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# DEVELOPMENT INITIATIVE FOR NORTHERN UGANDA (DINU)



EUROPEAN UNION

## Inclusive Market-based Development for Smallholder Farmers in Northern Uganda



# VALUE CHAINS AND MARKET ANALYSIS REPORT

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## Acronyms and Abbreviations

ALREP	Agricultural Livelihoods Rehabilitation Program
BNU	Bee Natural Uganda
CSO	Civil Society Organisation
CRS	Catholic Relief Services
DDA	Dairy Development Authority
DADO	Dynamic Agro-Pastoral Development Organization
DINU	Development Initiative for Northern Uganda
DRC	Democratic Republic of Congo
EU	European Union
FAO	Food Agriculture Organization
GADC	Gulu, Agricultural Development Company
GDA	Global Development Alliance
GOU	Government of Uganda
JICA	Japan International Cooperation Agency
KALIP	Karamoja Livelihoods Improvement Program
KAPFS	Karamoja Action Plan for Food Security
KDA	Karamoja Development Agency
KIDDP	Karamoja Integrated Disarmament and Development Programme
KTB	Kenya Top Bar hives
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organisation
NaSARRI	National Semi Arid Resources Research Institute
NGO	Non-Governmental Organization
MAAIF	Ministry of Agriculture, Animal Industry & Fisheries
OWC	Operation Wealth Creation
PRDP	Peace, Recovery and Development Plan for Northern

POF	Potential Opportunities for Females
PSFU	Private Sector Foundation Uganda
SACCO	Saving and Credit Cooperative Organizations
SP	Service providers
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic and Health Survey
UIA	Uganda Investment Authority
UOSPA	Uganda Oil Seed Producers and Processors Association
VC	Value Chain
YF	Where women are currently involved

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## Executive Summary

The CARE consortium comprising of partner organisations such as Catholic Relief Services (CRS), Gulu Agricultural Development Company (GADC), Dynamic Agro Pastoral Development Organization (DADO) and SORUDA are currently implementing a three-year project titled “Inclusive Market Based Development for Small Holder farmers in Northern Uganda. This project contributes to the Development Initiative for Northern Uganda (DINU) – A Government of Uganda program aimed at consolidating stability in Northern Uganda, eradicating poverty and under nutrition and strengthening the foundations for sustainable and inclusive socio-economic development. Specifically, the project under the CARE consortium contributes to DINU’ s specific Objective one on: ‘Improving livelihoods through increased production of diversified food, enhanced market opportunities and better maternal and child nutrition.’ The CARE consortium currently targets 11 districts including: Abim, Kotido, Karamoja, Kaabong, Moroto, Amudat, Nakapiripirit, Napak, Katakwi and Kitgum. Given this background, the study sought to:

- Map out existing and new Agricultural and non-Agricultural value chains and assess their potential to promote women and youth economic empowerment, and community-based nutrition and household incomes.
- Identify challenges, specific entry barriers for women and youth into the VC and opportunities along the Value chains of; 1) crops such as Soybean, groundnuts, nutritious potato, vegetable, etc.); 2) Honey; and 3) livestock (small ruminants, and other non-Agricultural value chain) and propose ways of addressing these challenges.
- Develop an individual VCs, including mapping of actors, actions, supporting functions, institutions, policy issues, along each chain and propose recommendations for specific gender sensitive value chain activities that promote women and Youth participation and economic empowerment (employment opportunities as well as increasing their incomes along the chain).
- Assess the market structure (players, channels, sourcing), demand and supply (product specifications, prices, volumes, preferences), trends, market opportunities and challenges for the different value enterprises above

We used both quantitative and qualitative approaches to answer the above objectives. Specifically, a participatory approach in which key stakeholders were invited to a workshop was conducted in each village. Workshop attendants were given ample time to identify key commodities in the respective district and scored each of these commodities on their potential to promote economic growth, women empowerment and improving household nutrition and income. Value chains that were highly scored were mapped by workshop attendants in a participatory way guided by our enumerators. Workshop attendants further identified challenges and the likely recommendation/ way forward. Enumerators later conducted key informant interviews with some of the stakeholders who are actors in various value chains. The quantitative approach involved instituting a survey to a sample of project beneficiaries. In total, 830 households were interviewed for our quantitative analysis.

The key highlights of the results include:

- Main agricultural value chains in the region that are crucial towards income growth, nutrition security and women empowerment for women and youth include: sorghum, cassava, maize, groundnuts, apiary, and livestock. Some value chains were unique to some districts such as pulses (green gram etc) were cited in Nabilatuk, sesame and cotton were cited in Kitgum. In general, most men and women participated in all the agricultural

value chains identified. Nevertheless, the differences in participation were along the nodes of the value chain. At input level, most of the actors were men. At production, it is mainly women but at small scale. For retailing, about 60 percent of the retailers are women and 40 percent are men. Then at wholesaling and processing, more than 60 percent are males. Very few women are involved at this stage.

- For the agricultural value chains, potential points of participation for women and youth which remain unexploited are at production and primary processing. Processing of products from oil crops value chain such groundnuts paste as observed within the district are run by women. Participation in groups is a key strategy to overcoming several of the challenges cited including lack of access to credit.
- Youth beyond participating as producers can be made to actively engage along the value chains as traders and processors. Providing them with the right skills is a step in the right direction.
- Non-agricultural value chains identified included: stone quarrying, brick making and bamboo construction value chains. Nevertheless, most of these value chains specifically threaten the environment and are against Uganda's environmental safeguarding policies. The project could therefore tailor its efforts towards encouraging the youth and women to ensure that such value chains are sustainable with no adverse effects on the environment through efforts like private establishment of bamboo plantations. For stone quarrying, most of the beneficiaries are engaged in these value chains at a low scale because of a lack of skills and lack of access to the right equipment. Also, these value chains are mainly dominated by male youth because of the energy required.
- Value chain actors in the districts include local traders, agro input dealers, wholesaler's transporters, and support institutions. Agro input dealers face the challenge of low demand as they must compete with Government that provides free inputs to farmers. Majority of those in the agricultural value chain particularly vegetables were only women. Vegetable growing was promoted by several organisations to address the nutritional aspects of feeding young children and adults.
- Challenges to the crop value chains include fluctuating prices, climate change, lack of access to capital. Challenges to the livestock and apiary value chains include pests and diseases, insecurity from cattle rustlers, cultural and social norms regarding ownership of cattle in Karamoja and fluctuating product prices.

Some of the recommendations and way forward cited in the report include:

- Government offering loans with low interest rates to allow farmers and other value chain actors to borrow which allows for women and youth participation. Lack of access continues to be one of the key hindrances to participation. There is also need for support towards rural agricultural banks
- The improvement of transport network through opening of feeder roads to facilitate easy movement of commodities from the point of production to market points
- Installation of processing initiatives or centres to help with processing of materials from their raw forms
- Support and encourage farmers to adopt climate smart agricultural practices such as water harvesting techniques and planting of drought resistant seed varieties
- Regulate high fuel prices which is a hindrance to transport within the districts



## 1.0 Background

### 1.1 DINU implementation in Karamoja sub region

The Development Initiative for Northern Uganda (DINU) is a Government of Uganda program aimed at consolidating stability in Northern Uganda, eradicating poverty and under-nutrition and strengthening the foundations for sustainable and inclusive socio-economic development. It is supported by the European Union (EU). DINU is implemented in 33 districts of Acholi, Karamoja, Lango, Teso and West Nile sub-regions for a duration of six (6) years 2017-2023). The overall supervision is with the Office of the Prime Minister through local governments in partnership with a wide range of stakeholders. DINU supports interventions in three specific interlinked sectors/lots: (1) Livelihoods (2) Infrastructures and (3) Good Governance

The consortium of CARE Denmark (Lead), comprising of Catholic Relief Services (CRS), Gulu, Agricultural Development Company (GADC), Dynamic Agro-Pastoral Development Organization (DADO) and SORUDA was awarded a three-year contract (January 2020 to December 2022) to implement 'Inclusive Market-based Development for Smallholder Farmers in Northern Uganda' project, contributing to DINU specific *Objective / LOT 1*: 'Improving livelihoods through increased production of diversified food, enhanced market opportunities and better maternal and child nutrition' in the Eleven (11) districts of Abim, Kotido, Karenga, Kaabong, Moroto, Amudat, Nakapiripirit, Nabilatuk, Napak, Katakwi, and Kitgum. Karamoja is targeted by the consortium because it is the poorest sub-region in Uganda with 61 percent of its 1.2 million people, living in absolute poverty and 24% experiencing chronic poverty. In Teso poverty rates are slightly lower although it is the region with the second lowest GDP per capita after Karamoja. Poverty is gendered with rates being higher for women. Hunger, stunting and lack of access to food and food insecurity are major challenges, where 35.2% of children under five in the Karamoja Sub-region are stunted. According to the Uganda Demographic Health Survey (UDHS) 2016, gender-based violence is common in both Karamoja and Teso. Karamoja Sub-region, Katakwi and Kitgum districts are also characterized by low agricultural productivity and market accessibility with women smallholder farmers being specifically challenged regarding achieving the agricultural potential. The targeting of this sub - region is because the CARE consortium partner organizations are specialized in development work in 'hard to reach' communities globally and locally.

### 1.2 Project Scope and specific objectives

The understanding is that the CARE Denmark consortium intervention will benefit 68,250 (60% women) smallholder farmer households (2,700 Farmer Groups / 675 Producer and Marketing Groups) in Karamoja sub-region Katakwi and Kitgum districts. The project will increase food security, improve maternal and child nutrition, and enhance household income, through support to diversified food production and commercial agriculture and through improved household resilience (notably to climate change) and women empowerment. The CARE Denmark consortium is therefore committed to the following specific intervention objectives.

- i. Increased adoption and production of more diverse and nutritious food crops and animal products by women and men smallholder farmers.
- ii. Increased market accessibility for women and men smallholder farmers.
- iii. Improved nutrition and uptake of family planning services through gender-responsive community-based approaches

The program will deliver to ensure the target beneficiaries exhibit the main outcome areas below.

- i. Increased adoption and production of diverse food crops and animal products.

- ii. Increased access to key input and output markets for women and men small-scale farmers.
- iii. Improved access to credit along the value chain through community saving and credit schemes.
- iv. Sustainable Strong linkages between smallholder farmers, agro-processors and market operators established.
- v. Market opportunities and product niches identified along the value chain and market exchanges and contractual agreements increased.
- vi. Increased adoption of community-based gender-transformative nutrition initiatives
- vii. Increased community appreciation of SRHR (family planning)

### 1.3 Objectives of the study

- (2) Map out existing and new Agricultural and non-Agricultural value chains and assess their potential to promote women and youth economic empowerment, and community-based nutrition and household incomes.
- (3) Identify challenges, specific entry barriers for women and youth into the VC and opportunities along the Value chains of; 1) crops such as Soybean, groundnuts, nutritious potato, vegetable, etc.); 2) Honey; and 3) livestock (small ruminants, and other non-Agricultural value chain) and propose ways of addressing these challenges.
- (4) Develop an individual VCs, including mapping of actors, actions, supporting functions, institutions, policy issues, along each chain and propose recommendations for specific gender sensitive value chain activities that promote women and Youth participation and economic empowerment (employment opportunities as well as increasing their incomes along the chain).
- (5) Assess the market structure (players, channels, sourcing), demand and supply (product specifications, prices, volumes, preferences), trends, market opportunities and challenges for the different value enterprises above

## 2.0 Methods

### 2.1 Design

The evaluation team utilized both qualitative and quantitative approaches to answer the research questions leading to the achievement of the objectives. Qualitative approaches included the use of participatory approaches through participant workshops, and key informant interviews with key actors in the value chain. The team used explorative qualitative methods to: (1) identify value chains that are significant to the development of the region spanning national and international markets (2) identify key value chain actors and market players in the region (3) identify key barriers to participation of women and youth in the value chain. We also did a market analysis to identify the market structure and opportunities for participation of women and youth. Key steps in the qualitative assessment to answer the project objectives include:

- 1) Step 1: Desk review. This involved the review of the following documents to identify key value chains in focus including the relevant stakeholders (Appendix 1)
  - a. The third National Development Plan for Uganda
  - b. Ministry of Agriculture Animal Industry and Fisheries (MAAIF) strategic Plan

- c. Private Sector Foundation – strategic plan
- d. Donor's Agriculture Plan for the country
- e. Project reports of relevant past and present projects
- f. Production and expert data and other official statistics from UBOS

## 2) Step 2: Stakeholder mapping.

Key stakeholders were identified through desk review and short interviews with project staff. The main aim was to identify likely key value chain actors for the different commodities in the different districts. Stakeholders interviewed include.

The value chain analysis targeted responses from a variety of stakeholders that include but not limited to:

1. Key staff members from the consortium organization i.e., CARE International, SORUDA GADC, DADO and CRS.
2. Key market actors involved in the value chain including existing agro-industries, market leaders
3. Project beneficiaries in the study area
4. Key representation from other key partners in the sector with similar projects and experiences
5. Relevant Government Departments including representation from Office of the Prime minister, Ministry of Agriculture Animal Industry, and fisheries, etc
6. Potential funding agencies like Food Agriculture Organization (FAO) and JICA

## 3) Step 3: Value Chain mapping and Analysis

We conducted workshops and solicited for responses through participatory approaches from key stakeholders identified in step two. In the workshop, participants identified key value chains relevant for improving welfare and nutrition. For each value chain, we identified the value chain nodes, the actors and how the different actors were interrelated. The key output in this step was: (1) value chain maps for the different commodities identified (2) value chains prioritized (3) market structure of the different commodities identifies including opportunities for beneficiary participation. Along each value chain map, nodes were marked PoF if they were promising, profitable opportunities for employment or self-employment for females and YF if females were already participating to some extent.

### Step 3: Further Value Chain mapping and Market Analysis

As a further step in value chain mapping and analysis and to validate responses from the workshop, we conducted key informant interviews with purposively chosen value chain actors from step 3. This was tailored to: (1) understand the opportunities for participation of women and youth (2) to identify the challenges faced and the likely solutions. This stage involved key informant interviews and focus group discussions.

### Step 4: Household survey amongst project beneficiaries:

For quantitative analysis, we conducted a household survey of project beneficiaries to assess, farmer profiles, crops grown, profitability, demand and competitiveness, challenges such as

pests and diseases, input and output supply, state of infrastructure - roads, electricity, mobile technology, internet, non-farm income, special attention to issues of climate change, gender, identification of other relevant nonagricultural value chains with potential for improving welfare and nutrition. We explored the Food and Agricultural Organization (FAO's) analytical tools; the sustainable food value chain, the gender-sensitive value chain frameworks and the youth sensitive value chain analysis (Reference); the three frameworks emphasize considerations for economic, social, and environmental outcomes of value chains vis-a-vis their potential while encompassing sustainability, women, and youth aspects respectively.

## **2.2 Selection and scoring of value chains**

For all key value chains identified through a participatory process at the workshop, participants were asked to score the values chains based on their growth potential and potential to contribute to increased youth employment, women empowerment, and gender equality. For each dimension, participants used scores of 1-5 with score 1 representing the lowest score and 5 representing the highest score.

Under the possibility for the growth potential, participants scored for : (1) Positive growth trend of the value chain, (2) unmet market, (3) Available sales outlet, (4) high interest of buying the product, (5) scope for expanding production and / or scope for value addition through processing or product improvement ( new products for which there is a market, (6) Low costs of value chain vis-à-vis competitors, (7) Other competitive advantage of value chain vis-à-vis competitors, (8) Potential for collaboration and coordination between actors for value chain upgrading, (9) Existence of institutions and service providers (financial, entrepreneurial, technological, gender) to support value chain actors.

Under the potential to contribute to increased women empowerment and gender equality, we assessed for (1) High number of women entrepreneurs in the value chain, (2) Women control equipment/ assets, (3) Women can acquire skills needed for profitable value addition opportunities through processing product and diversification, (4) women control the sales income, (5) Close to house hold within community area (geographically), (6) Low entry barriers for small-scale and poor entrepreneurs (small scale production, (7) low start -up costs, not requiring major capital investment, using low-tech skills), (8) Offering new opportunities to women.

## **2.3 Settings**

Karamoja borders Kenya to the east, South Sudan to the north and the districts of Kitgum, Pader, Lira/Agago, Amuria and Katakwi to the west; and Kumi, Sironko and Kapchorwa to the south. The value chain analysis was executed in the Eleven (11) districts of Kitgum, Karenga, Kaabong, Kotido, Abim, Katakwi, Napak, Nabilatuk, Nakapiripirit, Amudat and Moroto. Karamoja, is in Northeastern Uganda and its population is highly dependent on subsistence agriculture for food security and livelihoods. Most of the population in Karamoja and parts of the Northern region are engaged in agro-pastoral and pastoral farming to meet food security and livelihood needs. Karamoja and the greater north experience only one rainy season and climatic conditions such as drought and changing rain patterns greatly affect the growing of crops and rearing of animals.

