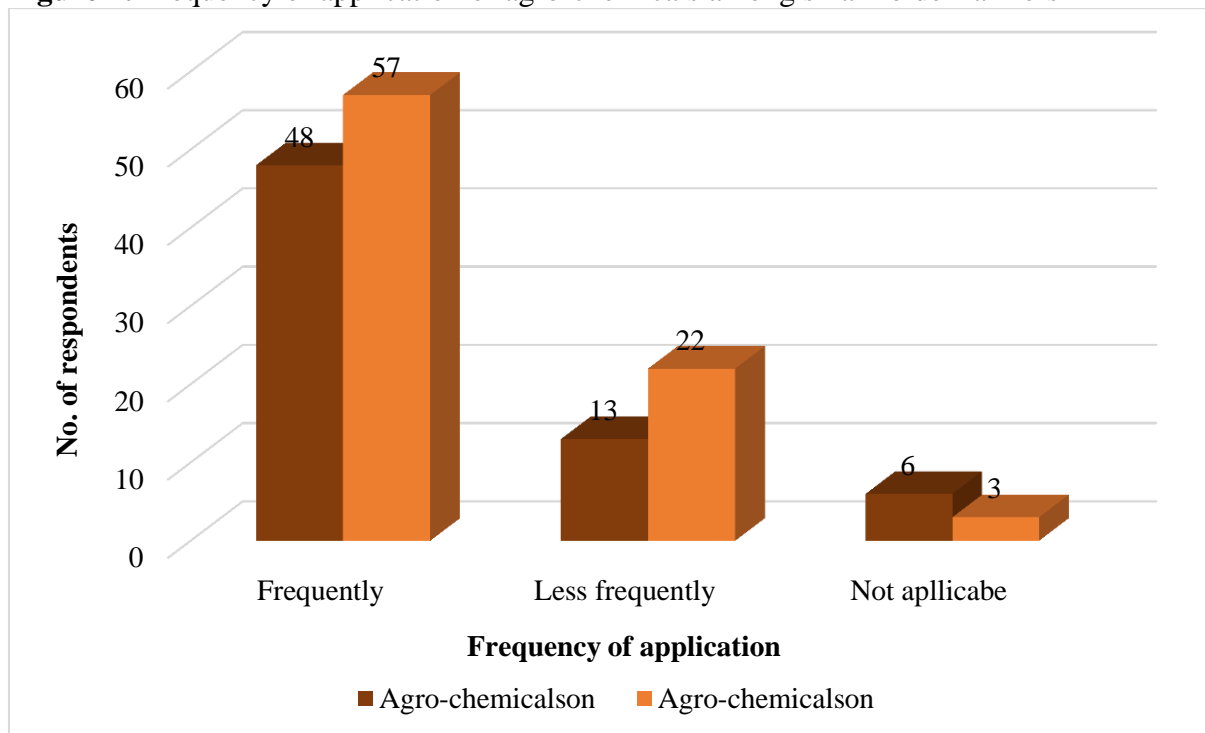
Table 5: Adoption of soil and water conservation practices by Age

| Soil and water conservation practices | Age of Respondent | | | | | | |
|---|-------------------|---------|---------|---------|---------|---------|--------------|
| | 20 - 25 | 26 - 30 | 31 - 35 | 36 - 40 | 41 - 45 | 46 - 50 | 51 and above |
| Improved agronomic practices e.g. intercropping, proper spacing, crop rotation) | 4 | 12 | 16 | 13 | 6 | 5 | 31 |
| Appropriate water harvesting techniques e.g. water tanks, contours, terracing, soak pits | 5 | 11 | 11 | 11 | 8 | 7 | 24 |
| Cost effective irrigation technologies e.g. drip irrigation, treadle pumps, motorized pumps | 7 | 11 | 23 | 14 | 11 | 14 | 35 |
| Others e.g. mulching, cover cropping, minimum tillage | 6 | 11 | 15 | 11 | 6 | 6 | 30 |

Further results indicate that smallholder farmers use agro-chemicals on their farms for both crop and livestock production. The study categorized agro-chemicals as both organic and inorganic with 46.2 percent farmers using organic agro-chemicals and 56.6 percent using inorganic chemicals. **Figure 4** shows that the frequency of application of inorganic agro-chemicals was slightly higher than organic chemicals at 57 percent and 48 percent respectively. 58.6 percent smallholder farmers are not comfortable using agro-chemicals (both organic and inorganic) because of their inability to meet identified needs. This finding is compliments Semalulu, et al (2005) who noted that with the growing population and crop production in Uganda, the import of pesticides is increasing despite the fact that these are of concern if used inappropriately even at low national rates of application.



Figure 4: Frequency of application of agro-chemicals among smallholder farmers



The conclusion from the results gathered in adoption of soil and water conservation practices is that smallholder farmers have not adopted them making it a critical area of intervention during implementation of the Single Spine extension reform (EPRC, 2016).

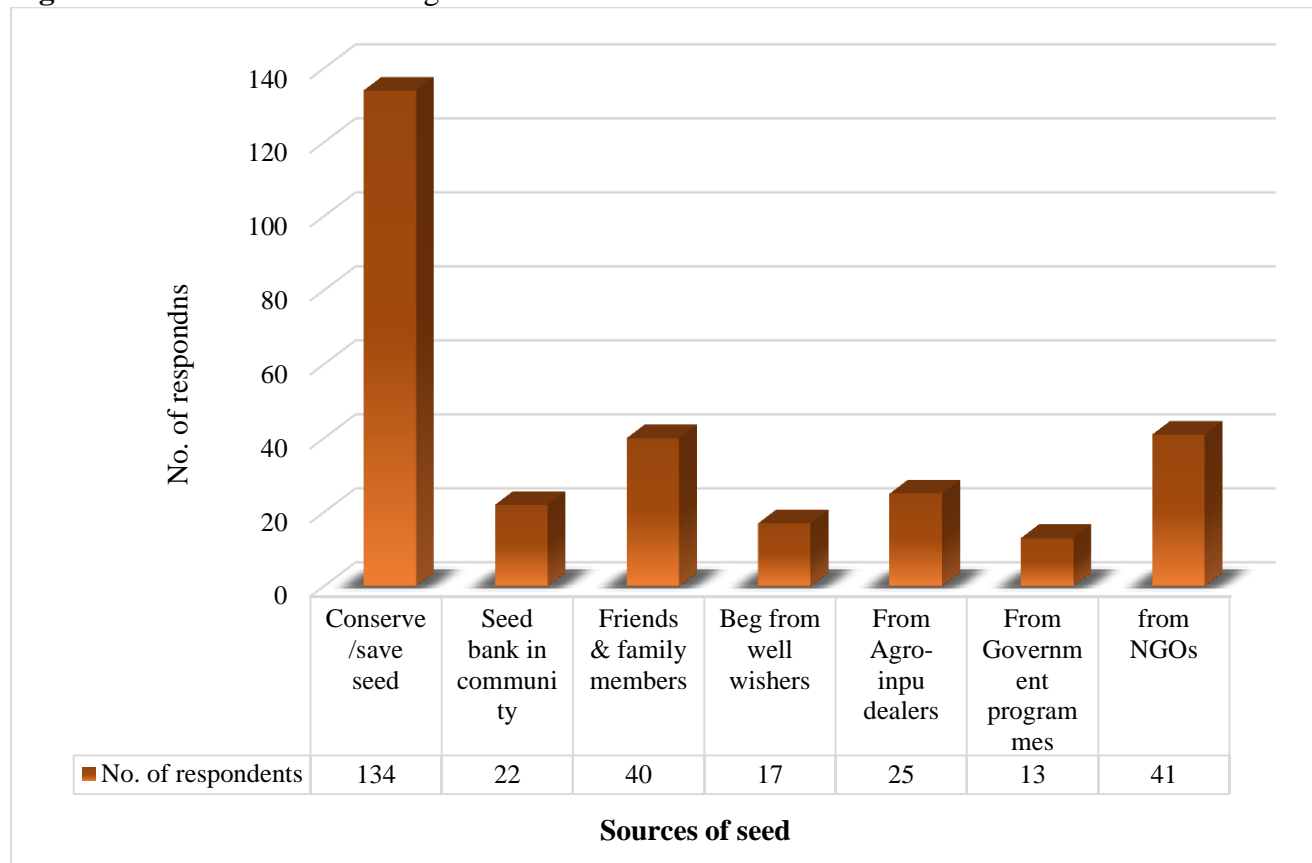
Seed security and management practices

When asked about their main sources of seed if not purchased, smallholder farmers responded that while they obtained seed from multiple sources, farm saved seed is their main source of seed at 92.4%. Such seed was a combination of certified, indigenous and quality declared seed. **Figure 5** indicates all major seed sources including; Government, NGOs, community seed banks and asking friends/ family members and well-wishers. 62% of the farmers were satisfied with their home saved seed but found the terms unfavourable (costly and untimely) if seeds are bought or provided by other sources.



Whereas seed saving was high, only 26.2% of the smallholder farmers were involved in seed multiplication activities despite the fact that 28.3 percent and 49.7 percent of them indicated loss of seed and poor crop yields as some of the effects of climate changes to their farming.

Figure 5: Sources of seed among smallholder farmers



The implication of these results on adoption of seed security and management practices among smallholder farmers is that informal seed systems⁸ are the major sources of seed to smallholder farmers. Similar findings were also reported by ISSD Uganda (2014) who showed that farmer seed systems in Uganda provide more than 80% of seed required by farmers. However, the results also show that when faced with agricultural related shocks such as floods and drought, many smallholder farmers are left seed insecure due to their reliance on farm saved seed that is minimally supported with seed multiplication and preservation practices and community seed banks.