## **2.4 Population**

The population in Karamoja is approximately 1.2 million people, with approximately 70 percentage living in rural areas (UIA, 2016). Karamoja is an agro-pastoralist area, and pastoralism is considered to be the most sustainable means of livelihood where 80 per cent of the households in this sub-region own livestock (UIA, 2016). Overtime, the population of

livestock has reduced following tribal conflict and climate change, subsequently, the average number of livestock per household has also reduced over time. Karamoja sub-region is also rich in minerals including; Gold, Limestone, Uranium, Marble, graphite, gypsum, Iron, Wolfram, nickel, copper, Cobalt, Lithium, Tin (United Nations Development Program, 2018)

Many initiatives have been undertaken in Karamoja to improve food security, bring peace and security, and build the resilience of communities to climatic change and variability. The Government of Uganda (GoU) for example has undertaken several project initiatives including Peace, Recovery and Development Plan for Northern Uganda (PRDP), Karamoja Development Agency (KDA), Northern Uganda Social Action Fund (NUSAF), Karamoja Action Plan for Food Security (KAPFS), Karamoja Livelihoods Improvement Program (KALIP), Agricultural Livelihoods Rehabilitation Program (ALREP), Karamoja Integrated Disarmament and Development Programme (KIDDP) and the operationalization of a fully-fledged Ministry for Karamoja Affairs of both government and development and humanitarian actors in the sub-region. Despite these efforts, majority of the households in the sub-region remain in extreme poverty.

## 2.5 Sampling and sample size

For the qualitative assessment, we purposively selected participants to allow for representation of the relevant stakeholders. We used snowball sampling where respondents at the workshops provided information and contacts for the actors of the different value chains to undertake key informant interviews. For the qualitative component, a total of 6 key informant interviews were conducted at national level to represent institutions such as Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Private Sector Foundation Uganda (PSFU), Food and Agricultural Organization (FAO) and JICA. At the district level, the number of key informant interviews was largely determined by the number of actors identified for each of the value chains identified from the workshop.

For the quantitative assessments, the study utilized a stratified random sampling technique. We stratified the farmer groups and producer and marketing groups by the identified primary commodities of focus including soybean, groundnuts, nutritious potato, vegetable, etc.); Honey; livestock; artisan small scale mining; etc. The final sample size for each district is in Table 1 below and the estimated total sample size is 830 respondents for the household survey.

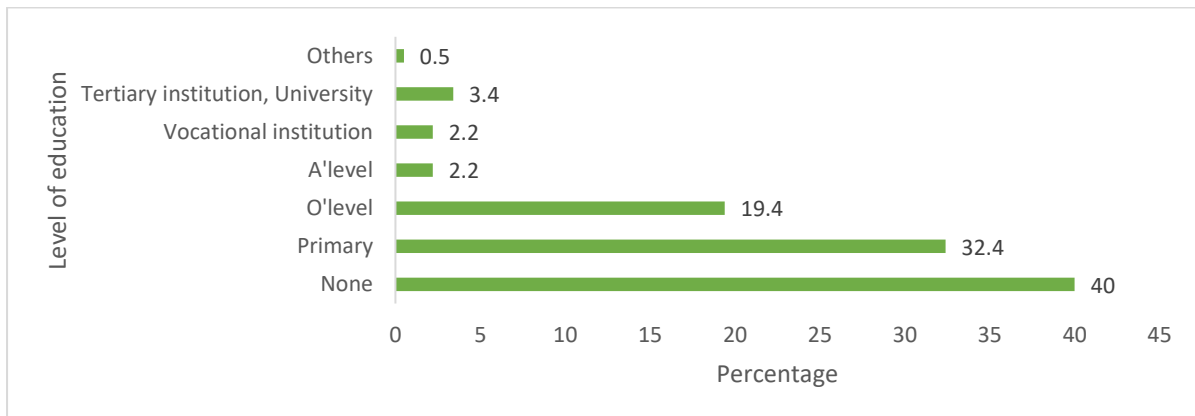
**Table 1: Sample size by district**

	District	Sample size		
		All sample	Males	Females
1	Karenga	100	60	40
2	Abim	91	34	57
3	Kitgum	100	45	55
4	Kaabong	90	55	35
5	Kotido	90	29	61
6	Katakwi	75	42	33
8	Moroto	52	20	32
9	Napak	50	21	29
10	Nakapiripirit	61	19	42
11	Nabilatuk	60	11	49
12	Amudat	61	18	43
	Total	830	354	476

### 2.5.1 Description of the survey sample

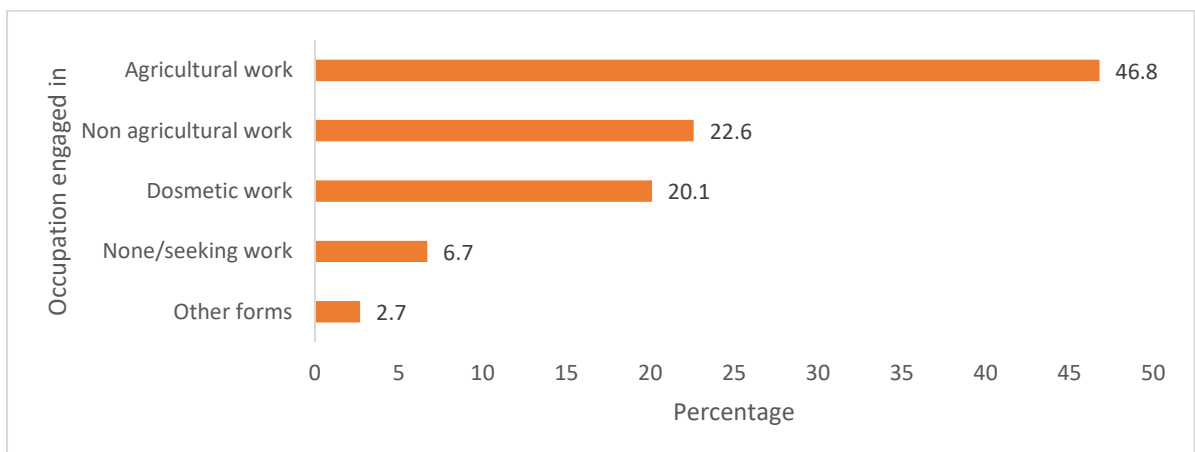
The detailed descriptive statistics of the surveyed sample is in Appendix 1. 57.3 percent of the surveyed sample were females and 42.7 percent were males. This distribution (more male respondents than female respondents) was also the same across the districts. Also, more than 60 percent of the sample were youth below 40 years of age. With only 4.5 percent being above 60 years of age. 82.9 percent of the sample is married, and 40 percent of the household heads have no education. 32.4 percent have a primary education, 19.2 percent have an ordinary level education and less than 10 percent have an education level of Advanced secondary and above (see figure 1).

Figure 1: Level of education of surveyed sample



Majority of the individuals sampled are employed in the agricultural sector (unpaid) and about 22 percent are engaged in non-agricultural employment (see figure 2 below). The presence of non-agricultural employment also implies there are some non-agricultural value chains that can potentially boost women empowerment and youth employment.

Figure 2: Occupation engaged of the surveyed sample



#### *Owner ship of Assets and land:*

Majority of the farmers had access to land for cultivation (93.1 percent) although some did not necessarily own the piece (Table 2). The average land size owned alone was about 4 acres. On average, females owned less than their male counterparts in all the

districts. Males on average owned 6 acres of land compared to their female counterparts who owned 4.6 acres. About 69 percent of the surveyed households owned phones and 32.7 percent owned bicycles and only 6.6 percent own motorcycles. Bicycle and motorcycle ownership has implications for transportation costs which are likely to affect one’s participation in the value chains. In Appendix 2, we provide a disaggregation of ownership of agricultural land and assets by gender. Generally, women own less assets like land, mobile phones and bicycles than men. For example, 82.6 percent of men own phones compared to 57.9 percent females.

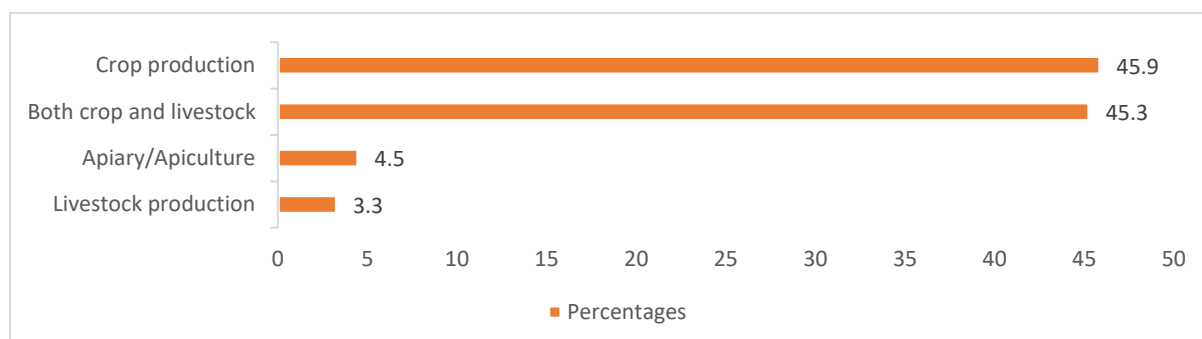
**Table 2: Agriculture land and Assets ownership**

Variable	All sample, n=830
Have access to land for cultivation	93.1(773)
Average size of land that one can access (in acres)	5.5(0.3)
Own land	74.1(615)
Average size of land owned alone in (SD), acres	4.1(0.2)
Average size of land owned Jointly (SD), acres,	5.0(0.2)
Household own a mobile phone	69.0(573)
Mobile phone in a functioning state	94.6(542)
Household own a bicycle	32.7(271)
Bicycle in a functioning state	73.4(199)
Household own a radio	30.7(255)
Radio in a functioning state	85.1(217)
Household own a motorcycle	6.6(55)
Motorcycle in a functioning state	83.6(46)

### *Agriculture production*

45.9 percent of the sample households were only engaged in crop production and 45.3 percent were engaged in both crop production and livestock. 4.5 percent were only engaged in apiary and only 3.3 percent were engaged in livestock production (Figure 3). This showed that majority of the population were either engaged in only crop production or in both crop production and livestock rearing.

**Figure 3: Proportion of sampled households engaged in different agriculture production activities**



The distribution of agricultural activities by gender shows that more women were engaged in crop and apiary production than men as shown in Appendix 2. On average more men were engaged in livestock production than women. Women’s engagement in Apiary production is majorly because of the support by many organizations.

Table 3: Agricultural production across districts

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiri pirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
<b>Kind of production household engaged in</b>												
<b>All sample</b>												
Crop production	45.9(381)	23.1(21)	53.3(48)	89.0(89)	62.2(56)	76.9(40)	3.3(2)	57.4(35)	50.0(30)	80.0(40)	8.0(6)	14.0(14)
Livestock production	3.3(27)	1.1(1)	1.1(1)	0.0(0)	18.9(17)	1.9(1)	1.6(1)	0.0(0)	3.3(2)	4.0(2)	1.3(1)	1.0(1)
Both crop and livestock	45.3(376)	50.5(46)	41.1(37)	7.0(7)	18.9(17)	13.5(7)	91.8(56)	41.0(25)	45.0(27)	12.0(6)	90.7(68)	80.0(80)
Apiary/Apiculture	4.5(37)	25.3(23)	3.3(3)	3.0(3)	0.0(0)	1.9(1)	3.3(2)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	5.0(5)
None	1.1(9)	0.0(0)	1.1(1)	1.0(1)	0.0(0)	5.8(3)	0.0(0)	1.6(1)	1.7(1)	4.0(2)	0.0(0)	0.0(0)
<b>Gender</b>												
<b>Males</b>												
Crop production	44.4(157)	26.5(9)	48.3(14)	85.0(51)	61.8(34)	70.0(14)	0.0(0)	36.8(7)	36.4(4)	71.4(15)	11.9(5)	8.9(4)
Livestock production	3.4(12)	2.9(1)	3.5(1)	0.0(0)	14.6(8)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	4.8(1)	2.4(1)	0.0(0)
Both crop and livestock	46.9(166)	47.1(16)	41.4(12)	10.0(6)	23.6(13)	15.0(3)	94.4(17)	63.2(12)	63.6(7)	19.1(4)	85.7(36)	88.9(40)
Apiary/Apiculture	4.2(15)	23.5(8)	3.5(1)	5.0(3)	0.0(0)	5.0(1)	5.6(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	2.2(1)
None	1.1(4)	0.0(0)	3.5(1)	0.0(0)	0.0(0)	10.0(2)	0.0(0)	0.0(0)	0.0(0)	4.8(1)	0.0(0)	0.0(0)
<b>Females</b>												
Crop production	47.1(224)	21.1(12)	55.7(34)	95.0(38)	62.9(22)	81.3(26)	4.7(2)	66.7(28)	53.1(26)	86.2(25)	3.0(1)	18.2(14)
Livestock production	3.2(15)	0.0(0)	0.0(0)	0.0(0)	25.7(9)	3.1(1)	2.3(1)	0.0(0)	4.1(2)	3.5(1)	0.0(0)	1.8(1)
Both crop and livestock	44.1(210)	52.6(30)	41.0(25)	2.5(1)	11.4(4)	12.5(4)	90.7(39)	31.0(13)	40.8(20)	6.9(2)	97.0(32)	72.7(40)
Apiary/Apiculture	4.6(22)	26.3(15)	3.3(2)	0.0(0)	0.0(0)	0.0(0)	2.3(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	7.3(4)
None	1.1(5)	0.0(0)	0.0(0)	2.5(1)	0.0(0)	3.1(1)	0.0(0)	2.4(1)	2.0(1)	3.5(1)	0.0(0)	0.0(0)
<b>Doing as an individual or as a group</b>												
As individual	66.3(550)	49.5(45)	71.1(64)	81.0(81)	90.0(81)	65.4(34)	37.7(23)	90.2(55)	91.7(55)	94.0(47)	61.3(46)	19.0(19)
As a group	10.7(89)	16.5(15)	11.1(10)	9.0(9)	1.1(1)	15.4(8)	6.6(4)	9.8(6)	8.3(5)	4.0(2)	32.0(24)	5.0(5)
Both	23.0(191)	34.1(31)	17.8(16)	10.0(10)	8.9(8)	19.2(10)	55.7(34)	0.0(0)	0.0(0)	2.0(1)	6.7(5)	76.0(76)
<b>Size of land under cultivation (In acres)</b>												
Less than an acre	6.5(54)	0.0(0)	3.3(3)	15.0(15)	10.0(9)	5.8(3)	1.6(1)	3.3(2)	8.3(5)	24.0(12)	1.3(1)	3.0(3)
Equal to an acre	17.6(146)	1.1(1)	3.3(3)	24.0(24)	30.0(27)	15.4(8)	44.3(27)	27.9(17)	41.7(25)	14.0(7)	6.7(5)	2.0(2)
More than an acre	75.9(630)	98.9(90)	93.3(84)	61.0(61)	60.0(54)	78.8(41)	54.1(33)	68.9(42)	50.0(30)	62.0(31)	92.0(69)	95.0(95)
<b>Level of engaged for the crop production</b>												
Subsistence production	49.0(371)	17.9(12)	16.5(14)	64.6(62)	100(73)	44.7(21)	96.6(56)	56.7(34)	47.4(27)	91.3(42)	20.3(15)	16.0(15)
Commercial production	2.1(16)	0.0(0)	0.0(0)	11.5(11)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	4.3(2)	2.7(2)	1.1(1)
Both subsistence and commercial production	48.9(370)	82.1(55)	83.5(71)	24.0(23)	0.0(0)	55.3(26)	3.4(2)	43.3(26)	52.6(30)	4.3(2)	77.0(57)	83.0(78)
<b>Challenges experienced in producing crops</b>												
Parasites/Disease	68.9(572)	73.6(67)	78.9(71)	44.0(44)	89.7(78)	84.6(44)	72.1(44)	82.0(50)	60.0(36)	50.0(25)	76.0(57)	56.0(56)
Insecurity	36.4(302)	12.1(11)	44.4(40)	82.0(82)	90.0(81)	30.8(16)	3.3(2)	14.8(9)	33.3(20)	56.0(28)	8.0(6)	7.0(7)
Theft	30.2(251)	6.6(6)	40.0(36)	40.0(40)	51.1(46)	9.6(5)	6.6(4)	57.4(35)	25.0(15)	26.0(13)	32.0(24)	27.0(27)



Rainfall variability/Drought/climate	88.4(734)	93.4(85)	96.7(87)	72.0(72)	77(70)	76.9(40)	98.4(60)	96.7(59)	100.0(60)	92.0(46)	93.3(70)	85.0(85)
Lack of markets	13.7(114)	0.0(0)	0.0(0)	6.0(6)	41.1(37)	0.0(0)	13.1(8)	4.9(3)	3.3(2)	0.0(0)	16.0(12)	46.0(46)
Low prices for agriculture produce	24.3(202)	6.6(6)	1.1(1)	21.0(7.2)	26.7(24)	3.9(2)	32.8()	16.4(10)	5.0(3)	2.0(1)	68.0(51)	63.0(63.0)
Other	14.1(117)	40.7(37)	14.4(13)	25.0(25)	3.3(3)	3.9(2)	3.3(2)	4.9(3)	1.7(1)	18.0(9)	14.7(11)	11.0(11)
<b>Ways one has coped with the challenges mentioned</b>												
Support from NGO/Government	45.5(378)	5.5(5)	32.2(29)	62.0(62)	100(90)	75.0(39)	1.6(1)	78.7(48)	66.7(40)	46.0(23)	25.3(22.9)	22.0(22)
Irrigation	2.5(21)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	14.8(9)	0.0(0)	0.0(0)	6.0(3)	8.0(6)	3.0(3)
Others (Specify)	57.4(476)	95.6(87)	80.0(72)	39.0(39)	0.0(0)	25.0(13)	85.3(52)	21.3(13)	66.7(40)	52.0(26)	77.3(58)	76.0(76)
<b>Agro-inputs accessed in the last 12 months</b>												
Seeds and seedlings	74.0(614)	100.0(91)	84.4(76)	57.0(57)	94.4(85)	50.0(26)	57.4(35)	82.0(50)	95.0(57)	88.0(44)	74.7(56)	37.0(37)
Fertilizers	3.4(28)	3.3(3)	2.2(2)	1.0(1)	11.1(10)	0.0(0)	1.6(1)	0.0(0)	1.7(1)	0.0(0)	10.7(8)	2.0(2)
Agro-chemicals agricultural equipment and fuel	6.0(50)	12.1(11)	2.2(2)	5.0(5)	1.1(1)	1.9(1)	1.6(1)	0.0(0)	0.0(0)	0.0(0)	33.3(25)	4.0(4)
Animal Traction,	11.7(97)	23.1(21)	27.8(25)	24.0(24)	1.1(1)	0.0(0)	1.6(1)	0.0(0)	18.3(11)	0.0(0)	30.7(23)	12.0(12)
Agricultural tools (cultivators, levelers, etc.)	16.9(140)	1.1(1)	7.8(7)	3.0(3)	37.8(34)	26.9(14)	24.6(15)	14.8(9)	0.0(0)	0.0(0)	30.7(23)	34.0(34)
None	19.3(160)	0.0(0)	8.9(8)	35.0(35)	3.3(3)	42.3(22)	32.8(20)	19.7(12)	5.0(3)	10.0(5)	6.7(5)	47(47)
Others specify	4.2(35)	2.2(2)	10.0(9)	21.0(21)		0.0(0)	0.0(0)	0.0(0)	0.0(0)	6.0(3)	0.0(0)	0.0(0)
<b>Average total cost (amount) of inputs used</b>												

## 3.0 Results

### 3.1 Value chain analysis

Table 1 shows the scoring of value chains identified for Abim, Katakwi, Nabilatuk and Nakapiririt. In Abim, bamboo cutting was scored highly regarding its potential for growth but scored lowly regarding its potential to contribute to increased women empowerment and gender equality. Even if a considerable percentage of the population of Uganda relies on firewood and charcoal products for cooking fuel and thereby offering opportunities for those engaged in the bamboo energy products value chain, this activity is a threat to the natural forests in the country. Nevertheless, alternatives ways apart from the depletion of natural trees exist such as promoting private bamboo plantations. We discuss these alternatives in the next subsection and how women can be sustainably engaged in participating in this value chain.

Stone quarrying in Abim was scored highly regarding its growth potential and potential to contribute to increased women empowerment. In Katakwi, and the karamoja region, diary and livestock value chains showed high potential towards contributing to women empowerment while in Nabilatuk, the ground nut value chain showed high potential towards women empowerment and growth potential.

**Table 4: Table showing the scoring of value chains identified through participatory means for selected districts**

District	Value chains identified	Scoring of value chains	
		Growth potential (out of 245).	Potential to contribute to increased women empowerment and gender equality (out of 140)
Abim	Sorghum	133	56
	Cassava	133	56
	Beans	133	56
	Bamboo	154	63
	Stone quarrying	126	133
Katakwi	Cassava	189	112
	Ground nuts	189	112
	Diary/Livestock	189	140
Nabilatuk	Pulses (Green grams (most grown); Cow Peas, Navy Beans/Etapadill, Soya Beans (potential))	105	126
	Cereals	147	105
	Livestock	105	56
	Ground nuts	189	140
Nakapiririt	Maize	126	119
Kaabong	Apiary	161	119
	Maize	189	119
	Beans	189	119
	Sunflower	140	140
	Goats	140	140
	Cattle	140	140

Sesame and cotton were not scored on top in these five districts but in other districts like Kotido, Karenga, Katakwi and Kitgum, these value chains came out on top and they are described in the subsequent sections

## 3.2 Crop value chain analysis

### 3.2.1 Maize value chain

Maize is one of the commonest and most preferred value chains in the 11 districts targeted given its importance as a food and cash crop in the sub region. More than 50 percent of the households are producers in the maize value chains in most of the districts in the region except in Nabilatuk, Napak and Kitgum (Table below). The average yield ranges from as low as one bag (100 Kg) per acre to 7 bags per acre in the area with an average yield of about 325.6 Kgs of maize produced. Only about 26.8 percent of households market the maize that they sell and Nakapiririt has the highest proportion of farmers selling their maize (about 60 percent). The output from the maize produced that is consumed is sold off to the market and another proportion is left for other purposes such as seed. From an average output of 325.6 Kg, an average of 249.4 kg is sold off to the market, although this varied across districts (See Appendix 3 for proportions sold off across districts). About 23 percent of the maize output is sold to the market. The largest proportion is kept for home consumption.

Kotido has the lowest proportion of farmers selling their maize. Most of the maize is sold as unprocessed maize in many of the districts for example in Moroto and Napak, 100 percent of farmers sell their maize as unprocessed. Majority of the farmers in Amudat and Napak sell their maize nationally, and outside the district. The maize value chain currently operational in Karamoja and parts of Northern Uganda is shown below.

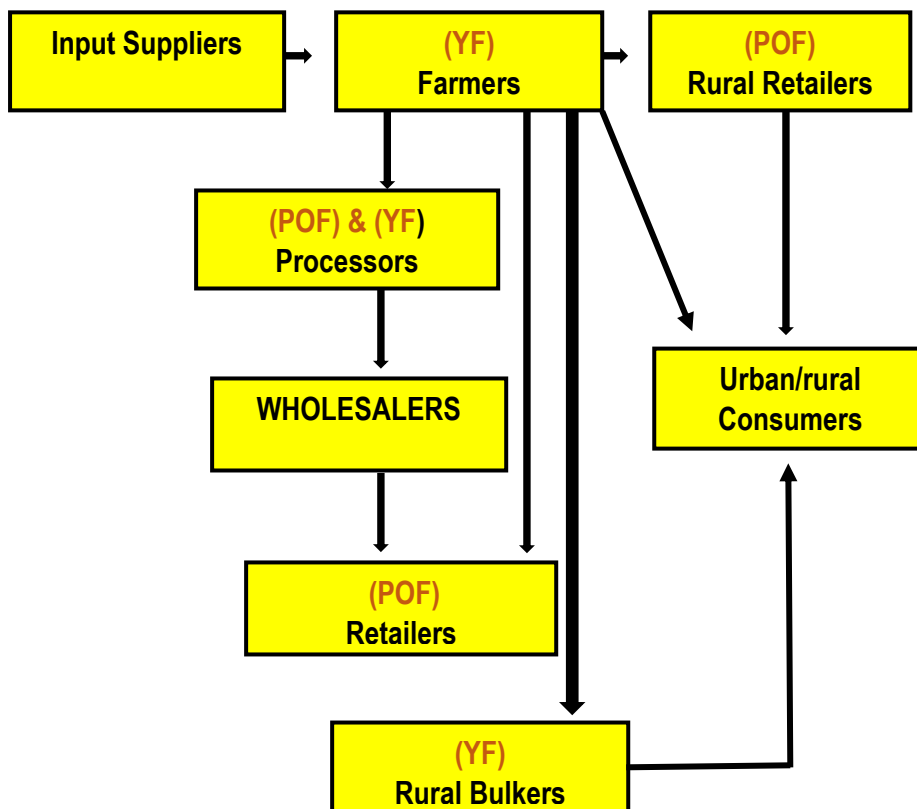
Table 5: The Maize value chain

District	Proportion growing maize in last 12 months	Proportion selling maize	Proportion selling maize as processed	Proportion selling maize as unprocessed	Proportion accessing national markets	Average yield (Kg/acre)	Average Amount sold
All (sample)	55.9(464)	26.8(124)	42.8(62)	57.2(83)	2.9(9)	325.6(485.1)	249.4(44.5)
Abim	67.0(61)	29.5(18)	10.5(2)	89.5(17)	0.0(0)	194.0(226.2)	181.6(234.5)
Kotido	47.8(43)	9.3(4)	0.0(0)	100.0(4)	0.0(0)	188.4(279.9)	224(155.8)
Karenga	48.0(48)	35.4(17)	58.8(10)	41.2(7)	4.8(1)	398.3(378.6)	252.5(254.6)
Kaabong	85.6(77)	11.8(9)	81.0(17)	19.0(4)	2.0(1)	150.7(338.6)	81.3(80.7)
Moroto	42.3(22)	13.6(3)	0.0(0)	100.0(2)	0.0(0)	136.8(78.3)	47.3(46.5)
Amudat	80.3(49)	18.8(9)	73.3(11)	26.7(4)	65.0(26)	798.9(832.6)	588(1037.5)
Nakapiririt	65.6(40)	60.0(24)	0.0(0)	100.0(24)	0.0(0)	540.9(818.4)	428.2(996.2)
Nabilatuk	38.3(23)	34.8(8)	44.4(4)	55.6(5)	0.0(0)	167.9(109.0)	62.8(60.7)
Napak	36.0(18)	44.4(8)	0.0(0)	100.0(9)	75.0(6)	158.7(377.4)	244.6(509.1)
Katakwi	62.7(47)	38.3(18)	73.7(14)	26.3(5)	3.9(1)	308.7(209.5)	264.2(148.9)
Kitgum	36.0(36)	16.7(6)	66.7(4)	33.3(2)	0.0(0)	415.6(301.4)	195.8(201.1)

Authors own construction from the dataset. Numbers in parenthesis are standard errors.

The maize value chain map below shows the key players along the maize value chain ranging from farmers, agents or brokers, local traders, rural bulkers, urban wholesalers, urban retailers, processors, and consumers. Some institutions (schools, hotels, and hospitals) procure and consume maize in large quantities. Government agencies (including NAADS, NARO, and MAAIF), NGOs, and research organizations also engage in different activities of breeding, multiplying, and distributing improved varieties of seed potato to farmers.

### The Maize Value Chain Map



(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

### Rural traders

These local traders go around the remote rural areas that are usually difficult to access and buy the maize from farmers; they either go to the local storage facilities or directly to the farmers' gates. These traders move from collection point to another and bulk up the maize until they accumulate enough, which usually consist in filling up the truck. Once the maize is collected, local traders bring the maize to the millers for it to be processed or sell it as grain to wholesalers. The local traders are the main buyers of all maize traded in the sub-counties (smaller administrative units in the districts). Their main function is to buy and/or assemble maize from the numerous scattered farmers, often located in inaccessible rural areas. These rural agents use bicycles to transport the maize from the farmers to their collection points. They find market for the maize (often the urban traders and processors) when they have accumulated enough. The urban traders and processors arrange transport to collect the maize

either directly from the farmers whom they pay on a cash basis, or from the collection points of the rural traders. Since the agents live in the rural areas, they are a reliable linkage between the farmers and urban traders and processors/millers.

Rural traders include both males and females. However, one of the reasons given by respondents regarding challenges to women traversing remote location was insecurity and bad roads. Insecurity risk causes fear in traders but more particularly women and conditions of the bad roads requiring sleeping on the way, pushing cars and many others offers more risks and difficulties to women.

### **Urban traders**

Urban traders are found in major urban centers in the district in every district. Their main activities include networking with rural agents, serving as a market outlet for farmers, and collecting maize grain before selling it to the various clients, including institutions and processors located in the districts. Urban traders are also sources of bagging materials (sacks) used by farmers as well as market (price and volumes) information in their areas of operation. To cover the costs of rural agents and transport, urban traders sell their maize mostly to processors.

### **Small/medium scale millers**

Small millers can be found at a local level near trading centers and rural markets whereas medium scale millers are usually found in towns such as Lira and Gulu. These millers operate in the same way but at a different scale. They receive the maize grain and process it into flour for direct consumption. The processing of maize is an important stage in the chain because it adds a significant amount of value to the maize. The flour can be sold for a retail price of about Ush 1 600/kg; with a flour extraction rate of 55% (550g for 1kg of milled maize). The bran issued from the milling is then sold for animal feed at a price of about Ush 450/kg. Processors set a fixed price for milling the maize (around Ush 300/kg) and proceed to the milling according to customers' demands.

### **Wholesalers**

Wholesalers buy and sell maize grain destined to Kampala and regional markets (Kampala, South Sudan, and Kenya) where the maize will be eventually milled for final consumption. Wholesalers either go directly to collecting points such as trading centers and storage facilities or else they pass through local traders that bring the maize directly to them in the local towns (Lira, Gulu). Once the merchandise is bulked in large quantities, they transport it straight to the main market in Kampala or export it within the region (South Sudan and Kenya).

### **Large scale traders/exporters**

A number of large-scale traders and exporters of maize have emerged over the years. The main ones include: (i) the World Food Program, (ii) the Uganda Grain Traders (UGT) etc. Uganda's maize export market is mainly regional, comprising of markets within Eastern and Southern Africa, the Democratic Republic of Congo (DRC) and Southern Sudan. The country benefits from the unfavorable climate and low soil nutrition in these neighboring countries, as well as from its two annual harvests.

### **Processors**

The maize grown and traded undergoes some level of value addition – conversion of maize grain into flour and a variety of other by-products, such as bran and germ. The principal players

in this value chain are the processors/ millers grouped into three categories, namely: small-scale millers and medium-scale millers.

Majority of the processors/millers fall under the small-scale category, and they are scattered in various rural trading centers in the districts, carrying out primarily customized milling. They operate motor engine millers of less than 10 tons a day on order and at a fee. Daily production levels vary depending on the consistency of power supply, type of machines and maize grains used.

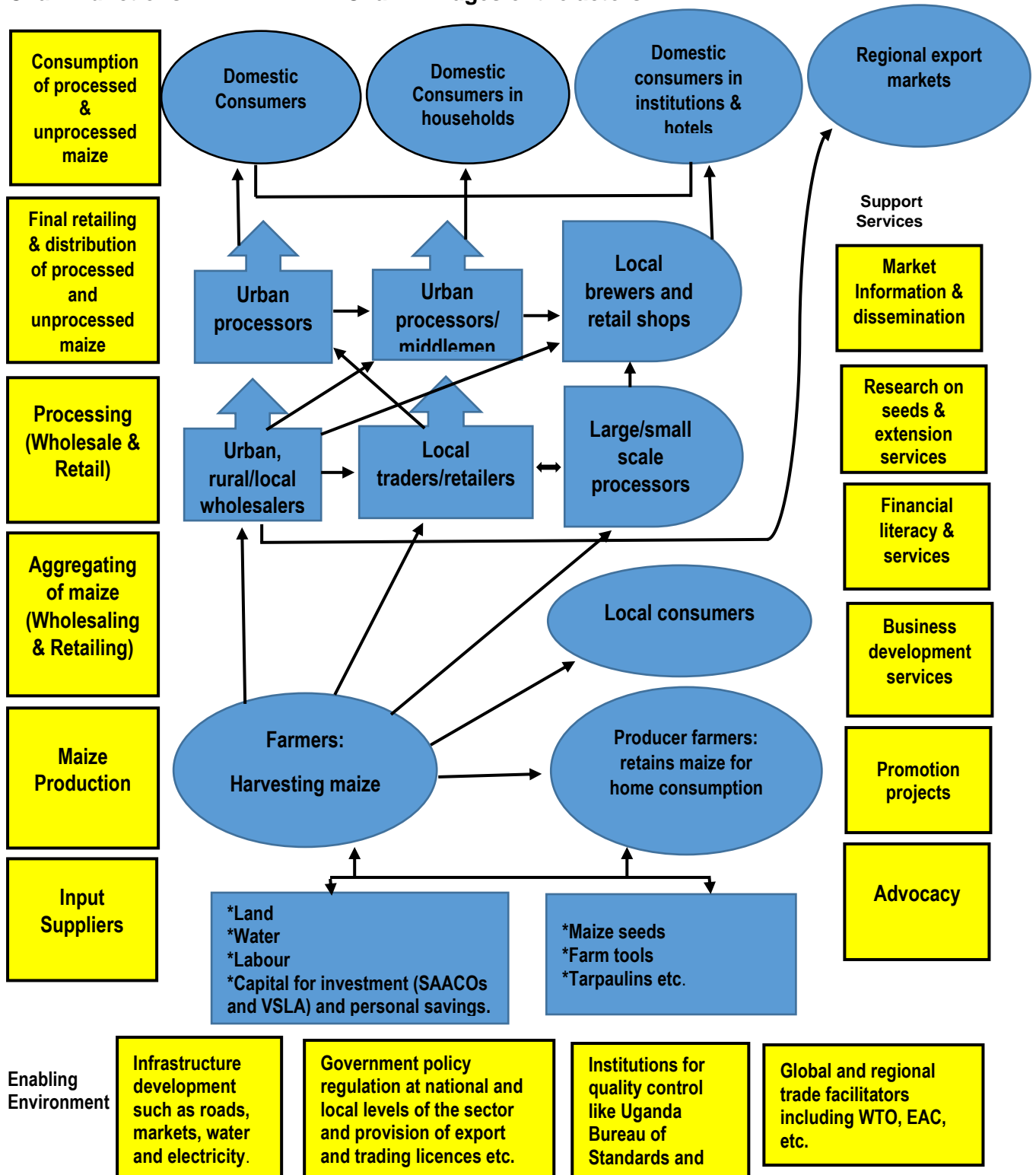
The medium-scale processors are based main in town centers of respective districts and offer both contract and trade-based milling services to institutions and urban traders. The medium-scale millers first hull the maize to remove bran and then produce refined flour. Maize bran is sold to poultry and livestock farmers, while the refined flour is mainly bought by the urban households. These processors operate mills with capacities of up to 50 tons per day. Although they are involved in grain storage, the volumes handled are limited by storage space and working capital.