⁸ The formal seed system is characterized by a clear chain of activities, usually starting with plant breeding and promotion of materials for formal variety release and maintenance while the informal seed system embraces most other ways in which farmers access seed



Livestock production and management practices

It was established that only 34.5 percent of the farmers are engaged in practices to improve and/or manage livestock breed quality. The farmers involved in livestock production mostly focused on small animals such as goats, chicken and pigs with a minimal number having cows. 59.3percent were not involved in livestock management citing reasons for this as genetic resources not being available, high costs involved, ignorance, lack of interest and lack of trust in the practices such as artificial insemination as de-motivators. **Table 6** indicates the specific livestock management practice employed. Adoption of these practices is not so different among women and women.

Table 6: Livestock production and management practices adopted by smallholder farmers

| Practices engaged in | Adoption rates by sex (Numbers) | |
|--------------------------------|---------------------------------|--------|
| | Male | Female |
| Proper record keeping | 22 | 19 |
| Selective breed/mating on farm | 19 | 21 |
| Take to neighbor for mating | 13 | 12 |
| Use of artificial insemination | 13 | 13 |

The implication of these results is that livestock production and management is at subsistence level where smallholder farmers' focus in keeping livestock is mainly to produce sufficient food to satisfy the needs of the household rather than sell them. Occasional surpluses may be sold or bartered. The situation was not so different from some of the other farmers that owned large animals such as cows. For instance, in Pakwach district one male smallholder farmer commented that:

“Most of us do not keep our cattle on our farms. We pay Balaalo (herdsmen from Western Uganda) to look after it on community land. Milk got from the cows acts as payment to the Balaalo. Each of us is however supposed to incur any other costs related to the management of the cattle such as vaccinations, treatment and artificial insemination if needed. We have limited control over the management of the cattle and have to take word from the Balaalo as truth.”

Another male responded further commented that,

“Because we employ other people to look after our cattle, we basically end up getting nothing from the cows. Not even cow dung to fertilize our soils. We keep the cows for prestige which is not really beneficial.”



Differences were found in their source of livestock breeding materials with more men using artificial insemination as a source of breeding material compared to 5% women as indicated in **Table 7**. More women (61%) however utilized neighbors as sources of breeding material compared to 47% men. This results indicate that whereas women had adopted artificial insemination as a livestock production and management practice, they did not hugely utilize it as a source of breeding material rather preferring their neighbors

Table 7: Sources of livestock breeding materials

| Sources of livestock breeding material | Male | Female | Total |
|--|------|--------|-------|
| Artificial insemination | 14 | 5 | 19 |
| Take to neighbor | 47 | 61 | 108 |
| No specific management | 8 | 10 | 18 |
| Total | 69 | 76 | 145 |

Only 10% of the farmers had access to diverse animal genetic resources with more men than women having access at 73 percent and 27percent respectively. **Table 8** below indicates the various sources of these genetic resources. 21.4% of the farmers indicated that they did not find the terms of accessing the genetic resources favourable in terms of costs and timeliness which largely contributed to 77.2% of them not being satisfied.

Table 8: Sources of livestock genetic resources materials

| Sources of genetic resources | Sex of respondents | | Total |
|--|--------------------|--------|-------|
| | Male | Female | |
| On-farm | 7 | 6 | 13 |
| Within community/ neighbors | 31 | 24 | 55 |
| Public veterinary services & live stock research institutions | 2 | 1 | 3 |
| Private veterinary services & live stock research institutions | 3 | 2 | 5 |
| NGOs | 4 | 4 | 8 |
| Academic institutions | 7 | 2 | 9 |

The implication of these results is that with minimal farmers involved in livestock production and management, adoption of other agroecological practices such as water and soil conservation is left in balance. Ideally, integration of livestock into cropping should increase the area cultivated, timeliness of agricultural operations and maintain soil structure and fertility. Furthermore, worldwide, the Food and Agriculture Organization (FAO) estimates that there will be a 73

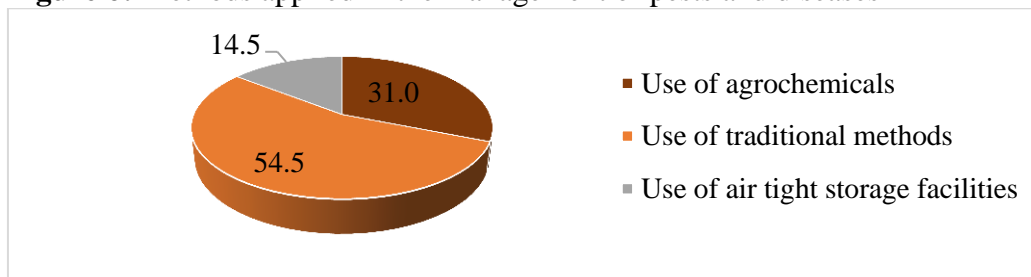


percent increase in meat and egg consumption and a 58 percent increase in dairy consumption over 2011 levels by the year 2050 (McLeod, 2011). However, with minimal efforts put into improving livestock management practices as well as value chains, Uganda’s smallholder farmers risk not benefiting from this rise in consumption.

Pest and disease management practices

Results in **Figure 6** indicate that management of pests and diseases is mainly through use of traditional methods (54.5%) and application of agro-chemicals-both organic and inorganic. 46.2 percent farmers were using organic agro-chemicals compared to 56.6percent using inorganic chemicals. Knowledge of traditional methods is mainly passed from generation to generation and farmers find it to be effective in dealing with pests and diseases. The results however show that some smallholder farmers have adopted harmful practices such as use of rat poison during storage of beans as a way of preventing pests and diseases.

Figure 6: Methods applied in the management of pests and diseases



Extension service delivery and adoption of agroecological practices

83.4% of the smallholder farmers had access to extension services which were mainly provided by government, NGOs and private companies (**Table 9**). However, the timeliness and frequency in accessing these services was not good. 51.7% of the smallholder farmers reported that they received the services very often, 40% less often and 8.3% did not receive it at all. Those with access to extension services received information on agroforestry, soil and water conservation, animal health, improved livestock feeding, restoration of degraded areas, tree planting and nursery establishment and on-farm tree management practices among others. Only 6.2% of them were satisfied with the services provided with 32.4% not satisfied at all.



Table 9: Institutions that provide extension services to smallholder farmers

| Type of extension service Provider | Percentage of respondents receiving the service (%) |
|------------------------------------|---|
| Government | 49.7 |
| NGOs | 50.3 |
| Private companies | 13.1 |
| Individuals | 31.7 |

Figure 7: Access to extension services from different institution per age category

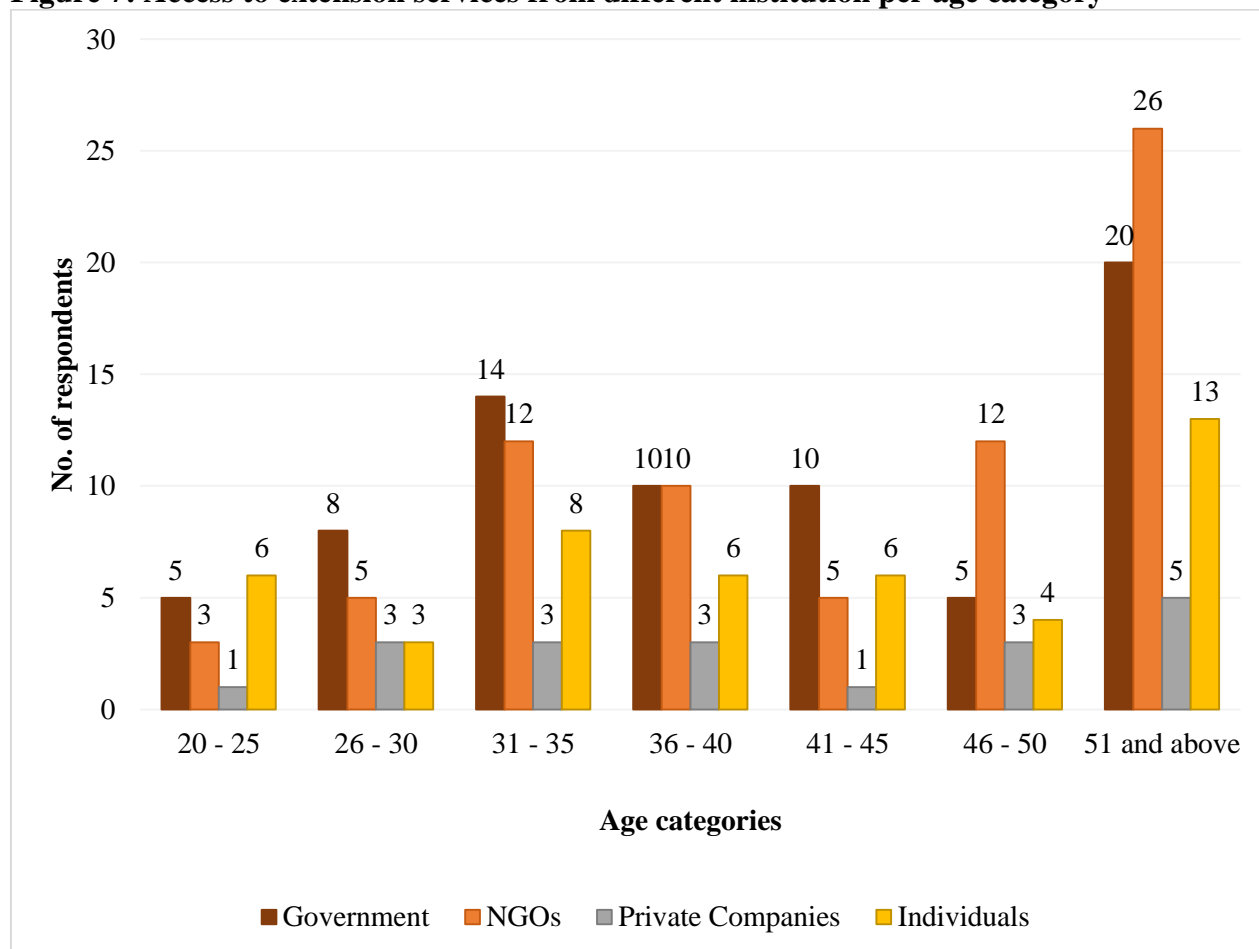


Figure 7 shows that youth (ages 26-30) access to extension services from the various institutions is low compared to other categories. There was no clear definitive source of extension services for them. This may imply that the youth have not been prioritized by the institutions as a vulnerable category that needs to be targeted for extension service delivery.

The results also imply that smallholder farmers who receive less extension services may find it hard to adopt agroecological practices due to the untimeliness and infrequency of the services.



When asked how extension service provision could be improved; the farmers responded that; the services need to be brought closer to them, in addition to training and organizing them into groups, improve on the timeliness and frequency of the technical advice, ensure that the services reach all farmers and not just a few, providing more trainings on animal management and give timely feedback.

4.4.1.3 Objective 2: Capacity of agroecological value chains in stimulating the adoption of agroecological practices among smallholder farmers.

Value chains are the set of sequenced value-creation activities that convert raw materials to final products and the institutions that link these different production nodes (Vroegindewey & Hodbod, 2018). As the primary mediator between agroecological systems, households and markets, value chains are an important part of the social structure of food systems. For agroecology values chains to cause adoption of agroecological practices, the study focused on the status of the following;

- Organic certification,
- Value addition and marketing – (availability of markets, involvement satisfaction and satisfaction derived from marketing produce, weighting), agro-processing.
- Favourable policy environment (discussed in objective 3)

4.4.1.3.1 Organic certification

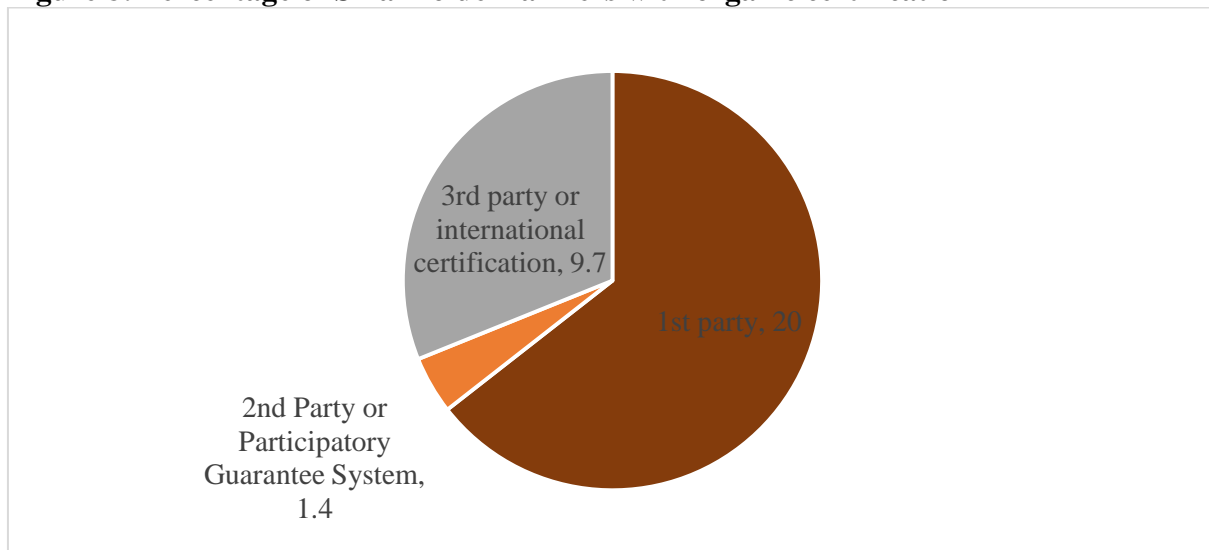
According to the African Trade Policy Centre (2010), organic certification and mandatory regulation are necessary in organic agriculture not only to create a respectable and credible image for the sector but also to serve as an instrument for development of the local market and, finally, to serve as a tool for assisting organic producers in accessing export markets through equivalence agreements. Results show that 16.6 percent of the respondents had heard about organic certification of which only 31percent had acquired it. Of those who had heard about it, 52.4 percent were women while 47.6 percent were men.

Figure 8 indicates the percentage of smallholder farmers who had acquired organic certification with the majority 20% having attained 1st party certification. Only 1.4% of those who acquired organic certification reported having accessed better markets. This could be attributed to the fact



that organic products have no outright distinction from conventional products, especially at the market, the nature of markets where the smallholder farmers sell their produce and the lack of price premiums in the domestic market. Indeed, according to African Trade Policy Centre (2010), market studies on organic produce have showed that the African market has been quite small in most parts of the continent due to a number of factors such as lack of awareness due to poor marketing, low-income levels and lack of local organic standards and certification infrastructure. Organic farmers reported facing challenges such as pests and diseases, limited market, price fluctuations, climate changes among others

Figure 8: Percentage of Smallholder farmers with organic certification



The implication of this result is that awareness and acquisition of organic certification is still very low among smallholder farmers as producers and consumers of organic products. This finding is in line with African Trade Policy Centre (2010) findings that most customers were neither aware of the standards available for organic products nor whether their suppliers had certification even though the Kilimohai Mark is the label that marks products as organic under the East African Organic Products Standards (EAOPS).



4.4.1.3.2 Value addition and marketing

Post-harvest handling practices

Results indicate that majority of the smallholder farmers lack appropriate technologies to aid in activities along the value chain which reduces quantity and market quality. Hand harvest and sun drying were the major methods used to harvest and dry produce. Storage of harvested produce was mainly done within a designated store (43.4%) and inside the house (29%). Other areas in which respondents stored their produce included; individual stores (15.9%), under trees and other natural shades (4.8%) and traditional granaries (6.9%). Traditional methods of post-harvest handling were passed on from generation to generation. As stated earlier, the results also show that some smallholder farmers have adopted harmful practices such as use of rat poison during storage of beans as a way of preventing pests and diseases. Only 2.1% of the respondents found the adopted post-harvest handling practices mentioned above to be very good in dealing with postharvest losses; 41.4% find them to be good, 16.6% fair and 40% poor.

The implication of the adopted postharvest handling practices is that many of the farmers end up losing produce to insects, pests, mold and moisture. This result is in support of studies conducted by the Food and Agriculture Organisation of the United Nations and the World Food Programme which show a 10 per cent food loss resulting from poor post-harvest practices by farmers in Uganda. Poor quality produce cannot fetch premium prices on the market.

In an interview with a trader who dealt directly with smallholder farmer, he noted that the poor quality of produce provided by smallholder farmers was one of the reasons why they earned less in the market.

“It is very common to find a farmer threshing and drying produce such as beans and cassava on bare ground, on dirty tarpaulins or by the roadside. Then after all this they pack the dried produce in dirty bags or basins and store them in unprotected areas where they are easily attacked by pests and diseases.”





Some of the drying practices utilized by smallholder farmers (Photo credit: PELUM Uganda, 2018)

Marketing of value added and non-value added produce

Table 10 indicates the different institutions or other value chain actors to which smallholder farmers are linked. From these institutions, farmers get services such as knowledge on agroecological practices, extension services, market for their produce, credit, agriculture inputs, extension services, market information among others. Collaboration between smallholder farmers and other value chain actors is mainly informal with only 4.1% having signed agreements with the value chain actors.

Table 10: Services smallholder farmers receive from other value chain actors

| Services received from the linkage | Percentage of respondents (%) |
|------------------------------------|-------------------------------|
| Credit | 13.1 |
| Market | 17.9 |
| Market information | 25.5 |
| Seed or agricultural inputs | 24.1 |
| Extension services | 15.9 |
| Value addition | 7.6 |
| Storage | 9.0 |
| Certification | 3.4 |

Further results show that 60.7% of the respondents are involved in the sale of their produce with majority of them (46.9percent) selling their non-value added produce to local traders and at farm gate. Only 11percent of the smallholder farmers bulk and market their produce collectively. 60%



of the smallholder farmers sold half of their produce and consumed the rest. Only 63.4percent of the smallholder farmers weighed their produce before sale.

Although smallholder farmers are involved in value addition practices such as threshing and cleaning, storage, sorting and grading and drying of produce, 72.4% felt that adding such value to their products did not fetch them better markets within their areas. Indeed 75% of the key informants interviewed were of the view that all farmers, whether practicing agroecology or conventional farming- accessed the same markets. However, some local leaders mentioned that farmers attached to specific buyers such as Kawacom in Zombo district benefited more from selling agroecological products than those who did not.

Smallholder farmers identified poor transport infrastructure as the number one challenge they face when marketing their produce. They cited poor roads and inadequate transport means (public transport, motorcycles) as a hindrance to accessing markets for their produce.