Large-scale processors are mainly found in Kampala, Mbale, Lira and Gulu. They buy their maize from urban traders and large-scale traders operating in the main districts of Kitgum, Katakwi, Moroto and Kotido. They sell most of their maize products to the World Food Programme (WFP) and other large-scale millers. The processors carry out activities such as cleaning, drying, fumigating, and milling into flour.

The linkages in the flow of maize output along various distributional channels.

Chain Functions:

Chain linkages of the actors:



### 3.2.2 Beans value chain

Beans is also an important crop in the region and its importance varies across districts. Beans are produced in all the target districts but was highly scored in Abim, Nabilatuk and Kaabong. According to a survey by UBOS, 81% of all Ugandan households cultivate beans, with the western region leading in terms of numbers of households growing beans, followed by central, eastern, and northern regions in that order. Sometimes the farmers sell their beans directly to the market or to large institutions especially schools. In Abim district, about 86 percent of the interviewed households participated in bean production in the past twelve months, 78.3 percent participated in Nabilatuk, and 70 percent participated in Kabong (Table 5). In districts such as Karenga, Moroto, Amudat, Napak and Katakwi, less than 30 percent of farmers were engaged in bean production. The average yield per acre ranges between 30Kg to 300Kg with the highest production being in Kitgum and the lowest in Amudat district. Also, the proportion of farmers marketing beans varies by district with Karenga having the highest proportion of farmers selling their beans and Kotido having the least proportion of farmers selling beans. Also, like maize, most of the beans is sold unprocessed.

Table 6: The beans value chain

District	Proportion growing beans in last 12 months	Proportion selling beans	Proportion selling beans as processed	Proportion selling beans as unprocessed	Average yield (Kg)
All sample	43.7(363)	26.1(94)	47.7(53)	52.3(58)	139.8(409.6)
Abim	86.8(79)	34.6(27)	7.1(2)	92.9(26)	135.4(82.7)
Kotido	47.8(43)	9.3(4)	75.0(3)	25.0(1)	54.4(82.7)
Karenga	17.0(17)	47.1(8)	62.5(5)	37.5(3)	181.9(193.6)
Kaabong	70.0(63)	19.4(12)	88.0(22)	12.0(3)	190.8(951.8)
Moroto	25.0(13)	16.7(2)	0.0(0)	100.0(2)	69.1(55.5)
Amudat	24.6(15)	13.3(2)	0.0(0)	100.0(1)	34.6(63.0)
Nakapiripirit	50.8(31)	45.2(14)	7.7(1)	92.3(12)	146.9(210.4)
Nabilatuk	78.3(47)	21.3(10)	83.3(10)	16.7(2)	120.1(138.0)
Napak	22.0(11)	27.3(3)	0.0(0)	100.0(5)	74.4(154.6)
Katakwi	24.0(18)	33.3(6)	83.3(5)	16.7(1)	142.0(132.4)
Kitgum	26.0(26)	23.1(6)	71.4(5)	28.6(2)	277.2(231.7)

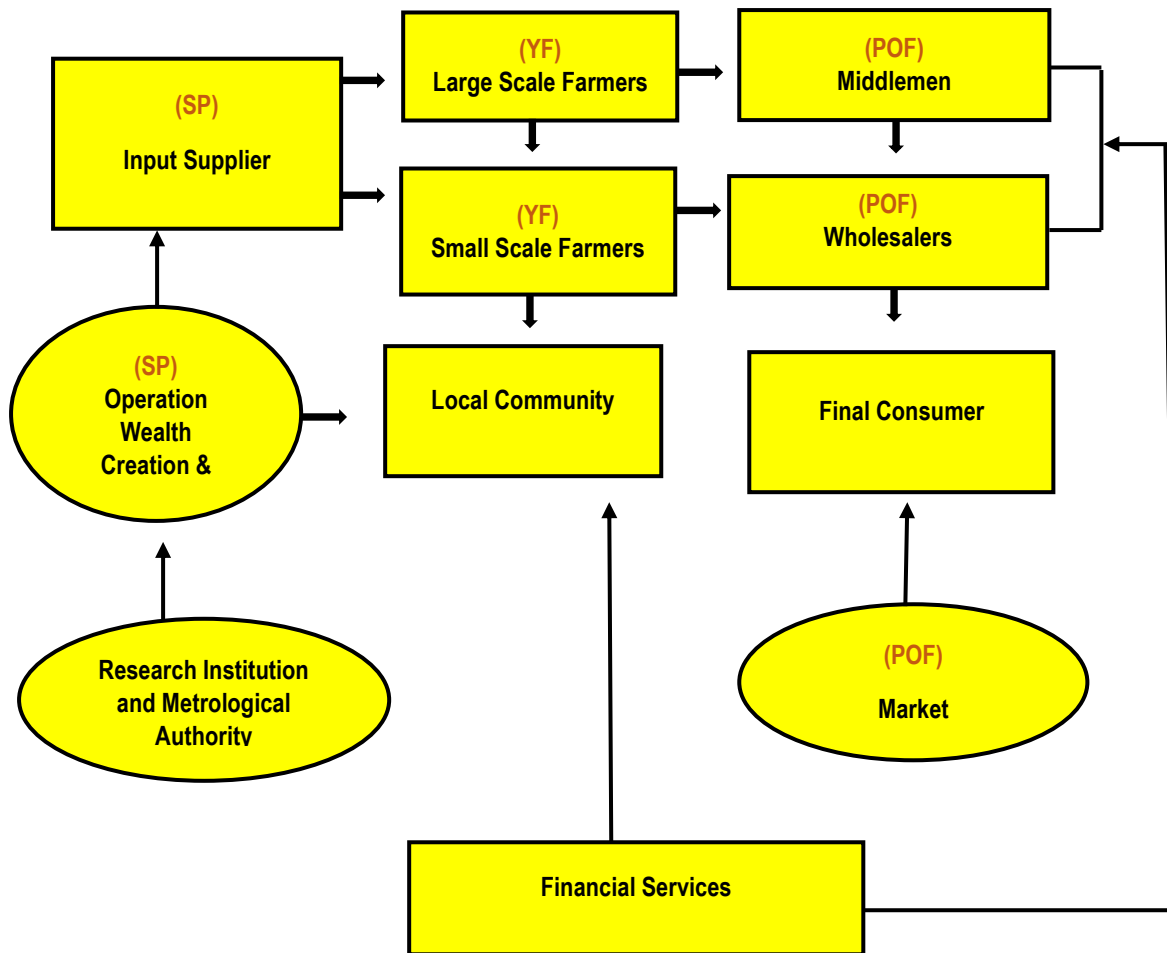
Authors own construction from the dataset. Numbers in parenthesis are standard errors.

The output from the beans produced that is consumed is sold off to the market and another proportion is left for other purposes such as seed. From an average output of 139.8 Kg for the whole sample, an average of 26 percent sell off to the market, although this varied across districts (See Appendix 4 for the marketing of beans). The largest proportion is kept for home consumption.

Beans are produced in all the target districts but was highly scored in Abim, Nabilatuk and Kaabong. According to a survey by UBOS, 81% of all Ugandan households cultivate beans, with the western region leading in terms of numbers of households growing beans, followed by central, eastern, and northern regions in that order. Sometimes the farmers sell their beans directly to the market or to large institutions especially schools.



### Beans Value Chain Map



(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

#### **Input dealers**

The main beans seeds suppliers are the wholesalers and retailers within urban centers and in the villages from whom farmers normally buy the seeds. In very minimal circumstances do farmers buy improved seeds often citing their low germination rates. The main inputs obtained by farmers is pesticides for controlling fireflies, grasshoppers, and other insects. This is usually done by farmers with between 2 – 3 acres of land but small-scale farmers mostly use ash as a pesticide. Both women and men are affected equally.

#### **Rural traders**

The rural traders buy from the farmers and sell to travelling traders and wholesalers who are mainly based in the urban centers of Abim, Nabilatuk and Kaabong. The travelling traders mainly come from Lira especially for Abim district.

#### **Wholesalers**

Each of these urban centers have wholesaler's majority of whom deal in a variety of commodities including beans. These wholesalers sell their beans to local retailers and to major urban centers in Lira, Kitgum and Gulu.

## Constraints and opportunities

At production level the main constraints were limited improved seed variety, Poor quality seeds, loss to pests and diseases, limited use of appropriate agronomic practices, Low soil fertility and reliance on weather, makes the crop susceptible to droughts and weather-related factors.

The other constraint is related to trade and marketing which includes inadequate market information for farmers especially regarding prices. Because of inadequate market information, farmers decide on their own procedures, and marketing is done individually leading to low bargaining powers and thus low farm gate prices.

The other constraint is related to price fluctuation. The prices of the beans are not stable and fluctuate due to several factors, including the volume of harvest, source of supply, type of beans and seasons. Furthermore, beans are grown in rural areas by peasant households. Quite often the quantities produced are small. Traders must collect from many farmers in order to make commercially viable quantities. This makes it costly.

### 3.2.3 Ground nuts value chains

Ground nuts is an important food and cash crop. Less than 10 percent of farmers produce groundnuts in the last seasons in Karenga, Amudat, Nakapiripirit, Moroto and Nabilatuk (Table 6). Groundnut is grown predominantly in the districts of Katakwi. Majority of the farmers sell their groundnuts unprocessed and only less than 35 percent of the households do sell groundnuts in the market across all the districts. This implies that most of the ground nuts are consumed at home.

Table 7: **Ground nuts value chains**

District	Proportion growing groundnuts in last 12 months	Proportion selling groundnuts	Proportion selling groundnuts as processed	Proportion selling groundnuts as unprocessed	Average yield (Kg)
All sample	25.3(210)	34.1(71)	35.9(28)	64.1(50)	174.0(238.0)
Abim	50.5(46)	19.6(9)	0.0(0)	100.0(12)	68.9(73.8)
Kotido	45.6(41)	19.5(8)	12.5(1)	87.5(7)	157.8(249.3)
Karenga	1.0(1)	0.0(0)	0.0(0)	100.0(1)	73.2(60.3)
Kaabong	17.8(16)	37.5(6)	85.7(6)	14.3(1)	57.6(56.9)
Moroto	1.9(1)	100.0(1)	0.0(0)	100.0(1)	75.4(35.4)
Amudat	3.3(2)	0.0(0)	0.0(0)	100.0(2)	-
Nakapiripirit	3.3(2)	100.0(2)	0.0(0)	100.0(2)	130.0(99.0)
Nabilatuk	13.3(8)	14.3(1)	0.0(0)	100.0(1)	187.1(81.8)
Napak	18.0(9)	25.0(2)	0.0(0)	100.0(2)	150.8(328.3)
Katakwi	90.7(68)	51.5(35)	57.1(20)	42.9(15)	283.3(236.8)
Kitgum	16.0(16)	43.8(7)	14.3(1)	85.7(6)	340.4(346.7)

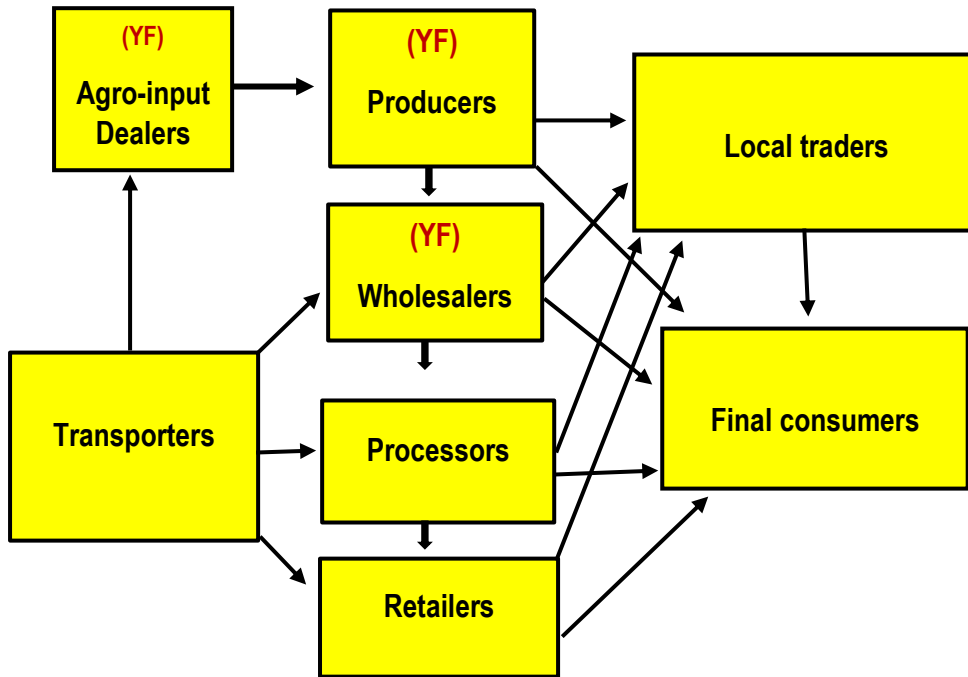
Authors own construction from the dataset. Numbers in parenthesis are standard deviations

Small-scale groundnuts farmers may often act as processors and retailers at the local level. In the value chain small-scale producers (men and women) bring their produce to the rural or urban markets (collection points) where groundnut may be bought directly by (i) retailers (rural traders), (ii) town traders, and (iii) wholesalers.

The groundnuts value chain map below shows the key players along the groundnuts chain ranging from farmers/producers, agents or brokers, local traders, urban wholesalers, urban retailers, agro-input dealers, processors, and consumers. Some institutions (schools, hotels, and hospitals) procure and consume groundnuts in large quantities. Government agencies

(including NAADS, NARO, and MAAIF), NGOs, and research organizations also engage in different activities of breeding, multiplying, and distributing improved varieties of seed potato to farmers.

### Ground nuts Value Chain Map



(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

#### **Rural traders/retailers**

The rural traders buy directly from the farmers and sell to the middlemen/traders from major urban centers or towns mostly from Mbale, Soroti or Lira. Usually, after buying from the farmers, the rural traders/retailers shell the groundnuts before selling at retail prices in their shops or to wholesalers/middlemen from major urban centers. Shelling is done at Shs 500/bag using a machine. In some cases, rural traders buy shelled groundnuts directly from farmers.

#### **Middlemen/urban traders**

The middlemen/urban traders buy shelled or unshelled groundnuts from trading centers or storage facilities in Katakwi and Karenga and then they transport it to town markets like Soroti, Mbale or Lira. Usually, after buying unshelled groundnuts from the farmers, the local traders shell the groundnuts before selling to the wholesalers from the major urban centers. Unshelled groundnuts are shelled at between 1000shs per bag using a machine.

#### **Wholesalers**

The whole traders operate from major urban centers in the region and deal in many products including groundnuts. They are involved in both wholesale and retail business. They buy their stock mainly from the middlemen or rural traders, although occasionally they may buy directly from farmers in which case, they provide transport services. The whole traders also sell

groundnuts to buyers from other towns outside the region, but they tend to deliver directly to buyers in Kampala and the markets in Southern Sudan.

### **Large traders**

The large traders operate from Kampala, with their groundnut supplies coming from various parts of the country – primarily the main groundnut growing areas. The large traders operate from the main towns/cities, such as Gulu, Lira, and Kampala. They buy the produce from local traders, or occasionally directly from the farmers. Most of the production goes to Kampala to be sold directly to consumers as it is (sold between Ush 5000 to 6000 per kg) or processed into paste. The regional market is also another important destination; trucks deliver groundnuts to markets in Kenya and South Sudan.

### **Processors**

Processors operate out of the small towns and even urban centers to process the groundnuts to produce paste/butter.