Poor postharvest handling practices such as drying produce on dirty equipment (left) or on bare ground (right) were very common among smallholder farmers (*Photo credit: PELUM Uganda, 2018*)



4.4.1.4 Objective 3: To assess the capacity of actors in influencing policies that affect agroecology.

4.4.1.4.1 Status of Agroecology Related Policies in Uganda

Agroecology is a relatively new concept in Uganda and there are no specific agroecology policies to support its development and implementation in Uganda. There are however several policies that were found to be relevant to agroecology through literature review. These include;

The National Agriculture Policy, 2013: The national Agriculture policy is the overarching guiding instrument for agriculture sector development where all the other policies, strategies and legal frameworks are promised. The policy envisions “A Competitive, Profitable and Sustainable Agricultural Sector” and the mission of the policy is to: “Transform subsistence farming to sustainable commercial agriculture.” The overall objective of the agriculture policy is to achieve food and nutrition security and improve household incomes through coordinated interventions that focus on enhancing sustainable agricultural productivity and value addition; providing employment opportunities, and promoting domestic and international trade.

The element of agriculture sustainability and ecological integrity is strongly emphasized within the policy; Objective 5 is primarily focused on ensuring sustainable use and management of agricultural resources which is believed to be a core determinant for the sustainable attainment of all other policy objectives. The policy further stresses that, “Society as a whole needs to be guided on the proper use and maintenance of key agricultural resources particularly soils and water for agricultural production”. Several strategies are proposed such as; periodic resource mapping, regulations for agriculture resource utilization within ecologically sustainable levels, awareness and capacity building on sustainable land use management among many others.

Agroecology is therefore well aligned to the agriculture and specifically, objective 5 which implies an enabling policy environment for the promotion of agroecology. However, more specific and elaborate strategies could further guide how such a process for promoting agroecology could be undertaken at all levels.



Draft Organic Agriculture Policy, 2012: The draft policy is aimed at creating an enabling environment for production, processing and marketing of organic products in Uganda through improved postharvest handling and value addition practices, promote sustainable use of natural resources and conservation of the environment including biodiversity conservation and utilization of indigenous knowledge. Specifically, the draft policy intends to ensure credibility of OA through adoption of appropriate organic standards, certification and accreditation. The policy also aims to support and strengthen research, technology development and dissemination in Organic agriculture in Uganda. Furthermore, it aims at developing domestic, regional and international markets for organic products, support provision of information, knowledge and skills on Organic Agriculture principles and practices at all levels of the value chain.

The OA policy was approved by Top Policy Management of the Ministry of Agriculture, with recommendation to proceed develop the policy costed implementation strategy which is also in place and currently awaiting the certificate of financial implication for the Ministry of Finance, Planning and Economic Development. The delay in finalizing and implementation of the policy has negatively affected the growth of the organic sub sector in Uganda despite its potential to contribute to Uganda's social economic development.

The National Fertilizer Policy, 2016: The rationale for this policy stems from the Uganda Vision 2040 and National Agriculture Policy (2013), the global sustainable development goal 2 on End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Government's commitment to the Abuja 2006 Declaration; and the on-going EAC discussions on the harmonisation of the fertiliser sub-sector. The policy is hinged on the belief that increasing the use of fertilisers, especially by smallholder farmers, who represent the majority of farmers, requires multiple and well-coordinated interventions. These include raising awareness about the importance of fertilisers and countering anti-fertiliser campaigns; creating incentives for the private sector to invest in the fertilizer business to ensure its availability in all parts of the country; regulatory institutions to ensure quality of fertilizers and their safe use; and public-private partnerships to venture into fertilizer manufacturing.

The policy recognizes the need to promote both organic and inorganic fertilizers as key for increased agriculture production. It also recognizes that inappropriate use of inorganic fertilizer as having negative effect to the environment.



The National Climate Change Policy, 2015: The goal of the policy is to ensure a harmonised and coordinated approach towards a climate resilient and low-carbon development path for sustainable development in Uganda. The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy.

In order to achieve the policy's overarching objective, the policy builds on a number of specific objectives, These are to: 1. Identify and promote common policy priorities to address climate change in Uganda, 2. Identify and promote adaptation policy responses for Uganda, 3. Identify and promote mitigation policy responses for Uganda, 4. Identify and promote monitoring, detection, attribution and prediction policy responses for Uganda, 5. Support the integration of climate change issues into planning, decision making and investments in all sectors and trans-sectoral themes through appropriate institutional arrangements and legal framework, and 6. Facilitate the mobilisation of financial resources to address climate change in Uganda.

The policy recognizes agriculture as among the most vulnerable sectors to climate change and well as the potential for agriculture to contribute to climate change mitigation through climate smart agriculture practices that increase carbon absorption and sequestration below ground. Implementation of the policy has guided the mainstreaming of climate change in different sectors and policies of Uganda including agriculture, for example the national adaptation plan for agriculture that has already been developed by the ministry.

The Draft National Seed Policy, 2016: The draft seed policy envisions a competitive, profitable and sustainable seed sub-sector where farmers have access to affordable quality seed. The policy therefore aims at creating a well-regulated seed sector that ensures availability of and access to safe and high quality seed under inclusive seed systems. The draft policy recognizes both the formal and informal sub sector as critical for sustainable seed supply. The overall objective of the policy is to promote, develop and regulate the seed subsector in order to ensure availability and access of safe and high quality seed to all stakeholders for increased food security, household income, wealth creation and export earnings. This has led to the introduction of a new seed class in Uganda; the Quality Declared Seed which makes provision for organized groups of



smallholder farmers to engage in quality seed production. This is also aimed to bridge the gap between the formal and informal sector and ensure quality and diversified seed access.

The delayed finalization and implementation of the policy could go a long way in further contributing to the growth of a more inclusive seed sector Uganda.

National Policy on Plant Genetic Resources for Food and Agriculture (2016): The draft policy envisions a diversified and secure base of Plant genetic Resources for Food and Agriculture (PGRFA), managed and sustainably utilized for the benefit of all. The mission for the draft policy is to achieve a well conserved and managed plant resource base for national development. The policy recognizes biodiversity loss as a major challenge to agriculture and endeavors to guide the process for revival and sustainable utilization of Uganda's plant genetic resources for more sustainable agriculture. Specifically, the policy intends to establish a well-coordinated and functional institutional framework for the survey and inventory, conservation, management; and sustainable use of PGRFA; to ensure a diversified resource base of PGRFA and equitable sharing of benefits arising from its utilisation; To increase the contribution of Uganda's PGRFA to economic growth, food and nutrition security and livelihoods of the people; and To empower farmers to effectively participate in the management, conservation and sustainable use of plant genetic resources.

The policy also recognizes the critical role played by farmers in conservation and sustainable management of plant genetic resources and makes strong provisions for safeguarding the rights of farmers to use, share and equitably benefit from use of plant genetic resources. Finalization and implementation of the policy could also significantly contribute to biodiversity conservation, farmers rights to seed and safeguard against bio piracy.

Revised Uganda Strategic Investment Framework for Sustainable Land Management (U-SIF SLM) 2018-2030: The U-SIF SLM is a multi-sectoral national initiative bringing together five sectors in government (MAAIF, MEMD, MWE, MLHUD, MTTI) with mandates that have a direct bearing on land degradation vis-à-vis sustainable land management. The overall goal of the U-SIF SLM is to promote key sectors cooperation to improve natural resource based livelihoods and other ecosystem services. The SIF aims at providing an integrated cross-sector approach to



investing in solutions to crosscutting SLM challenges. It also aims at scaling up and mainstreaming SLM into the center of the national development agendas.

The Investment Framework has five themes that guide interventions toward the objectives and impacts above. These are: (i) Supporting on-the-ground activities for scaling up SLM; (ii) Strengthening enabling environment for SLM; (iii) Strengthening commercial and advisory services for SLM; (iv) Supporting SLM research; and (v) Improving and strengthening SLM knowledge management and monitoring and evaluation.

Currently, the investment framework is undergoing reviews to develop a new twelve (12) year strategy for the period, 2018 to 2030; The overall goal of the U-SIF SLM is to ensure that key sectors are cooperating to improve natural resources based livelihoods and other ecosystem services and with the development Objective; to strengthen sector cooperation in order to halt, reverse and prevent land degradation/ desertification and mitigate the effects of climate change and variability.

4.4.1.4.2 Engagement in policy advocacy on agroecology related policies in Uganda

Only 15.2% of the smallholder farmers were aware of some of the existing agroecology related policies compared to 60% of the key informants. Only 41.4percent of the smallholder farmers were participating or had participated in policy processes that affect agroecology. Their involvement in policy processes was mainly around environmental issues such as bush burning, tree cutting and charcoal burning. A lack of information and awareness of existing advocacy platforms was identified as a key hindrance in people's participation in policy processes.



CHAPTER FIVE: EXISTING LIVELIHOOD SKILLS GAPS

5.1 Irrigation and water harvesting

Results indicate that only 33.8% respondents were practicing irrigation and water harvesting practices on their farms. This is a very low percentage owing to that fact that incidences of drought and erratic rainfall have increased over the past few years. Agroecology actors' capacity needs to be enhanced in simple, appropriate and cost effective irrigation technologies and water harvesting techniques. This will ensure continuous access to water for production thereby contributing to increase in production and productivity hence increase in incomes, food and nutrition security.

5.2 Limited capacity to manage pests and diseases

Pest and disease management was one the key reasons smallholder farmers advanced for applying agro-chemicals on their farms and among their livestock. However, many of smallholder farmers (56.6%) applied inorganic chemicals not only because of their ability to deal with pests and diseases but also because the farmers lacked capacity (knowledge and skills) to make effective organic agro-chemicals that could act as fertilizers, herbicides and pesticides. One respondent commented that, “as an organically certified producer, when faced with pests and diseases, I am not allowed to use chemical fertilizers and yet organic solutions are not readily available. This applied to agroecology trainers whose knowledge and skills in this area was limited. In an interview with an agroecology trainer, she too conceded that;

We are always telling farmers not to spray inorganic chemicals on their crops and animals but what solution are we giving them? We tell them that such chemicals once sprayed damage our health and the environment, but have we given them any safe options? We need to research and come up with organic agro-chemicals that can counteract the inorganic agro-chemicals but unfortunately, we lack knowledge and skills.

5.3 Postharvest handling and processing

Majority of smallholder farmers used rudimentary methods during postharvest handling period leading to losses and poor quality produce. Some of such poor methods include; threshing and drying produce on the floor, storing produce within the house or with animals. Results indicate that respondents in Masaka and Kasese districts added rat poison in beans during storage in order to prevent pests. Only 2.1% of the respondents found the adopted post-harvest practices



mentioned above to be very good in dealing with postharvest losses. Majority of the smallholder farmers (41.4%) found them to be good, (16.6%) fair and (40%) poor. There is need to build capacity of agroecology actors in safe and sustainable postharvest handling practices for threshing, drying and storage among others. The promotion of new skills and appropriate non-patented technologies among all farming communities is crucial and requires integrating traditional and local knowledge and improving collaborations between public research institutions and education facilities (Friends of the Earth Africa and African Centre for Biodiversity, (2017).

5.4 Livestock production and management

Only 34.5 percent of the farmers are engaged in practices to improve and/or manage livestock breed quality. Some farmers such as those in Pakwach district keep cattle for prestigious purposes and not because of the benefits they could get out of it. This calls for capacity building in integrated crop and animal management. Apart from the direct benefits of their products (meat, milk, fleece, skins and manure), integrating animals with crops could reduce weeds because they become forage for the animals. It could also improve soil quality, increase yield, produce a diversity of foods, aid pest management, and improve land use efficiency

5.5 Acquiring organic certification

Acquiring organic certification is one way that smallholder farmers can re-enforce their commitment to being agro-ecological producers. However, the study revealed that only 16.6% of the respondents had heard about organic certification and 31percent had acquired it. Only 1.4% of those who acquired organic certification reported having accessed better markets. Those who acquired reported that they did not access better markets as a result of acquiring the certification. This can be attributed to the fact that their products have no outright distinction from conventional products and to the nature of markets where they sell their produce (mostly local markets). Smallholder farmers therefore need to be supported in acquiring organic certification and knowledge and skills in accessing better markets for their produce.



5.6 Collective production and/or marketing

Markets are fundamental to scaling up agroecology and alternative local markets and networks of consumers and producers have played a key role in providing support to agroecological producers (Actionaid, 2018). Study results show that marketing of produce is mostly done at individual level not collectively. Individually, farmers mostly sell their produce in local markets missing out on the district and regional markets that only collective bulking and marketing could help them access hence most likely better prices for their produce. Similarly, networking with other value chain actors needs to be improved. This indicates that smallholder farmers are still working in ‘silos’ an aspect that limits the potential of out-scaling and up-scaling agroecology within communities. Farmers’ capacity therefore needs to be built on how together so as to develop farmer-to-farmer networks, farmer-to-consumer solidarity and social movements that advance agro-ecology (Altieri, 2009).

5.7 Land rights

Land is a major capital and resource in agroecology livelihood systems. As such, all agroecology actors especially women need to be able to access, own and control it. The percentage of women with their land rights needs to go beyond the 15.2% that had jointly registered their land with their husbands and the 9.0 with land registered in their names. Women therefore need to be provided with knowledge and skills on how to access their land rights.

5.8 Inadequate knowledge and skills in advocacy or policy influencing

The study revealed that only 15.2% smallholder farmers were aware of policies related to agroecology and only 18.6% participated in policy influencing. This points to inadequate knowledge and skills in agroecology. As a movement, agroecology still needs influencers at all levels. Agroecology actors, education and research institutions, NGOs and private sector need to join hands to further the agroecology agenda but to do this, knowledge and skills in advocacy need to be developed and/or strengthened.



CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of the findings, conclusions derived from the findings and the recommendations. The summary of the findings of the study are presented following the three sub objectives of the study.

6.2 Summary of results

The study established a number of results and the summary is outlined here under.

6.2.1 Status of agroecological practices among smallholder farmers in Uganda

The study established that under objective one, all household members (women, men and youth) participate in economic activities both on-farm and off-farm from which they get food for consumption and sale. On average, households consume 2 meals per day but these are likely to reduce among 25.2% smallholder farmers when faced with climate change effects. Adoption of soil conservation practices such as cover cropping, mulching, composting, intercropping, agroforestry and use of organic chemicals was low.

Farm saved seed is the major source for seed for smallholder farmers at 92.4%. However, whereas seed saving was high, only 26.2% of the smallholder farmers were involved in seed multiplication activities despite the fact that 28.3 percent and 49.7 percent of them indicated loss of seed and poor crop yields as some of the effects of climate changes to their farming. Few farmers (34.5) percent of are engaged in practices to improve and/or manage livestock breed quality with a focus on mainly small animals such as goats, chicken and pigs with a minimal number having cows.

Management of postharvest pests and diseases is mainly through use of traditional methods and application of agro-chemicals-both organic and inorganic. The adopted postharvest handling practices lead to lose of produce to insects, pests, mold and moisture among many of the farmers. NGOs, government and private sector companies are the major structures that influence



smallholder farmers' adoption of agroecological practices by providing them with access to services and products such as; knowledge on agro-ecological practices, extension services, capacity building in agriculture related fields, inputs among others.

6.2.2 Capacity of agroecological value chain in stimulating adoption of agroecological practices among smallholder farmers

60.7% of the smallholder farmers are involved in the sale of their produce. Only 11 percent of the smallholder farmers bulk and market their produce collectively. 60% of the smallholder farmers sold half of their produce and consumed the rest. Only 63.4 percent of the smallholder farmers weighed their produce before sale. Majority of the smallholder farmers (46.9%) sell their non-value added produce to local traders and at farm gate. Results further show that 16.6% farmers have heard about organic certification of which only 31% have acquired it. 1.4% of those who acquired organic certification accessed better markets.

In addition, only 15.9% smallholder farmers are linked to other value chain actors with collaboration mainly informal - only 4.1% having signed agreements with the value chain actors. Smallholder farmers lack appropriate technologies to aid in activities along the value chain which reduces quantity and market quality. Hand harvest and sun drying were the major methods used to harvest and dry produce which was then mainly stored within a designated store usually a room within the house, inside the house, under trees and other natural shades or in traditional granaries. Only 2.1% of the respondents found the adopted post-harvest handling practices to be very good in dealing with postharvest losses.

6.2.3 Capacity of actors in influencing policies that affect agroecology

15.2% of smallholder farmers are aware of existing policies related to agro-ecology and only 18.6% are participating or had participated in policy processes that affect agroecology. Involvement in policy processes was mainly around environmental issues such as bush burning, tree cutting and charcoal burning. A lack of information and awareness of existing advocacy platforms was identified as a key hindrance in people's participation in policy processes.

The study identifies 8 related policies, their objectives, status and contribution to the development of agroecology.



6.3 Conclusion

In conclusion, adoption of agroecological practices and value chain practices among smallholder farmers is still so low and is mainly affected by various knowledge and skills gaps as discussed under chapter five of this report. The untimely and infrequent extension services delivered do not help the situation. This calls for increased efforts that ensure enhanced knowledge and skills in agroecological practices. This can be done through research, farmer-to-farmer knowledge and skills transfer, use of demonstration gardens, farmer-scientist collaborations and prioritizing ecological agriculture extension activities.

6.4 Recommendations

Based on the findings and discussions of this study, the following recommendations are made:

6.4.1 Set up District level agroecology centers of excellence for easy access to information

Uganda Martyrs University (UMU) should set up agroecology centers of excellence within districts in order to facilitate easy access to information and transfer of skills to the different agroecology stakeholders. When asked whether they knew of any agroecology learning centers that had been established within their community only 17.9% smallholder farmers responded affirmatively. It is therefore not surprising that uptake of agroecology and climate change coping and adaptation practices was still low. Agroecology actors need to have an assured source of information, practical skills and solutions to some of the challenges they face. For the start, UMU can have centers of excellence at regional level (North, South, East, West, West Nile and Karamoja) but gradually bring them closer to the farmers at district level.

6.4.2 Conduct research and develop organic agro-chemicals

Concerted efforts need to be put into researching and developing organic agro-chemicals that effectively help farmers in dealing with the ever emerging pests and diseases among crops and animals. Pest and disease management was one the key reasons why smallholder farmers applied agro-chemicals on their farms and among their livestock. Majority of them applied inorganic agro-chemicals. Although many did not feel comfortable using these inorganic agro-chemicals,



they felt they had no choice because the traditional organic pest and disease management concoctions were sometimes not able to eliminate some pests and diseases such as banana wilt and the fall army worm. The study revealed that respondents in Masaka and Kasese used rat post during storage of beans in order to prevent pest. UMU needs to therefore continuously research and come up organic agro-chemical products that meet the needs of different agroecology actors.

6.4.3 Develop and offer tailor made short courses for different agroecology stakeholders

Owing to the knowledge and skills gaps under each sub-objective, there is need for UMU to develop and deliver short courses tailor made for smallholder farmers, NGOs, local leaders and agroecology trainers. Each of these stakeholders is constrained by different aspects such as time, geographical location and education background, which limit them from taking up the existing training opportunities or courses offered by UMU. There is therefore need to ‘take trainings to these people’. These should ideally be short certificate courses of about 2-4 weeks delivered within their locality. The courses should incorporate theoretical and practical sessions with the latter taking up the biggest percentage. Doing this will enhance acquisition of the needed knowledge and skills in agroecology among the various stakeholders.