### **Constraints**

**Disease and pests:** The main diseases are rosette virus and early leaf spot. Groundnut rosette virus disease has been the most limiting factor of production. Other diseases include bacterial wilt, rust, and stem rot. The major insect pests are aphids, grubs, and termites. Storage pests include moths, flour beetles, etc. Mould (*Aspergillus flavus*) also attack groundnut, leading to aflatoxin contamination, if the nuts are not dried sufficiently. Aflatoxin in peanuts is a serious problem because once they are infected, it becomes difficult to remove the aflatoxin and the peanut becomes dangerous for human consumption

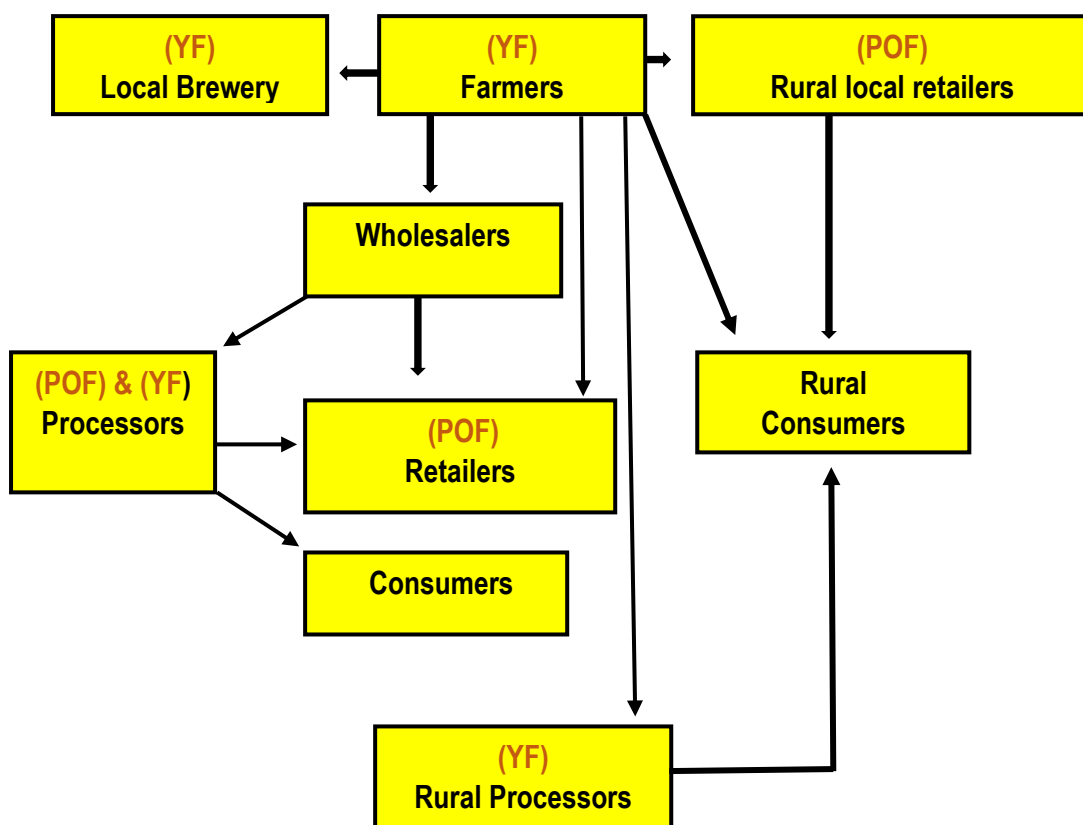
**Low levels of inputs:** As groundnut is grown mostly by small-scale farmers, the production is limited by low level of inputs. The lack of proper storage leads to attack by storage pests and moulds. Limited access to formal credit particularly for women

### 3.2.4 Sorghum chain analysis

Table 7 provides some descriptive insights on the producers of sorghum across the districts. 48.3 percent of all the sample households are engaged in sorghum production and only 23.7 percent do sell their produce. All sample households in Nabilatuk are engaged in sorghum production. Other districts producing sorghum are Kaabong, Moroto and Kotido. Very few, less than 7.1 percent are traders and less than 2 percent process their output. Also, only 30.4 percent indicated that they accessed agro processors.

Production is concentrated in the Karamoja region and most of kitgum and Katakwi districts mainly at subsistence level for home consumption. Sorghum is a main staple food in the northern and Karamoja region. Sorghum consumption is mainly localized to the growing areas. The sorghum value chain map below shows the key players along the groundnuts chain ranging from farmers/producers, agents or brokers, local traders, urban wholesalers, urban retailers, agro-input dealers, processors, and consumers.

**The Sorghum Value Chain Map**



(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

### Sorghum Exports/importers

Currently, Southern Sudan is the biggest market for Ugandan sorghum, where small quantities of about 1-5 bags of 100 kg are exported mostly by individual Ugandan traders of South Sudan importers. About 95% of the trade in the commodity is not recorded and for this reason, the

exact quantities exported are not well established. Other markets for Ugandan sorghum include Kenya.

### **Rural traders**

Rural traders buy most of the sorghum traded in the rural areas. The rural traders buy at lower prices from the farmers and sell at a profit to the middlemen. The rural traders then supply the urban markets in larger urban centers or small-scale exporters. The value chain for sorghum was mostly small scale. Interaction with produce buyers and transporter reveal that large scale producers want to do business with rural farmers. However, this is impeded by the poor roads and insecurity as well as lack of proper storage facilities which hinders and/or affects their willingness hence their engagement with the store dealers or middlemen.

### **Constraints**

Sorghum is a minority crop in Uganda, but its production and trade suffer from similar constraints as the other agricultural staples. These include low levels of technology employed for production and for processing, lack of adequate credit, lack of proper on-farm storage facilities, inadequate attention to standards and a poor marketing infrastructure.

### **Opportunities**

Cotton is highly adaptive in the semi-arid and dry areas of northern Uganda and karamoja, farmers can take advantage of suitable condition to grow sorghum in larger quantities. Farmers can also take advantage of available markets by breweries companies such as Nile breweries and Uganda breweries to increase their production

The linkages in the flow of sorghum output along various distributional channels.

Chain Functions:

Chain linkages of the actors:

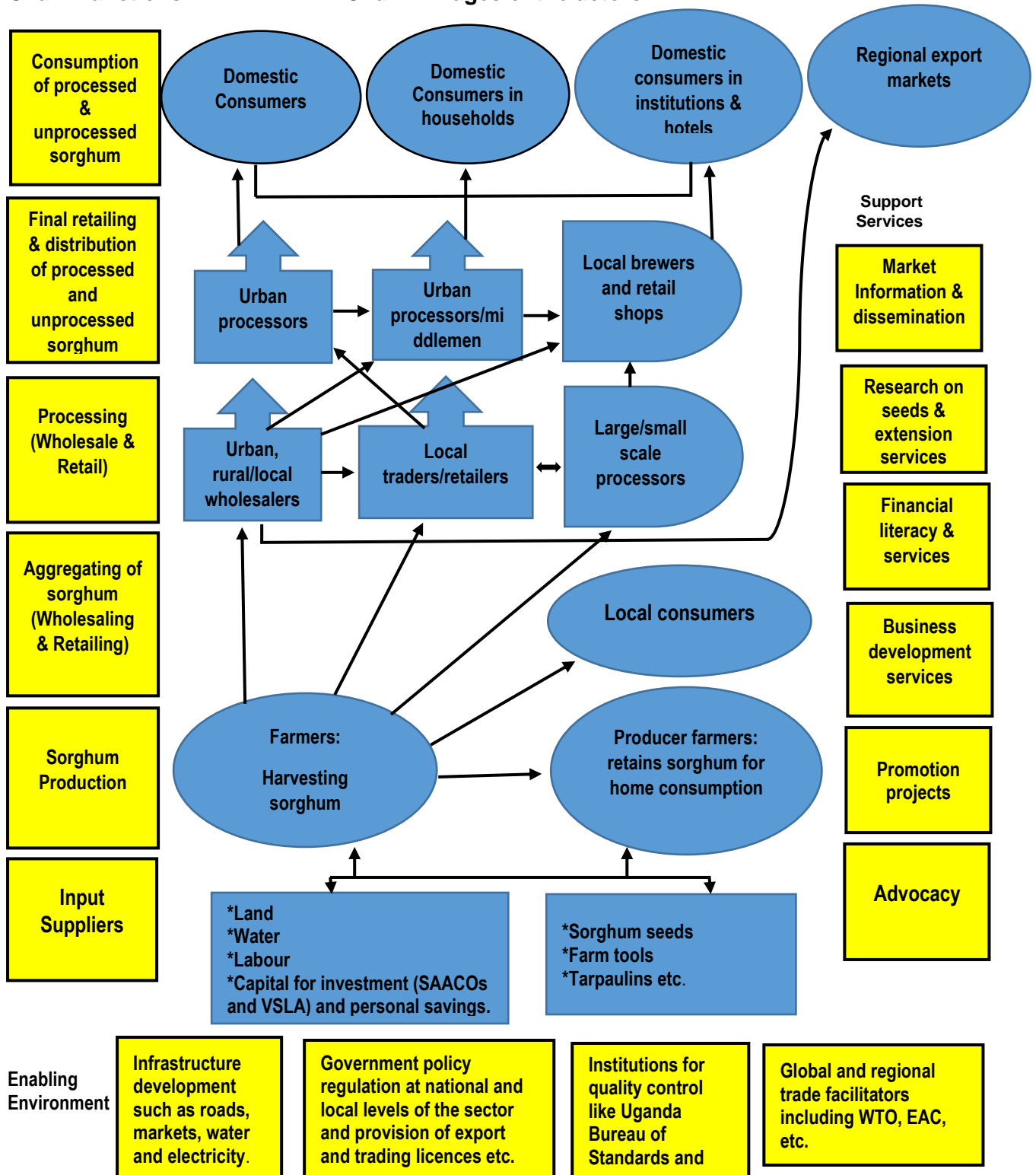


Table 8: Sorghum value chains

Variable	Total	Abim	Kotido	Karenga	Kaabong	Moroto	Amud at	Nakapir ipirit	Nabilatuk	Napak	Katakwi	Kitgum
<b>Sorghum</b>	48.3(401)	85.7(78)	53.3(48)	46.0(46)	60.0(54)	26.9(14)	3.3(2)	0.0(0)	100.0(60)	52.0(26)	38.7(29)	44.0(44)
<b>Sold the output of sorghum</b>	23.7(94)	32.1(25)	14.6(7)	13.0(6)	14.0(7)	14.3(2)	0.0(0)	0.0()	43.3(26)	38.5(10)	13.8(4)	15.9(7)
<b>Form sold the output</b>												
<b>Processed</b>	54.9(56)	0.0(0)	85.7(6)	66.7(4)	83.3(15)	0.0(0)	0.0()	0.0()	76.9(20)	0.0(0)	100.0(4)	100.0(7)
<b>Unprocessed</b>	45.1(46)	100.0(21)	14.3(1)	33.3(2)	16.7(3)	100.0(2)	0.0()	0.0()	23.1(6)	100(11)	0.0(0)	0.0(0)
<b>Markets one has been able to access for sorghum in the last 12 months</b>												
<b>Local markets/ Sub County</b>	43.8(106)	26.4(19)	100(21)	50.0(6)	42.1(16)	100.0(2)	0.0(0)	0.0(0)	67.6(25)	63.6(7)	36.4(4)	16.2(6)
<b>Within my district</b>	23.6(57)	0.0(0)	90.5(19)	8.3(1)	13.2(5)	50.0(1)	0.0(0)	0.0(0)	67.6(25)	36.4(4)	18.2(2)	0.0(0)
<b>National markets (Outside the district)</b>	4.1(10)	6.9(5)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	36.4(4)	9.1(1)	0.0(0)
<b>None</b>	54.1(126)	66.7(48)	0.0(0)	50.0(6)	55.3(21)	0.0(0)	100(1)	0.0(0)	29.7(11)	9.1(1)	63.6(7)	83.8(31)
<b>Played any of the role</b>												
<b>Input supplier</b>	0.7(2)	0.0(0)	0.0(0)	2.5(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	2.4(1)
<b>Producer</b>	90.4(255)	96.1(73)	85.0(17)	90.0(36)	100(42)	50.0(1)	100(1)	0.0(0)	68.4(26)	83.3(10)	100(10)	95.1(39)
<b>Trader</b>	7.1(20)	3.9(3)	5.0(1)	0.0(0)	0.0(0)	50.0(1)	0.0(0)	0.0(0)	31.6(12)	16.7(2)	0.0(0)	2.4(1)
<b>Processor</b>	1.8(5)	0.0(0)	10.0(2)	7.5(3)	0.0(0)	0.0(0)	0.0(0)	0.0()	0.0(0)	0.0(0)	0.0(0)	0.0(0)
<b>Have been able to access agro processing operators/ markets for your produce, in the last 12months</b>	30.4(84)	49.3(37)	30.8(4)	34.1(14)	2.4(1)	100.0(2)	0.0(0)	0.0(0)	44.7(17)	41.7(5)	18.2(2)	4.9(2)

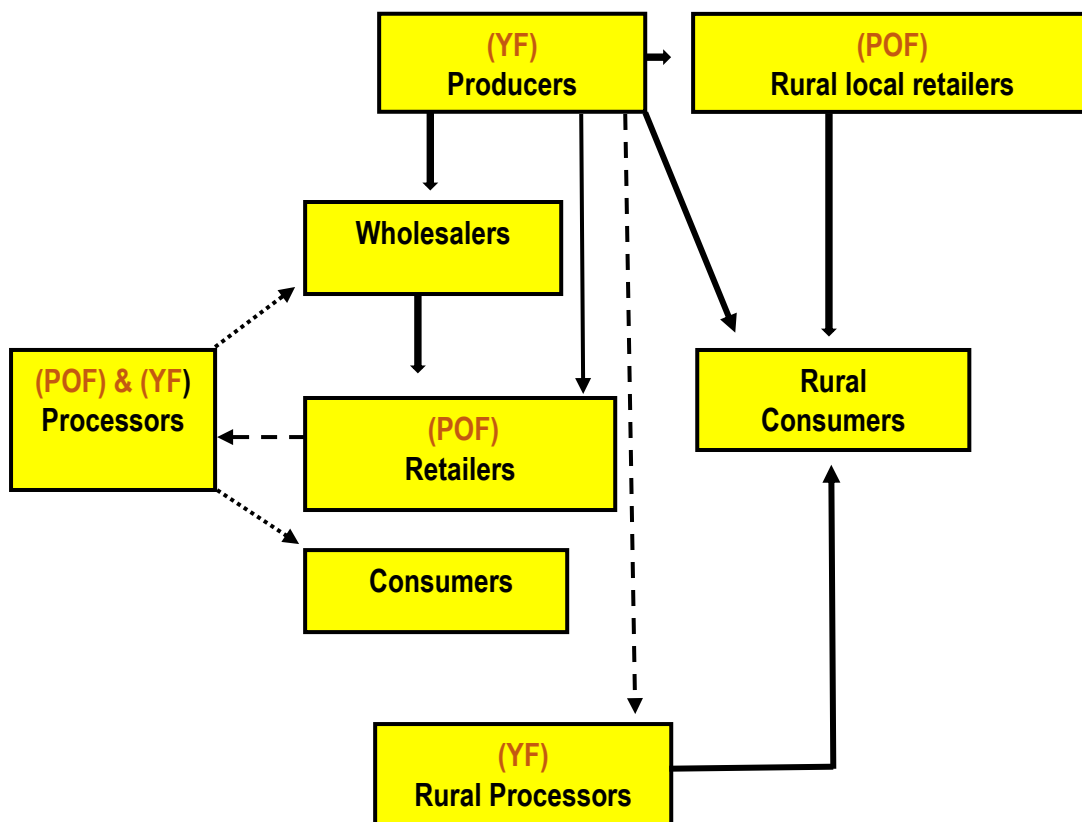


### 3.2.6 Cassava value chain Analysis

The main cassava producing area is Nabilatuk, Katakwi, and Abim districts in the northeast. Because of its resilience to drought conditions, cassava plays a major role in the farming systems of the north and the east of the country.

The cassava value chain map below shows the key players along the groundnuts chain ranging from farmers/producers, agents or brokers, local traders, urban wholesalers, urban retailers, agro-input dealers, processors, and consumers.

**Cassava Value Chain Map**



**Key:**

The thick lines indicate the fresh cassava flow, the thick dotted lines indicate cassava flour flow while the small, dotted lines indicate the cassava chips flow.

(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females. The

**Producers**

Cassava producers usually double as local traders as well. The Farmers harvest, peel, and dry cassava roots. The farmers usually sell directly to rural retailers, rural consumers or, if they are near a town to wholesalers. The farmers also sometimes transport cassava (fresh or dried chips) and sell it directly to urban market or through middlemen. Some of the large-scale farmers with big volumes of the crop sell direct to big traders at farm gate. Farmers rarely sell on credit terms except with traders with whom they have built a long-standing business relationship.

## **Local traders**

Sometimes individual farmers who have access to more capital than their neighbors also act as local traders. They use their financial resources and their knowledge of the local environment, to bulk cassava chips from the surrounding areas. Customers (usually wholesalers from local towns or travelling traders) are willing to pay for their services to reduce on the time and money spent on assembling enough cassava chips. This bulking process helps in relieving customers of the burden of having to check the quality of the small quantities of chips typically offered by the farmers.