6.4.4 Develop value chains based on indigenous crops

UMU needs to bring the issue of indigenous crops to the forefront of its training and value chain development. Whereas government is continuously promoting improved and hybrid seeds among farmers, many have been found to be lacking in taste and resistance to weather conditions and pest and diseases. Smallholder farmers who participated in the study found it unaffordable to purchase such seeds hence the reason why 92.4% of them saved seed instead of buying it. Some respondents in Pakwach district had resorted to planting indigenous cassava varieties that stay in the garden for more than a year as a way of ensuring availability of food in times of drought. The value of indigenous crops still remains. UMU therefore needs to actively promote production, multiplication, preservation, value addition and marketing of such crops for they can support agroecology actors’ livelihoods.



6.4.5 Support dissemination of information, education and communication materials

UMU needs to actively engage in the production and dissemination of information, education and communication (IEC) materials such as posters, fliers, guides, fact sheets, short videos among others. Such simplified information will help farmers understand agroecology related issues such as climate change, soil and water conservation etc. Production and dissemination of IECs should be done in partnership with NGOs and government to ensure uniformity in messages communicated as well as to share costs. There is also need to utilize social media and the UMU website a channels of information dissemination. Through social media and the website, agroecology related messages can reach far and wide.



APPENDICES

1: Questionnaire for Agroecology actors



African Centre of Excellence Project (ACE II)

Baseline situational analysis of agroecology and livelihood skills gaps in Uganda

QUESTIONNAIRE for agroecology actors

PELUM Uganda is working with Uganda Martyrs University to conduct a baseline analysis on the selected agricultural livelihood systems and their connectivity to agro ecology in Uganda. The baseline analysis is for the ACALISE Project whose objective is to streamline the production of a high level and well-motivated, ethically oriented critical mass of Agroecology and livelihood systems experts to impact on prevailing agricultural, nutritional, and environmental challenges in the region.

Please take a moment to complete these questions. Your answers are confidential and will only be used to assess the pre-operation situation of this project and will assist benchmarking of the project outcomes.

Interviewer's name: _____

| Question | Response |
|--|---|
| Respondent identification particulars | |
| 1. District | 1. Masaka _____ 2. Kalangala _____ 3. Kiboga _____ 4. Kibaale _____ 5. Kabale _____ 6. Kasese _____ 7. Hoima _____ 8. Nakasongola _____ 9. Mityana _____ 10. Soroti _____ 11. Nebbi _____ 12. Kabong _____ 13. Iganga _____ 14. Gulu _____ 15. Zombo _____ 16. Kapchorwa _____ |
| 2. Organisation | 1. Agency for Rural Women Empowerment (ARUWE) _____ 2. Zombo District Farmers Association (ZODFA) _____ 3. Caritas Nebbi _____ 4. Caritas MADDO _____ 5. Volunteer Efforts for Development Concern (VEDCO) _____ 6. Hoima District Farmers Association (HODFA) _____ 7. Eastern Archdiocesan Development Network (EADEN) Iganga _____ |



| | | |
|--------------------|--|--|
| | | 8. Tree Talk Plus (Kapchorwa) _____ 9. Emesco Development Foundation (EDF) _____ 10. Eastern and Southern Africa Small-scale Farmers Forum (ESAFF) Uganda _____ 11. Sustainable Agriculture Trainers Network (SATNET) Kasese _____ 12. Caritas Kabale _____ 13. SOCADIDO _____ 14. Rural Community in Development (RUCID) _____ 15. Dodoth Agro-Pastoralists Development Organisation (DADO) _____ 16. Ecological Christian Organisation (ECO) Kalangala _____ |
| 3. | Agro-ecological actor's name | _____ |
| 4. | Agro-ecological actor's telephone contact (optional) | _____ |
| 5. | GPS location | _____ |
| 6. | Sex of respondent | Male _____ Female _____ |
| 7. | Age | 15 - 19 _____ 20 - 25 _____ 26 - 30 _____ 31 - 35 _____ 36 - 40 _____ 41 - 45 _____ 46 - 50 _____ 51 and above _____ |
| 8. | Marital status of the respondent | Single no children _____ Single parent _____ Married _____ Separated _____ Widow/er _____ Divorced _____ |
| 9. | Total household membership | _____ |
| Land rights | | |
| 10. | What size of land does your household own? (in acres) | _____ |
| 11. | Which other assets does the household have to support the household? | |
| 12. | Who is the household head? | |
| 13. | How old is the household head? | |
| 14. | In what type of land tenure system is your land? | a. Government or state land _____ b. Customary including Kibanja holders _____ c. Freehold _____ d. Leasehold _____ e. Mailo _____ f. Don't know _____ |
| 15. | In whose name is the land registered? | a. Husband _____ b. Wife _____ c. Both husband and wife _____ d. Someone else male in or outside the household _____ e. Someone else female in or outside the household _____ f. Not registered _____ g. Don't know _____ |
| 16. | Who generally makes the decisions about use of your land? | a. Household jointly _____ b. Male or husband in the household _____ c. Female or wife in the household _____ d. Outside household male _____ |



| | | |
|------------------------------------|---|---|
| | | <ul style="list-style-type: none"> e. Outside household female_____ f. Government or other institution_____ g. Clan or family outside the household_____ h. No decision made_____ |
| 17. | If any revenue is generated from your land who decides how to spend this revenue? | <ul style="list-style-type: none"> a. Jointly as a household_____ b. Male or husband in the household_____ c. Female or wife in the household_____ d. Outside household male_____ e. Outside household female_____ f. Government or other institution_____ g. Clan or family outside the household_____ h. No decision is made_____ |
| Production and productivity | | |
| 18. | What activities do you mainly engage in? | _____ |
| 19. | What proportion of the land is under crop cultivation? ⁹ | _____ |
| 20. | What was the estimated yield you harvested last year/last season per crop? | _____ |
| 21. | What proportion of the land is under livestock management? | _____ |
| 22. | What was the estimated yield you got last year/last season for each livestock? | _____ |
| 23. | What are some of the activities you did during the production phase? | <ul style="list-style-type: none"> a. Land preparation_____ b. Weeding_____ c. Pruning_____ d. Harvesting_____ e. Making organic manure_____ f. Pest and disease management for plants_____ g. Soil fertility management e.g. Composting, green manuring, liquid and plant manures, etc_____ h. Soil and water conservation e.g. mulching,terracing, contours etc_____ i. Livestock feed management practices e.g. feed production, hay and silage production etc_____ j. Vaccination of livestock_____ k. Provision of livestock supplements _____ l. Pest and disease management for livestock _____ m. Controlled breeding e.g. to avoid inbreeding_____ n. Record keeping and documentation_____ o. Others (specify) _____ |
| 24. | Do you have access to extension/advisory services? | Yes _____ No_____ |
| 25. | From who do you get extension services? | Government_____ NGOs _____ Private companies_____ Individuals_____ |

⁹ Researcher must take trouble to get all the livelihood options



| | | | |
|-------------------------------------|--|---|--|
| | | No one _____ | |
| 26. | What type of extension services do you receive? | _____ | |
| 27. | How often do you receive extension services? | _____ | |
| 28. | How is the information delivered to you? | _____ | |
| 29. | To what extent are you satisfied with the provided extension services? | 1. Not satisfied at all _____ 2. Relatively Satisfied _____ | 3. Satisfied _____ 4. Very satisfied _____ |
| 30. | How better can the extension services provision be improved? | _____ | |
| 31. | Did you use any agro-chemicals on your farm (crop and livestock)? | Yes _____ No _____ | |
| 32. | If yes above, what kind of agro-chemicals did you use? | Organic _____ Inorganic _____ | |
| 33. | How often do you apply these agro-chemicals? | _____ | |
| 34. | How much agro-chemicals do you apply? | _____ | |
| 35. | How comfortable are you in using agro-chemicals on your farm? | 1. Not comfortable _____ 2. Relatively comfortable _____ | 3. comfortable _____ 4. Very comfortable _____ |
| 36. | How do you harvest your produce? | _____ | |
| 37. | How do you normally dry your produce before storage? | _____ | |
| 38. | How do you store your harvest? | 1. In a designated store _____ 2. An individual store _____ 3. Under trees and other natural shades | 4. Traditional granaries 5. Within the house _____ 6. In the livestock shelter _____ |
| 39. | How effective are the options mentioned in (37) above in dealing with post-harvest losses? | 1. Poor _____ 2. Fair _____ | 3. Good _____ 4. Very Good _____ |
| 40. | How do you manage post-harvest pests? | 1. Use of agro-chemicals 2. Use of traditional methods | 3. Use of airtight storage facilities (e.g. silos, PICS bags) _____ |
| 41. | Why did you choose the options mentioned in 39 above? | _____ | |
| 42. | How effective are the options mentioned in (39) above in dealing with post-harvest losses? | 1. Poor _____ 2. Fair _____ | 3. Good _____ 4. Very Good _____ |
| Seed security and management | | | |
| 43. | Are you currently saving any seed for replanting next season? | Yes _____ No _____ | |