## **Wholesalers**

The wholesalers mainly operate in towns such as Abim, Katakwi and Nabilatuk but to a limited extent also supply chips and flour to wholesalers in major urban such as Lira, Soroti or Moroto and Kotido. The wholesalers mainly arrange the processing of the Cassava chips into flour using specialized millers, and to stock and sell the flour to their various customers. In a lesser role, the wholesalers also provide another level of bulking between the farmer and the major consumer markets. The wholesalers' stores dried up cassava in form of chips or flour in moderate quantities at the end of the dry season, depending on the financial capacity. Some wholesalers specialize in dry cassava, but majority also typically deal in other food products such as maize, millet and oil seeds.

The stronger wholesalers concentrate on cassava chips and flour in the wet season, when sourcing quality chips is a problem, yet profits are highest. The less ambitious traders sell more cassava flour during the dry season when supplies are abundant. Few districts' wholesalers secure credit from their sellers. Instead, they provide assembly traders with cash advances when supply is short. This practice is less common when there is ample supply of dried cassava.

## **Travelling traders**

These traders supply most of the cassava flour to large urban consumer markets. They turn over their capital rapidly by minimizing the length of time between purchase and sale. By avoiding storage, they both limit the risk that prices will move against them and avoid significant overhead costs. Most commonly, such traders buy from several local traders in one trip and hire vehicles to transport the chips to urban centers, where they pay for milling and sell flour to wholesalers. Travelling traders tend to specialize in just one food product.

## **Processors**

In towns such as Moroto and Kotido there are several specialist businesses who combine cassava flour milling with wholesaling. These are efficiently run operations, purchasing either directly from local traders in the villages or from travelling traders.

## **Constraints**

Cassava production remains traditional, with virtually no use of purchased inputs. This is because of its reputation as a food security crop – it is considered resilient and therefore planted in poor soils with little or no fertilizers.

Regarding the fresh cassava value chain, there are inefficiencies in the marketing chain (such as transport bottlenecks and storage) which are all very costly, given that fresh cassava is highly perishable. Secondly, the bulkiness and value of fresh cassava can cause transportation costs to be high, thus constituting a large share of the final price. Moreover, the

perishability and bulkiness of fresh cassava means that it requires that buyers are located close to the production centers or in villages.

Dry cassava requires the development of processing service providers. Secondly, reliance on sun-drying for processing of chips and flour creates serious scale issues. In addition, labor intensity of processing is high creating demand for increased availability of small and medium scale processing equipment.

Cassava mosaic remains a major constraint to cassava producers. It affects both the leaves and the roots. The cassava leaves turn yellow and shade off, while the cassava itself develops some spots, hardens, and in some cases taste sweet. The new disease tolerant material is insufficiently reaching the farmers and hence they are prone to the disease, leading to low yields and deficits, which is a threat to food security.

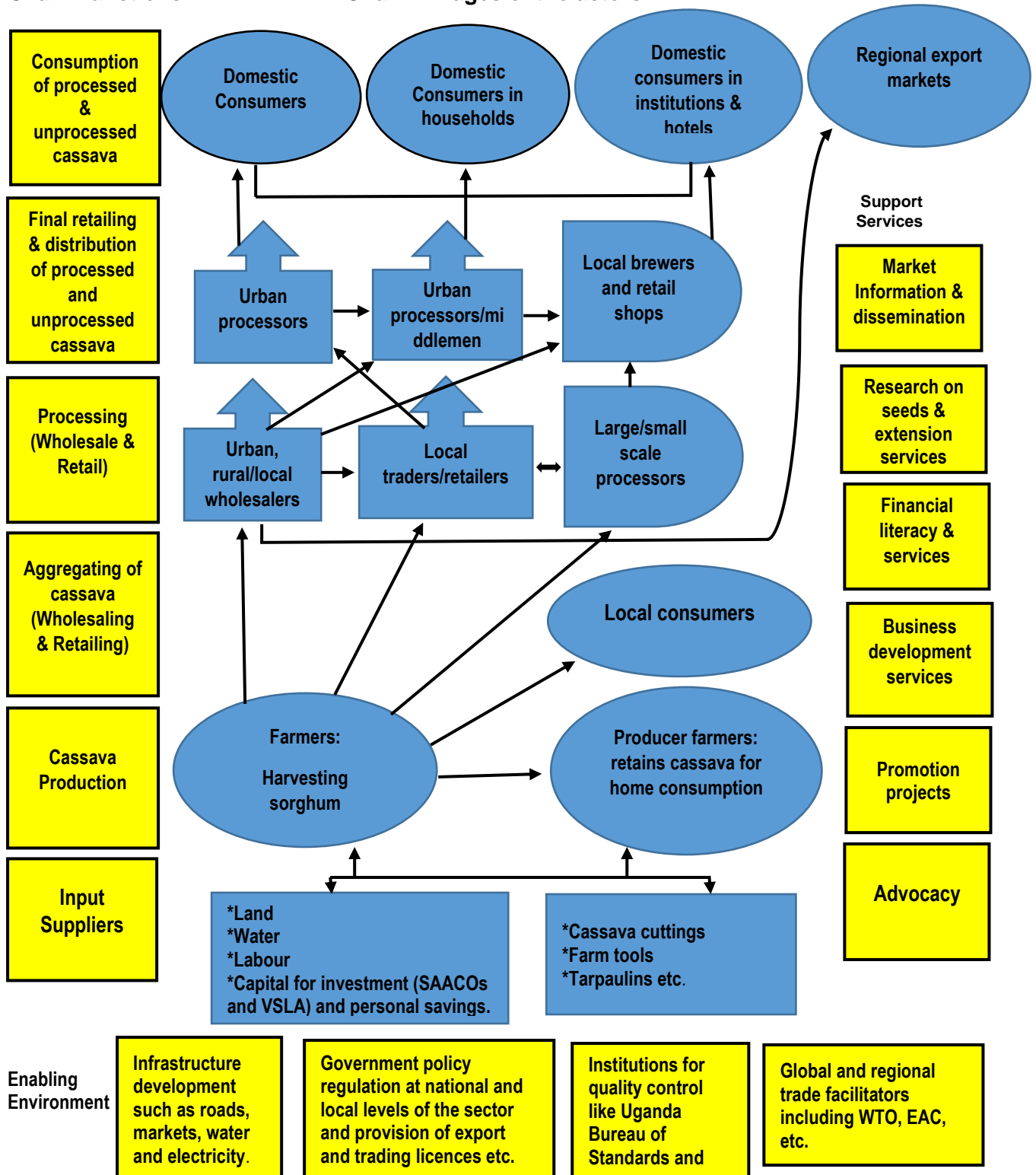
Most farmers have small plots – 0.5 to 2 hectares per household – and have limited chances of increasing the acreage under (cassava) crop. As a result, cassava is intercropped with other commodities such as beans, maize etc. This affects not only the quantity produced, but also puts the crop at a higher risk of diseases. Where family labor is constrained and hiring of labor becomes necessary, opening of (new) land is limited by the cost of labor especially for the poor households.

Inadequate organization by farmers complicates marketing and increases transaction costs. Such costs are normally transferred to the farmers and hence decrease the farm gate price. The absence of large-scale processing of cassava into any by product makes the farmers depend on the ad-hoc marketing arrangements and fluctuating demand and prices.

The linkages in the flow of cassava output along various distributional channels.

Chain Functions:

Chain linkages of the actors:



### 3.2.7 Cotton Value Chain Analysis

#### **Background**

Cotton is grown primarily in the northern and northeastern region of the country. In the study context, cotton is primarily grown in the districts in Kitgum, Karenga, Kaabong and Kotido. Cotton is primarily grown by small farms with an average size of less than 0.5 hectares. Cotton is grown as either a monoculture or inter-cropped with food crops. Cultivation is characterized by manual hoeing and low use of inputs. The crop is entirely rain-fed, and harvesting is hand-picked.

#### **Input dealers**

Cotton companies in northern Uganda provide seeds (from the Cotton Development Organization, CDO) to farmers. The CDO provides cotton companies with seed at a cost covered by the development levy. Because the CDO controls seed distribution, when germination rates are low, farmers who want to obtain additional seeds are unable to do so, as there are no private channels through which to purchase them. Instead, farmers must simply face a significant reduction in yield—and income—from their cotton harvest. GADC controls the cotton market in Kitgum and source cotton from as far as Abim, Karenga and Kaabong. GADC provide inputs to farmers to help boost yields. They then buy cotton for cash. Other major players include Dunavant who operate the same model as GADC and uses CDO as the main input supplier. Government agencies, particularly NAADS (National Agricultural Advisory Services) and many NGOs also provide farmers with tools to assist in land opening. In addition, there are domestic input suppliers from which farmers can purchase tools, but not seeds.

#### **Producers**

Though there are some exceptions, very few farmers in the cotton cultivating regions cultivate large tracks of land for cotton. This level of cultivation is consistent with the average land size for cotton producers in the rest of the country. Although there are cooperatives storage structures, most farmers utilize their own storage units for cotton.

#### **Buying agents and purchasing channels**

Most farmers in Kitgum sell their cotton either to GADC based at the East Acholi Cooperative Union ginnery or individual buyers mostly operating from Lira. GADC mostly uses buying agents who traverse the northern region and Karamoja and buy directly from the farmers. Another major buyer is Dunavant who also purchase cotton through buying agents who receive a commission in return. Both GADC and Dunavant also purchase cotton through the cooperative societies that still operate in various locations. Some farmers also sell directly to individual buyers who then sell either to GADC or traders from Lira.

#### **Transporters**

Most of the companies buying Cotton from the cotton producing areas have their own trucks that pick the cotton from middlemen in the rural trading centers or directly from the farmers. This then transport the cotton to the processing centers in Kitgum or Lira. The processed cotton is transported via road and through the railway system for export.

#### **Ginners and processors**

The ginnery in the project in Kitgum owned by the East Acholi Cooperative Union and rented and operated by GADC. At the ginerry which also acts as a buying center, the cotton is sorted and weighed and then baled for export. The only textile mills in the region with potential to

provide spinning and weaving is in Lira and is not currently operational. Almost 98 percent of ginned cotton in the project area is exported directly to conventional markets in Europe or China or to organic markets in South Africa, Indonesia, China, the U.S., France, Belgium, and India.

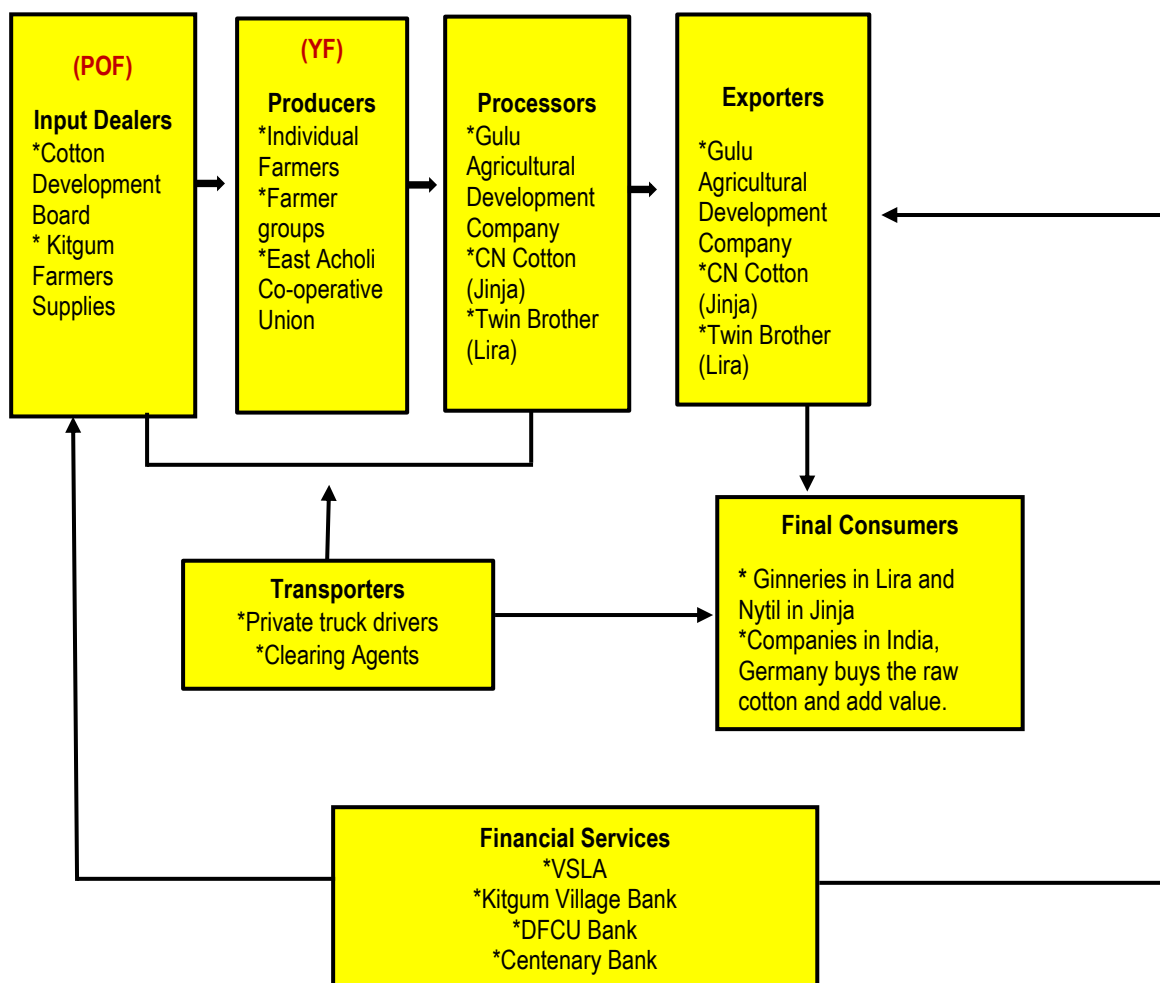
**Constraints**

Farmers cannot diversify cotton production and markets due to the strict control on cotton inputs by supplies by the CDO and market domination by companies like GADC and Dunavant. This often leads to low buying prices for cotton.

**Opportunities**

Women and youth can take advantage and register as buying agents. This can create avenue for the women and youth to provide limited agricultural extension services and can mobilize famers to negotiate better prices. As Village agents, the women and youth may have better interaction with farmers in remote areas and can reach farmers for the last mile of service delivery.

**Cotton Value Chain Map**



(YF) shows nodes where women are currently participating and (POF) shows nodes that a were promising, profitable opportunities for employment or self-employment for females

### 3.2.8 Sunflower value chain Analysis

#### Producers

Most farmers grow sunflower together with other crops, including maize and soybean, on smallholder farms. Due to availability of fast maturing breeds, farmers can generally plant sunflower in any season, however the best yields and oil content are achieved when the crops are planted early. Regardless, most farmers plant two crops throughout the year. Sunflowers grow best in well-drained, ploughed fields. Sunflower is produced by both contract and non-contract farmers. Contract farmers sell directly or through agents to the Mukwano factory in Lira. Mukwano has an informal contract (which is not written) with farmers and provides them with hybrid seeds from South Africa twice a year (once every season) at the cost of Ush 16 500/kg (two kilos of seeds are needed for one acre of planted land, which means that farmers pay Ush 33 000/acre). These seeds are paid months in advance by farmers before being delivered. Upon this, Mukwano agrees to buy the entire production from farmers at an estimated price; although it has been arranged, the price might be susceptible to vary according to the international oil market (between Ush 800 - 1 200/kg). Once the sunflowers are harvested, the farmers bring the seeds to the collecting point managed by the agent; farmers do not receive any money but will be paid once Mukwano has set the final price which can take weeks after harvest.

#### Collection

Upon harvest, contract farmers sell the entirety of their product to Mukwano. It should be noted that although an estimated price was provided to the farmers upon purchase of the seeds, it is subject to change according to international oil prices. As such, the farmers may be paid anywhere from 800 UGX to 1,200 UGX per kg. In general, farmers bring the sunflower seeds to a collection point managed by the Mukwano agents in each district. However, they are not paid immediately. Instead, they are compensated once Mukwano sets the final price for the harvest, which may take a few weeks. Linking the prices to the international sunflower seed sector (rather than the prices in the target market, i.e., the domestic oil market) means that smallholders must compete with industrial agriculture. This dynamic creates uncertainty for the farmers contracted by Mukwano.

Most independent farmers meanwhile sell their harvest to local traders. These traders connect rural farmers in remote areas to the larger value chain. They purchase sunflower seeds at both farmers' gates and stores. Once they have accumulated a large enough quantity, they bulk the product together and transport it to Lira, where they sell it to millers for processing. Local millers pay a higher price than Mukwano (roughly 1,100 to 1,300 UGX per kg), though the traders may take a 100 to 200 UGX cut. Other farmers do sell their harvest directly to local millers but doing so means that the farmer must cover the cost of transportation. Independent farmers who purchase seeds from Mukwano are in principle free to sell their produce elsewhere if they choose to, but the sector dynamics influence them to sell their harvest back to the conglomerate.

#### Local Traders

These local traders have similar roles as the previous value chains like maize; they collect the sunflower seeds in remote areas where it is difficult to access and buy the merchandise directly at farms' gates and stores. Once they have collected and bulked enough, they bring it to the local millers in urban centers such as Lira.

#### Local Millers

Local millers buy the sunflower seeds at a slightly higher price than Mukwano between 1100 - 1 300 shillings per kg and then they dry the seeds before processing them into cooking oil. Millers then package and sell the oil in 20L jerricans to local retailers at a price of about 78,000 shillings per jerrican, which corresponds to about 3,900 shillings per liter. The cake that is produced during the processing of the oil is sold as animal feed to traders from Kampala and other towns at 1000 shillings per kilo.

### **Local Retailers**

Local retailers buy the oil from the local millers and then sell it at their small shops in Lira while managing to make a small profit. They either sell the oil as a 20L jerrican or sell it in smaller bottles of 50 to 150cl.

### **Agents**

Mukwano has agents in every district, their role is to link farmers with Mukwano by providing inputs and collecting the sunflower seeds once they are harvested. These agents can also provide trainings on agronomic practices (crop rotation, post harvesting, etc.). The agency model is not popular with farmers because the agents mostly determine the prices and take advantage of bumper harvest to lower prices and farmers usually have to other market options. The agency model also prevents farmers from selling directly to the market.

### **Processors**

Sunflower seeds are processed into cooking oil or cake which is sold for animal feed. Mukwano buys the sunflower seeds at a price fluctuating between Ush 800-1 200 depending on the international sunflower oil market prices. The refined oil is then ready for consumption and can then be packaged and sold on the national market at a price of Ush7,500/Litre. The cake is sold on the regional markets.

### **Opportunities**

There is high demand for sunflower by Mukwano and small-scale oil producers within the region. Farmers can diversify their markets from Mukwano by selling to their produce to other players.

Higher prices obtained by farmers due to direct marketing of sunflower. Sunflower is currently selling at 2000 shillings per kilo. Farmers can take advantage and increase production.

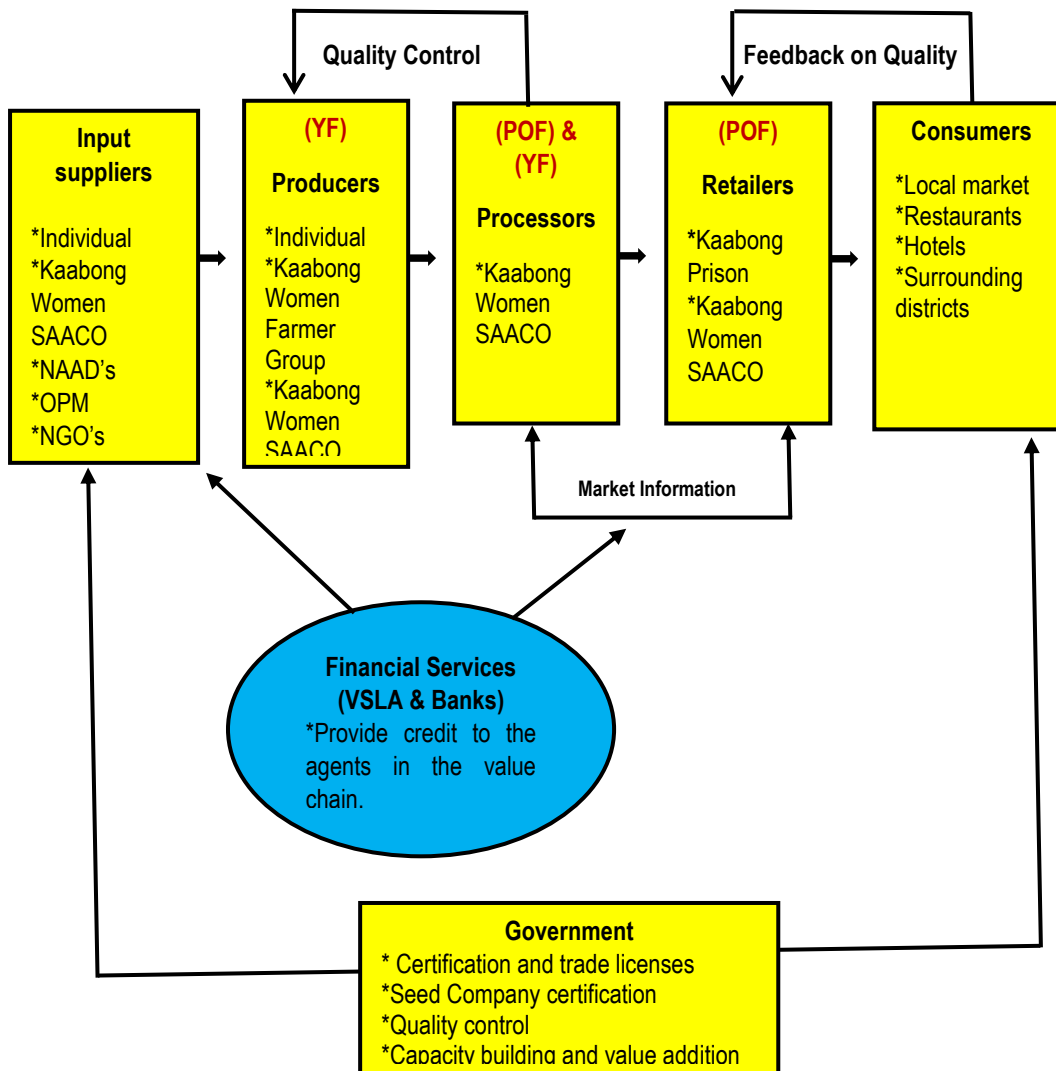
### **Constraints**

Delays in delivery of seeds which can affect germination (seed germination rate decreases after 4 to 6 months). This is because the agents usually supply the seeds to the farmers and control the supply of seeds. The project could take advantage and supply sunflower seeds directly to the project beneficiaries.

The project could also work with NASSARI/NACRI to develop quality seeds whereby women and youth beneficiaries participate in the trial by planting the seeds then the project supplies the women and youth with the seeds. This will be a win situation for NASSARI and the women and youth to produce quality seeds.



## Sunflower Value Chain Map



(YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

### 3.2.9 Pulses value chain Analysis

The value chain for pulses which largely includes cow peas and navy beans was mainly cited in the focus group discussions in Nabilatuk. Women are already active producers, and some are engaged as input dealers. The pulses were scored highly for their potential for growth and available sales outlet although they currently have no institutions or service providers to support the sector (Table 8). Also, it has a high number of women entrepreneurs although women currently don't own the equipment or assets needed for its production or processing at higher nodes in the value chain (Table 9). The value chain map is shown below and largely shows nodes for potential intervention by the project.

**Table 9: Scoring of the pulse value chain against their potential to contribute to economic growth in Nabilatuk**

	<b>Characteristics</b>	<b>Score</b>
1	Growth trend of the value chain, unmet market demand	4
2	Available sales outlet, high interest of buyers in buying the product	3
3	Scope for expanding production and/ or scope for value addition through processing or product improvement (new products for which there is a market)	2
4	Low costs of the value chain vis-à-vis competitors	2
5	Other competitive advantage of the value chain vis-à-vis competitors (unique product/ local specialty)	2
6	Potential for collaboration and coordination between actors for value chain upgrading	1
7	Existence of institutions and service providers (financial, entrepreneurial, technological, gender) to support value chain actors.	1

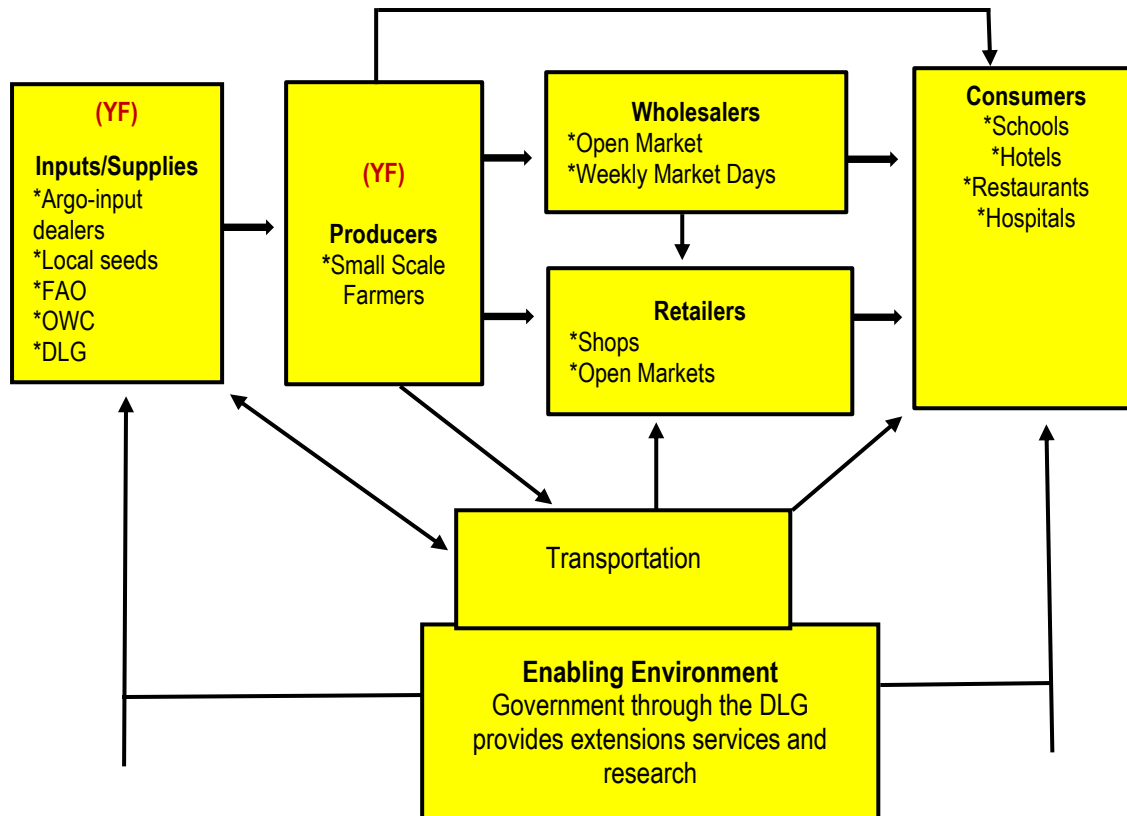
Measures for the scores are adopted from USAID

**Table 10: Scoring of the pulse value chain against their potential to contribute to increased women empowerment**

	<b>Characteristics</b>	<b>Score</b>
1	High number of women entrepreneurs in the value chain	4
2	Women control equipment/ assets	1
3	Women have or can acquire skills needed for profitable value addition opportunities through processing product & diversification Women control the sales income and the enterprise	2
4	Close to household within community area (geographically)	3
5	Low entry barriers for small-scale and poor entrepreneurs (small scale of production, low start-up costs, not requiring major capital investment, using low-tech skills).	2
6	Offering new opportunities for women	2
7	New activities are in line with livelihood conditions (year-round income, using family labor, rapid returns, contributing to food security, keeping the environment intact, not reducing availability of clean water)	2

Measures for the scores are adopted from USAID

## Pulses (Green grams, Cow peas and Navy beans) Value Chain Map



YF) shows nodes where women are currently participating and (POF) shows nodes that are promising, profitable opportunities for employment or self-employment for females

### Input dealers

Input packages for pulses is almost nonexistent as farmers mostly rely on own seeds and use traditional methods for pest control. Inputs of seed, fertilizer, and growing practices information was nonexistent. The only emergent input were general inputs such as hoes.

### Production

The primary producers of pulses are smallholders with small and dispersed plots under rain fed conditions. Women are also heavily involved in production, conducting most of the on-farm labor during both planting and harvest, with additional activities in value-addition. Majority of producers do not consider pulses a major cash crop therefore production is kept at a small scale and mostly dominated by women.

### Retailers

Pulses form a significant portion of the local diet in Nabilatuk and Katakwi districts, particularly for rural and peri-urban consumers. The retailers mostly buy from farmers and sell on market days or in urban centers like Soroti and Moroto. The pulses variety grown are mostly green grams, cow peas and navy beans which are mainly used for domestic consumption.

### Wholesalers

Wholesalers mostly buy directly from farmers or from retailers and sell in lock up shops in urban centers such as Soroti, Katakwi and Moroto. Wholesalers then mostly sell to consumers in those urban centers.

### Constraints

Productivity is below potential due to low input usage, especially chemical fertilizers capable of increasing yields; limited availability of seed and limited familiarity with the variety of existing pulse types, and limited usage of modern agronomic practices.

The link between the producers and the export markets is weak, due to the large number of ineffective intermediaries operating in the value chain and mindset. The intermediaries have failed to acquire scale and operate in limited geographic areas, mostly in Katakwi and Nabilatuk districts. The fragmentation of intermediaries creates a lack of transparency and misinformation in the market.

### Opportunities

Strong domestic market which could easily be expanded for export markets. This can be achieved through creating access to inputs to bridge the yield gap between current and potential production. Phosphates and other fertilizers could be supplied to farmers, along with knowledge on how to use them effectively.

The farmers could also be supported to take advantage of the NASSARI research center in Serere for seed multiplication to adequately supply the needs for domestic demand. Pulse breeding should expand, and leverage varieties used in other countries. Extension workers could also incorporate pulses into the curriculum.

### 3.2.10 Sesame value chain Analysis

Only less than 10 percent of the sample was engaged in sesame production majorly in the districts of Kotido, Karenga, Katakwi and Kitgum (Table 10). A high proportion of those who produce sesame sell it to the market and about 43.1 percent sell it as processed. Only 6.9 percent are traders and only about 19.8 percent can access processors. Opportunities therefore exist for farmers to upgrade to higher nodes of the chain (see map below).

Table 11: Sesame value chains

	All	Kotido	Karenga	Katakwi	Kitgum
Proportion growing sesame	9.8(81)	20.0(18)	4.0(4)	12.0(9)	50.0(50)
Did you sell the output from this crop?	72.8(59)	50.0(9)	25.0(1)	66.7(6)	86.0(43)
Form sold the output					
Processed	43.9(25)	57.1(4)	100.0(1)	83.3(5)	34.9(15)
Unprocessed	56.1(32)	42.9(3)	0.0(0)	16.7(1)	65.1(28)
Markets one has been able to access for Sesame in the last 12 months					
Local markets/ Sub County	49.3(35)	100(14)	50.0(1)	0.0(0)	40.8(20)
Within my district	49.3(35)	85.7(12)	50.0(1)	66.7(4)	36.7(18)
National markets (Outside the district)	12.7(9)	0.0(0)	0.0(0)	66.7(4)	10.2(5)
None	15.5(11)	7.1(1)	50.0(1)	0.0(0)	18.4(9)
Played any of the role					
Producer	93.1(67)	78.6(11)	100.0(2)	100.0(6)	96.0(48)
Trader	6.9(5)	21.4(3)	0.0(0)	0.0(0)	4.0(2)
Have been able to access agro processing operators/ markets for your produce, in the last 12 months	19.7(13)	10.0(1)	0.0(0)	40.0(2)	20.0(10)

Sesame is grown in all the research areas with more intense production in the districts of Kitgum, Abim, Karenga and Kaabong. Sesame is produced predominantly by small scale farmers. The farming methods employed in sesame production are simple and have not changed over many generations. Farmers use animal draught for land preparation, broadcasting for planting and manual weeding, harvesting, drying, and threshing. As such,

sesame farming is characterized by low resource use with little mechanization or use of inorganic fertilizer and chemical pesticides. Farmers have been producing sesame for subsistence consumption and increasingly for income through the marketing of surplus production.

Due to the fragmented and small-scale nature of production, considerable effort is required to assemble sesame into economically viable volumes for trade. Sesame marketing is therefore characterized by numerous transactions involving small volumes, and equally as many traders with variable capacity. These traders can be categorized into categories based on the location, volumes handled and hierarchy along the sesame marketing value chain. The categories include the following:

### **Rural assemblers**

Various actors are involved in moving sesame from the farm gate to the market. They include traders on foot, bicycle traders, rural open-air market traders, rural wholesalers, and rural shopkeepers. Bicycle traders and traders on foot move from farm to farm during the marketing season buying from farmers. The local traders' role is to gather and bulk enough sesame. Once sesame is accumulated in a sufficient quantity, the local traders then sell the merchandise. The local traders go into the most remote areas to collect sesame from farms' gates, storage facilities or local trade centers. These traders are mostly active on non-market days and then sell the accumulated stocks to rural open-air traders. Rural open-air traders are traders operating mainly on designated market days. They move from market to market on designated market days as well as buying directly from farmers and other smaller traders who move sesame from farm gate to market. These traders are seasonal and operate for a short period after sesame is harvested when volumes are high. During the off-season for sesame, they move to other commodities.

Other traders to be found at the assembly stage include rural wholesale and retail traders. These are stationary traders operating from permanent premises such as shops and grain stores. They buy sesame continuously throughout the sesame marketing season from farmers directly, and from foot traders, bicycle traders and open-air traders. The bulked sesame is then transported to larger market centers in sub-county, county, district, and regional levels and sold to urban wholesale produce dealers. After locally produced sesame is exhausted, these traders are involved in the sourcing of sesame from larger markets and then retail sesame seed to farmers and rural consumers at the grassroots.