| | | | |
|-----|--|---|---|
| 44. | What seeds are you saving? | a. Vegetable seeds _____ b. Roots and tuber seeds _____ c. Pulses and legume seeds _____ | d. Fruit seeds _____ e. Cereal seeds _____ |
| 45. | Do you engage in any seed multiplication activities? | Yes _____ No _____ | |
| 46. | What seeds do you multiply? | a. Vegetable seeds _____ b. Roots and tuber seeds _____ c. Pulses and legume seeds _____ | d. Fruit seeds _____ e. Cereal seeds _____ |
| 47. | What kind of seeds do you access in your community? | a. Certified seeds _____ b. Quality declared seed _____ c. Traditional/home saved seeds _____ d. All _____ e. None _____ | |
| 48. | For which crops do you access any of the above seed types? | a. Certified seeds _____ b. Quality declared seed _____ c. Traditional/home saved seeds _____ | |
| 49. | How do you access the seeds mentioned in Qn 32 above | a. Buying _____ b. Barter trade _____ c. Gifts _____ | |
| 50. | Do you find the terms favourable or affordable (costs and timeliness)? | Yes _____ No _____ | |
| 51. | If you don't purchase seeds how else do you get them? | a. Conserve seeds _____ b. Seed bank in community _____ c. From friends and family members _____ d. Beg from well wishers _____ e. From agro-input dealers _____ f. From government programmes _____ g. From NGOs _____ | |
| 52. | Are you satisfied with the quality of seeds accessed in question (32)? | 1. Not satisfied _____ 2. Relatively satisfied _____ | 3. Satisfied _____ 4. Very satisfied _____ |
| 53. | Are you engaged in any practices to improve and/or manage the breed quality of your livestock? | Yes _____ No _____ | |
| 54. | If yes, what practices are you engaged in? | a. Proper record keeping (mating record, yield data) _____ b. Selective breed/mating on farm _____ c. Use of artificial insemination _____ d. Take to neighbor for mating _____ | |
| 55. | If no in 52 above, why not? | a. Not aware _____ b. It is costly _____ c. I see no need _____ d. Services are not available _____ e. Lack of trust in the practices e.g artificial insemination, fear for diseases e.g. foot and mouth _____ | |
| 56. | Do you specifically select breeds for mating purposes? | Yes _____ No _____ | |
| 57. | What is the source of your breeding material? | a. Artificial insemination _____ b. Take to neighbor for mating _____ c. No specific management action _____ | f. Fruit seeds _____ Cereal seeds _____ |



| | | | |
|---|---|---|---|
| 58. | What do you consider when choosing a livestock breed? | | |
| 59. | Do you have access to diverse animal genetic resources in your community? | Yes _____ No _____ | |
| 60. | If yes above, what are the sources of these genetic resources in your community? | a. On-farm _____ b. Within community/neighbors _____ c. Public veterinary services and livestock research institutions _____ d. Private veterinary services and livestock research institutions _____ e. NGOs _____ f. Academic institutions _____ | |
| 61. | Do you find the terms favourable or affordable (costs and timeliness)? | Yes _____ No _____ | |
| 62. | Are you satisfied with the quality of livestock genetic resources accessed above? | 1. Not satisfied _____ 2. Relatively satisfied _____ | 3. Satisfied _____ 4. Very satisfied _____ |
| 63. | If yes above, give reasons for your answer | 1. It is easily accessible _____ 2. Affordable _____ 3. Good quality _____ 4. Resilient to the natural climatic stresses _____ 5. Culturally appropriate _____ 6. Other (specify) _____ | |
| Climate change, variability and resilience | | | |
| 64. | Have you heard about climate change and variability? | Yes _____ No _____ | |
| 65. | What are some of the incidences of climate change that you have witnessed? | a. Poor rainfall distribution _____ b. Increased drought incidences _____ c. Temperature extremes _____ d. Increased drying of wetlands and rivers _____ e. Crop failure _____ f. animal failure _____ g. Increased winds _____ h. Increased occurrence of El Nino, wind, sunshine _____ i. No response _____ j. Don't know _____ | |
| 66. | How has climate change affected your farming? | a. Loss of seeds _____ b. Poor crop yields _____ a. Lack of fodder _____ b. Livestock death _____ c. Poor livestock productivity _____ d. Limited access to water _____ e. Other (specify) _____ | |
| 67. | How does agriculture contribute to climate change? | a. Increased land degradation _____ b. Conversion of natural forests in agricultural land (carbon sinks) _____ c. Methane released during the normal digestion process of ruminants (enteric methane) _____ d. Wetland degradation e.g. through rice production _____ e. Use of synthetic fertilizers such as NPK releases nitrous oxide in the atmosphere _____ f. Bush burning releases carbon and reduces on the soil ability to absorb | |



| | | |
|---|--|--|
| | | carbons _____ g. Water pollution increases on the amount of nitrogen in the water _____ h. I don't know _____ |
| 68. | How do you cope ¹⁰ to these climate changes? | 1. Early and/or late planting _____ 2. Livestock migrating e.g. to forests _____ 3. Irrigation and water harvesting _____ 4. Seed preservation _____ 5. Indigenous methods _____ 6. Stress tolerant (drought and flood) and early maturing crop varieties (improved and indigenous crop and livestock varieties) _____ 7. Reduced number of meals taken per day _____ 8. Temporary migration _____ 9. Cultivating in wetlands _____ 10. Supplementing local diets through hunting and wild foods _____ 11. None _____ 12. Other (specify) _____ |
| 69. | How do you adapt ¹¹ / build resilience to climate change effects? | 1. Adjustment in planting regimes to adjust to the new seasonal patterns _____ 2. Sustainable pasture/fodder management e.g. making silage or hay, crop residues used as animal feeds _____ 3. Farm and livelihood diversification (Inter-cropping) _____ 4. Irrigation and water harvesting _____ 5. Stress tolerant (drought and flood) and early maturing crop varieties (improved and indigenous crop and livestock varieties) _____ 6. Adopt early warning systems _____ 7. Agro-forestry _____ 8. Education _____ 9. Soil and water conservation e.g. mulching, cover cropping, minimum tillage, composting _____ 10. Adopt integrated pest and disease management _____ 11. None _____ 12. Other (specify) _____ |
| 70. | How do you use social capital to cope with climate changes? | |
| 71. | How do you engage with local leaders or influencers in case of a shock? | |
| 72. | How effective are the practices adopted in coping with the climate change effects? Explain | _____ _____ |
| Agroecology training and practices | | |
| 73. | Which of the following agro-ecological practices are you familiar with? (Tick as many options) | a. Improved agronomic practices e.g. intercropping, proper spacing, crop rotation, cost effective green houses _____ b. Appropriate water harvesting techniques e.g. water tanks, contours, terracing soak pits _____ c. Cost effective irrigation technologies e.g. drip irrigation, treadle pumps, |

¹⁰ These should be short term strategies to mitigate the shock

¹¹ These should be long term strategies to overcome the shock



| | | | |
|-----|--|---|---|
| | | motorised pumps _____ d. Planting of adapted crop/animal varieties _____ e. Planting indigenous and traditional crops _____ f. Integrated Animal Management-small and large animals _____ g. Soil and water conservation e.g. mulching, cover cropping, minimum tillage, organic fertilizer application etc _____ h. Seed selection, multiplication and saving _____ i. Integrated pest and disease management _____ j. Appropriate postharvest handling _____ k. Early warning systems and disaster risk reduction strategies _____ l. Intensive compound gardening e.g. kitchen gardens etc _____ m. Use of energy saving technologies _____ n. Agro-forestry _____ | |
| 74. | Which of the following agro-ecological practices are you using on your farm? (Tick as many options) | a. Improved agronomic practices e.g. intercropping, proper spacing, crop rotation, cost effective green houses _____ b. Appropriate water harvesting techniques e.g. water tanks, contours, terracing soakpits _____ c. Cost effective irrigation technologies e.g. drip irrigation, treadle pumps, motorised pumps _____ d. Planting of adapted crop/animal varieties _____ e. Planting indigenous and traditional crops _____ f. Integrated Animal Management-small and large animals _____ g. Soil and water conservation e.g. mulching, cover cropping, minimum tillage, organic fertilizer application etc _____ h. Seed selection, multiplication and saving _____ i. Integrated pest and disease management _____ j. Appropriate post harvest handling _____ k. Early warning systems and disaster risk reduction strategies _____ l. Intensive compound gardening e.g. kitchen gardens etc _____ m. Use of energy saving technologies _____ n. Agro-forestry _____ | |
| | | o. | |
| 75. | How did you get to know about these practices? | a. Training _____ b. Copied from a neighbor _____ c. Government programme _____ d. NGO programme _____ | e. Through radio _____ f. Through TV _____ g. Innovation _____ |
| 76. | If through training, who provided the training? | a. Uganda Martyrs University _____ b. PELUM Uganda _____ c. Government extension worker _____ d. NGO _____ | e. Peer farmer _____ f. Local leader _____ g. Other (specify) _____ |
| 77. | How do you rate adoption of agroecology practices? | 1. Very low _____ 2. Low _____ 3. Medium _____ | 4. High _____ 5. Very high _____ |
| 78. | Do you know of any learning center in agro ecology that has been established in your community? | Yes _____ No _____ | |
| 79. | If yes what is the name and location of the agroecology centre? | _____ | |



| Market and value chain development | | |
|------------------------------------|---|--|
| 80. | Did you sell some of the produce? | Yes _____ No _____ |
| 81. | What proportion of your produce did you sell? | |
| 82. | To what extent were you involved in the sale of the produce? | 1. Very low _____ 2. Low _____ 3. Medium _____ 4. High _____ 5. Very high _____ |
| 83. | Looking at the amount of time and energy you put into farming, to what extent do you feel satisfied with the harvest and sells got? | 1. Not satisfied _____ 2. Relatively satisfied _____ 3. Satisfied _____ 4. Very satisfied _____ |
| 84. | What proportion of your produce do you consume? | |
| 85. | What types of foods do you consume within your household? | |
| 86. | What is the composition of your main meal? | |
| 87. | How many meals do you consume per day? | a. One meal _____ b. 2 meals _____ c. 3 meals _____ d. 4 meals and more _____ |
| 88. | Where did you sell produce (non-value added)? | a. Farm gate _____ b. Trader _____ c. Local market _____ d. District markets _____ e. Big town markets e.g. Kalerwe, Nakasero _____ f. Regional markets e.g. Kenya _____ g. International markets _____ |
| 89. | Where do you sell your value added produce? | a. Farm gate _____ b. Trader/middle man _____ c. Village/sub-county markets _____ d. District markets _____ e. Big town markets e.g. Kalerwe, Nakasero _____ f. Regional markets e.g. Kenya _____ g. International markets _____ |
| 90. | Are you linked to any institutions or value chain actors? | Yes _____ No _____ |
| 91. | What is your role / position within the value chain? Producer, processor, buyer etc | |
| 92. | Do you weigh or measure what you sell? | |
| 93. | What institutions or value chain actors are you linked to? | a. Microfinance institution _____ b. Processing (milling) and packing company _____ c. Marketing and trading company _____ |



| | | | |
|------|--|---|---|
| | | d. Export company _____ e. A bank _____ f. Consumers _____ g. Researchers _____ h. Cooperatives _____ i. transporters _____ j. Whole sellers and buyers _____ k. A ware house or bulking centre _____ l. Agro input dealer company _____ m. Certification agency or company e.g. UNBS _____ n. Meat producer associations _____ o. Livestock processing facilities _____ p. Public and private veterinary service providers _____ q. Diaries and cooperatives _____ r. Others (specify) _____ | |
| 94. | What services or engagements do you receive from the different value chain actors? | a. Credit _____ b. Market _____ c. Market information _____ d. Seeds or agriculture inputs _____ e. Extension services _____ f. Consumers _____ g. Researchers _____ h. Cooperatives _____ i. transporters _____ j. Value addition _____ k. Storage _____ l. Certification _____ m. Others (specify) _____ | |
| 95. | Have you signed any agreement with any value chain actor you work with? | Yes _____ No _____ | |
| 96. | Do you bulk or collectively market your produce? | Yes _____ No _____ | |
| 97. | Which of the following value addition practices do you use on your farm? | a. Threshing and cleaning _____ b. Labelling _____ c. Storage and storage management _____ d. Sorting and grading _____ | e. Processing _____ f. Packing _____ g. Drying _____ h. None _____ |
| 98. | Is there better market for value added products within your area? | Yes _____ No _____ | |
| 99. | What are the challenges to farmers in your area in adding value to their products? | _____ _____ _____ | |
| 100. | How can these challenges be overcome? | _____ _____ _____ | |
| 101. | Name the specific markets where you sell your produce. | _____ _____ _____ | |
| 102. | What are the challenges you face while marketing your | _____ _____ _____ | |



| | | |
|------------------------------|---|---|
| | produce? | |
| 103. | In your opinion, how can these challenges be overcome? | _____ _____ _____ |
| Organic certification | | |
| 104. | Have you heard about organic certification? | Yes _____ No _____ |
| 105. | If yes above, what types of organic certification do you know? | a. 1 st party (only the farmer knows that the produce is organic) _____ b. 2 nd party or Participatory Guarantee Systems- (the farmer, neighbors and partners such as NOGAMU know that the produce is organic) _____ c. 3 rd party or International certification e.g. Kilimohai, IMO, Ugocert etc _____ |
| 106. | Do you have any of the above certifications? (if the answer is No, proceed to Qn 114) | Yes _____ No _____ |
| 107. | If yes, which certification do you have? | a. First party (only the farmer knows that the produce is organic) _____ b. 2 nd party or Participatory Guarantee Systems- (the farmer, neighbors and partners such as NOGAMU know that the produce is organic) _____ c. 3 rd party or International certification e.g. Kilimohai, IMO, Ugocert etc _____ |
| 108. | Did you receive any support in getting the certification? | Yes _____ No _____ |
| 109. | Who provided the support? | a. UGOCERT/ NOGAMU _____ b. Others (specify) _____ |
| 110. | What kind of support did you receive? | _____ _____ |
| 111. | Have you accessed better markets as a result of acquiring the certification? | Yes _____ No _____ |
| 112. | If yes above, what are the new markets you have accessed? | _____ _____ |
| 113. | Which produce do you sell to these markets? | _____ _____ |
| 114. | What are the challenges you face as an organically certified producer and/or seller? | _____ _____ _____ |
| 115. | If you do not have organic certification, have you ever tried to access it? | Yes _____ No _____ |
| 116. | If yes above, why weren't you successful in getting certified? | _____ _____ |
| 117. | In your opinion, how can you be facilitated to acquire organic certification? | _____ _____ |
| Policy issues | | |
| 118. | Are you aware of any agro-ecological policies available? | Yes _____ No _____ |
| 119. | Do you participate or have | Yes _____ |



| | | |
|------|---|--|
| | you ever participated in any policy process that affects agroecology? | No_____ |
| 120. | What policy process have you participated in? | a. Budgeting processes _____ b. Planning processes _____ c. Land rights processes _____ d. Agriculture funding _____ e. Agriculture marketing _____ f. Quality assurance _____ g. Others (specify) _____ |
| 121. | If NO in Qn 118, why haven't you participated in these processes? | a. Not aware of such platforms _____ b. Such platforms do not exist here _____ c. Not interested _____ |
| 122. | What are the challenges that hinder you from participating in these processes? | _____ _____ _____ |
| 123. | What would be the best way of overcoming these challenges? | _____ _____ _____ |
| 124. | Do you think there is a favourable policy environment to support agro-ecological farmers? | Yes _____ No _____ |
| 125. | In your opinion, how can government support farmers in your area to adopt agroecology? | _____ _____ _____ |

Thank you very much for your responses



2: Key Informant Interview Guide for Buyers, traders, Companies



African Centre of Excellence Project (ACE II)

Baseline situational analysis of agroecology and livelihood skills gaps in Uganda

KEY INFORMANT INTERVIEW GUIDE – BUYERS, TRADERS, COMPANIES ETC

Please take a moment to complete these questions. Your answers are confidential and will only be used to assess the pre-operation situation of this project and will assist benchmarking of the project outcomes.

Date of Interview _____
Respondent name _____
Organisation _____
Position/title _____
Region/District _____

| | | |
|-----|--|--|
| 1. | How do you support agro-ecological farmers to access better markets? | |
| 2. | How can we facilitate win-win within the agro-ecological value chain? | |
| 3. | Comment on the current market of agro-ecological products in Uganda | |
| 4. | How can commodity specific agro-ecological value chains be strengthened? | |
| 5. | In your opinion, is there a favourable policy framework for the advancement of agro-ecological market development? | |
| 6. | If yes, which are these policy frameworks? If not, why? | |
| 7. | What are some of the challenges faced by private sector players in producing and marketing agro-ecological products? | |
| 8. | In your opinion, how can these challenges be overcome? | |
| 9. | Are there private sector specific skills gaps in relation to agroecology? | |
| 10. | In yes, how can they be overcome? | |

Thank you for your responses, time and participation



3: Key Informant Interview Guide for Local Leaders, NGOs



African Centre of Excellence Project (ACE II)

Baseline situational analysis of agroecology and livelihood skills gaps in Uganda

KEY INFORMANT INTERVIEW GUIDE – LOCAL LEADERS, NGOs

Please take a moment to complete these questions. Your answers are confidential and will only be used to assess the pre-operation situation of this project and will assist benchmarking of the project outcomes.

Date of Interview _____
Respondent name _____
Organisation _____
Position/title _____
Region/District _____

| | | |
|-----|---|--|
| 1. | What do you understand by agro ecology? | |
| 2. | What are some of the existing interventions to promote agroecology in your community? | |
| 3. | Do you find agroecology to be relevant to your community? | |
| 4. | If yes, how? If no, why not? | |
| 5. | In your opinion, what strategic actions need to be undertaken to facilitate the advancement of agroecology in your community? | |
| 6. | In your opinion, is there a favourable policy framework for the advancement of agroecology within your community? | |
| 7. | If yes, which are these policy frameworks? If not, why? | |
| 8. | Do farmers who practice agroecology have access to better markets compared to the conventional farmers? | |
| 9. | How would you rate your level of understanding of agroecology? | |
| 10. | Would you need capacity building in agroecology? | |
| 11. | What kind of capacity building would you need? Information materials, exposures, training etc | |

Thank you for your responses, time and participation.



4. Key Informant Interview Guide for Agroecology trainers



African Centre of Excellence Project (ACE II)

Baseline situational analysis of agroecology and livelihood skills gaps in Uganda

KEY INFORMANT INTERVIEW GUIDE – Agroecology Trainers

Please take a moment to complete these questions. Your answers are confidential and will only be used to assess the pre-operation situation of this project and will assist benchmarking of the project outcomes.

Date of Interview _____

Respondent name _____

Organisation _____

Position/title _____

Region/District _____

| | | |
|-----|---|--|
| 1. | What agroecology courses do you teach? | |
| 2. | When did you start offering these courses? | |
| 3. | How long are the courses? (Course duration) | |
| 4. | Are the courses offered accredited? By who? | |
| 5. | How many students are currently enrolled in each course? (male/female) | |
| 6. | How many students have graduated from these courses? | |
| 7. | What are some of the components taught in these courses? | |
| 8. | How relevant are these courses in meeting the skills gaps among smallholder farmers and other agroecology stakeholders? | |
| 9. | What are some of the outcomes or impact made by the graduates in the area of agroecology? | |
| 10. | As an agroecology trainer, what are some of the challenges you face while offering these courses? | |
| 11. | In your opinion, how can these challenges be overcome? | |

Thank you for your responses, time and participation



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