### **Regional traders/wholesalers**

The main buyer of sesame is GADC which operates out of Kitgum district. Other regional urban traders/wholesale traders mostly operate out of regional market centers such as Soroti, Lira, Kitgum and Gulu. They are commodity traders with well established businesses and the capacity to handle large volumes of sesame. They not only handle sesame, but other grains and legumes produced in the area. These traders are well capitalized and have investments in storage and transport facilities. They also have adequate access to formal credit. They buy sesame mainly from rural wholesalers and sell to exporters and processors in the regional buying centers or transport bulked sesame to exporters based in Kampala.

### **Exporters**

Most exporters and processors are found in the capital city Kampala. However, some exporters have buying centers in the production regions, mainly in Gulu and Lira. In Kampala, Gulu and Lira, exporters screen, clean and bag sesame into 50 or 100 kilo bags. The bagged sesame is then packed into 20 and 40 metric ton containers which are transported to the shipping lines for onward shipment to the export destinations through Mombasa.

### **Processors**

Most domestic processors are small in scale. They handle limited quantities of sesame which they process into snacks for confectionary industries and into sesame paste for distribution to retail shops and supermarkets. Other small-scale processors operate in urban markets in lockups that mill and blend sesame with groundnuts into sesame paste for application on bread.

### **Farmer Associations**

These are associations of farmers who are brought together by common interests such as collective marketing, learning activities in Farmer Field Schools, or participatory testing of improved sesame varieties with research organizations. Membership of the association is from the local community. Farmers were also found to engage in collective activities involving other crops besides sesame.

### **Government bodies and National research Organizations**

The Ministry of Agriculture is involved in framing agricultural policy and regulations while the National Agricultural Research Organization (NARO) is involved in research. Sesame research is carried out by NaSSARI, based at Serere in Eastern Uganda. Several improved varieties of sesame have been released to farmers. SESAME II is the most popular as established through participatory varietal selection with sesame farmers in the mandated regions.

The Uganda Oil Seed Producers and Processors Association (UOSPA) formed in 1995 as an organization of producers, processors, and other stakeholders, including traders of oilseed products. UOSPA's strategy has been to work through clusters of farmers in oil seeds production and processing and to develop an integrated enterprise farming system through the adoption of improved technologies, such as improved agronomic practices, use of improved seed, proper post-harvest handling, and establishing savings and loan schemes. UOSPA has been dedicated to fostering development of the Uganda's oil seed processors and producers and the edible oil sub-sector.

### **Opportunities**

The main opportunity of sesame is the huge volume of trade in sesame was reported to be profitable across the value chain.

Secondly, Infrastructure in the sesame producing areas was also reported to be well developed thus lowering operating and transportation costs for sesame. This is coupled with the fact that sesame is mainly harvested during dry season when most of the seasonal rivers and streams are dry.

Sesame farmers could also participate in planting field trials of disease-resistant sesame varieties at the National Semi-Arid Resource Institute (NaSSARI) in Serere. This will support research to develop crops varieties that can tolerate emerging challenges such as the outbreak of disease.

Most of the traders of sesame are also located in the regional markets and production areas which presented opportunities for information sharing, central accumulation of sesame and good supply of sesame.

GADC uses the agency model to buy sesame from farmers. Women and youth can exploit the agency model and become agents. They can also use proceeds from their sales to form association of larger agents. This may create opportunities to avoid selling their crops through agents.

### Constraints

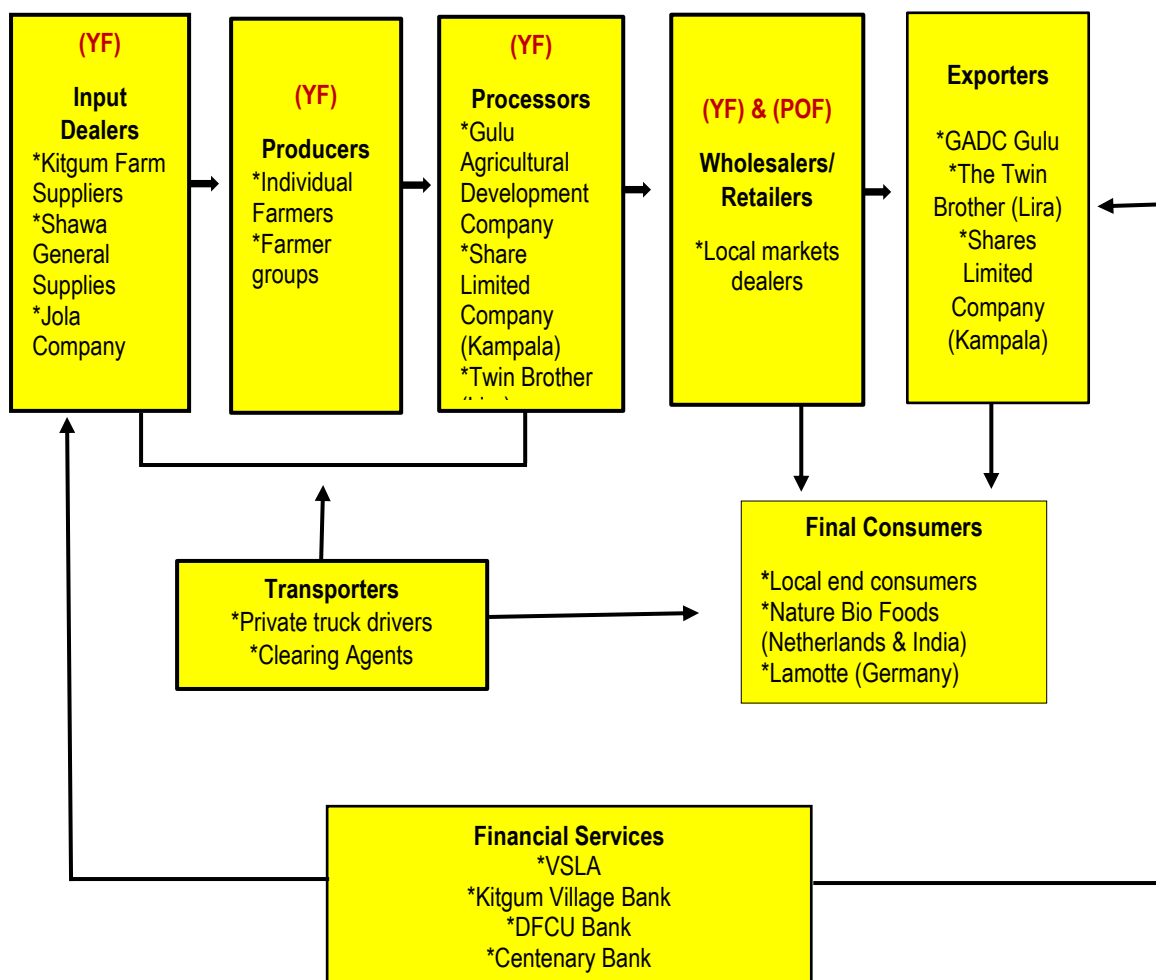
Several weaknesses affecting the marketing and trade in sesame in Uganda were also identified. This included inability to honor supply contracts, and opportunistic behavior where farmers adulterate sesame seed with soil and sand to increase the weight.

Supply was fragmented because the low average quantity supplied by farmers meant that traders had to cover a wide area to obtain sufficient sesame.

Poor post-harvest handling practices led to contamination with soil and dung during threshing and winnowing. This leads to grading and sorting of the crops which sometimes brings down the prices of the crops.

Exporters are few, limiting competition and leading to concentration of market power among a few large exporters including GADC. This largely do not consider the cost of production and buy from farmers at very low prices.

### Sesame Value Chain Map



### 3.3. Apiary value chain Analysis

Only about 23.3 percent of our sample are engaged in apiary value chain in the districts of Abim, Kotido, Karamoja, Amudat, Katakwi and Kitgum (Table 11). An equal percentage own both individual and group hives and some of the notable products include honey, candle, shoe

polish and about 57 percent sell the bee products to the markets. Unfortunately, more than 70 percent sell their products as unprocessed and rely on the local market.

### **Producers**

The Apiary producers are categorized into two groups. One group consist of farmers who are supported by NGOs, another group consist of farmers who received support from the government through operation wealth creation and NAADS farmers who work individually as independent beekeepers. Majority of these farmers still use the traditional beehives made from logs or pot hives supplied by both the government and NGOs. Men make traditional log hives from indigenous trees in the forests particularly in the hillsides. A few farmers use improved beehives such as the KTB and Langstroth hives sometimes in addition to traditional beehives. Beekeepers who belong to groups engage in collective production and marketing, accessing inputs, credit, and training.

### **Inputs suppliers**

There are some specialized inputs suppliers such as Wetlands International who deal specifically with bee-keeping related inputs. These inputs include beehives (KTB and Langstroth), bee suits, honey extractors, air-tight buckets, smokers, and gloves. There are also local beehive manufacturers who make the traditional hives from tree logs.

### **Processors**

Majority of processors only undertake extraction of liquid honey from the honeycombs. Some of the local processors include Abim beekeepers' association. The most common method of extraction is the cold dripping method whereby the combs are sliced and filtered overnight through a mesh or net. The other method is the pressing method using a cloth. In this method, the honey is extracted from the comb by hand pressing the honeycombs in a clean cloth and honey oozes out of the cloth into a storage bucket. Sometimes honey crystallizes while in the honeycomb and this makes it difficult to extract. In this case the honeycomb is heated so that the wax floats on top and is removed after cooling. A less common method is pressing method using a pressing machine due to the high cost of pressing machines.

### **Marketing**

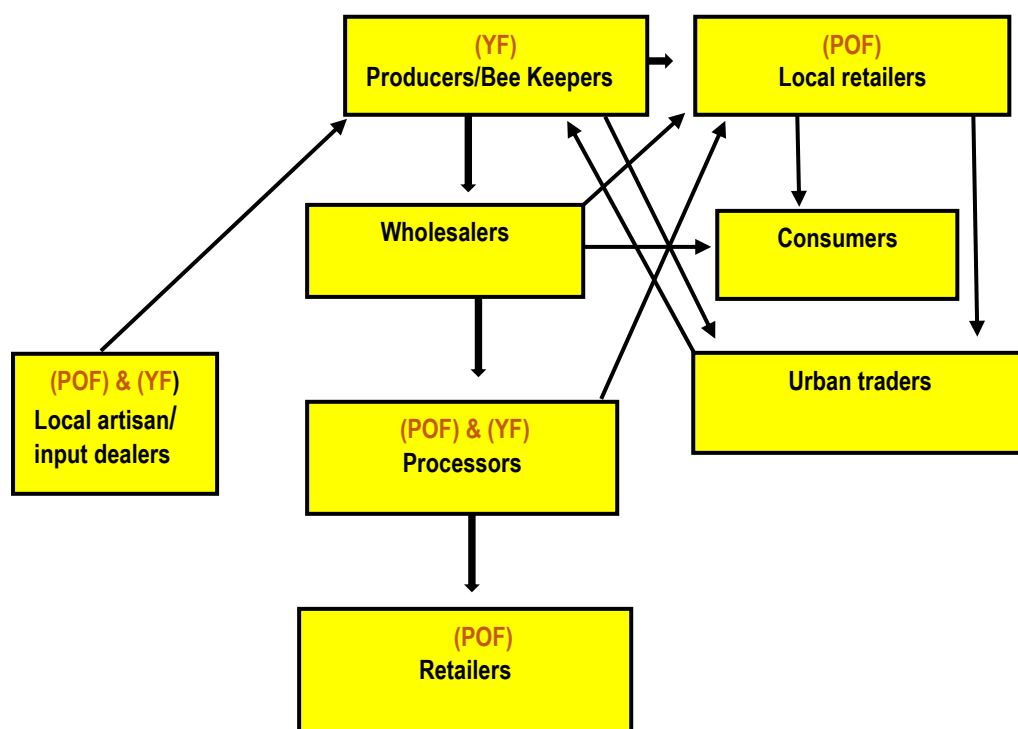
Marketing of honey is done in groups/ association of beekeepers. Beekeepers bottle and label their products which are then sold directly to local shops. Some dealers buy directly from the farmers or make arrangement with farmers and the unprocessed honey is delivered to the consumer. Other farmers set up stalls which they locate in appropriate places such as the market or along a busy route; this attracts a good number of customers or move around with the honey in urban centers looking for customers. In some cases, beekeepers form associations to collect and market the bee products of beekeepers in an area



**Table 12: Apiary value chain**

Variable	Total	Abim	Kotido	Karenga	Kaabong	Moroto	Amudat	Nakapiri pirit	Nabilatuk	Napak	Katakwi	Kitgum
<b>Practice bee keeping</b>	23.3(193)	37.4(34)	26.7(24)	27.0(27)	1.1(1)	19.2(10)	45.9(28)	8.2(5)	1.7(1)	4.0(2)	21.3(16)	45.0(45)
<b>Type of bee keeping</b>												
<b>Individual</b>	39.1(75)	35.3(12)	20.8(5)	55.6(15)	100.0(1)	100.0(10)	39.3(11)	80.0(4)	0.0(0)	50.0(1)	6.3(1)	34.1(15)
<b>Group</b>	39.6(76)	50.0(17)	54.2(13)	44.4(12)	0.0(0)	0.0(0)	53.6(15)	20.0(1)	100.0(1)	50.0(1)	87.5(14)	4.5(2)
<b>Both</b>	21.4(41)	14.7(5)	25.0(6)	0.0(0)	0.0(0)	0.0(0)	7.1(2)	0.0(0)	0.0(0)	0.0(0)	6.3(1)	61.4(27)
<b>Average number of beehives one owns</b>	32.0(5.5)	38.6(26)	124.3(181.3)	20.9(21)	1(-)	5.8(3.5)	3.0(2.6)	8(5.5)	4(-)	2(1.4)	47(12.3)	6.6(6.1)
<b>Key notable products one has produced</b>												
<b>Honey</b>	65.4(123)	44.1(15)	82.6(19)	55.6(15)	100.0(1)	90.0(9)	50.0(13)	100.0(5)	100.0(1)	100(2)	18.9(3)	93.0(40)
<b>Candles</b>	34.6(65)	55.9(19)	17.4(4)	44.4(12)	0.0(0)	10.0(1)	50.0(13)	0.0(0)	0.0(0)	0.0(0)	81.3(13)	7.0(3)
<b>Shoe polish</b>	5.3(10)	5.9(2)	26.1(6)	3.7(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	2.3(1)
<b>Challenges one has faced while practicing bee keeping</b>												
<b>Knowledge</b>	47.5(86)	0.0(0)	33.3(7)	69.2(18)	100.0(1)	20.0(2)	92.0(23)	60.0(3)	100.0(1)	50.0(1)	38.5(5)	58.1(25)
<b>Access to inputs</b>	44.2(80)	50.0(17)	42.9(9)	88.5(23)	0.0(0)	10.0(1)	32.0(8)	20.0(1)	100.0(1)	100(2)	30.8(4)	32.6(14)
<b>Access to markets</b>	45.9(83)	2.9(1)	47.6(10)	57.7(15)	100.0(1)	100.0(10)	48.0(12)	40.0(2)	0.0(0)	0.0(0)	0.0(0)	74.4(32)
<b>Other, Specify</b>	28.2(51)	52.9(18)	38.1(8)	23.1(6)	0.0(0)	0.0(0)	12.0(3)	20.0(1)	0.0(0)	0.0(0)	61.5(8)	16.3(7)
<b>Sold the bee product to the market</b>	57.4(105)	41.2(14)	85.7(18)	51.9(14)	100.0(1)	30.0(3)	38.5(10)	60.0(3)	100.0(1)	100(2)	15.4(2)	86.0(37)
<b>Where one sells Apiary products</b>												
<b>From home</b>	44.1(75)	8.8(3)	52.6(10)	65.2(15)	0.0(0)	20.0(2)	39.1(9)	100.0(5)	100.0(1)	50.0(1)	8.3(1)	82.5(33)
<b>Local market</b>	45.3(77)	11.8(4)	68.4(13)	26.1(6)	100.0(1)	90.0(9)	39.1(9)	0.0(0)	100.0(1)	100(2)	16.7(2)	62.5(25)
<b>Middlemen</b>	14.7(25)	11.8(4)	47.4(9)	0.0(0)	0.0(0)	0.0(0)	21.7(5)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	17.5(7)
<b>Others</b>	35.3(60)	73.5(25)	26.3(5)	34.8(8)	0.0(0)	0.0(0)	43.5(10)	0.0(0)	0.0(0)	50.0(1)	83.3(10)	2.5(1)
<b>Form one sold the output from Apiary</b>												
<b>Processed</b>	15.0(21)	0.0(0)	11.1(2)	35.0(7)	0.0(0)	10.0(1)	6.7(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	24.4(10)
<b>Unprocessed</b>	70.7(99)	95.0(19)	83.3(15)	45.0(9)	100.0(1)	20.0(2)	93.3(14)	100.0(4)	100.0(1)	100(2)	25.0(2)	73.2(30)
<b>Both</b>	14.3(20)	5.0(1)	5.6(1)	20.0(4)	0.0(0)	70.0(7)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	75.0(6)	2.4(1)
<b>Markets one has been able to access for the apiary product . in the last 12 months</b>												
<b>Local markets/ Sub County</b>	54.0(94)	14.7(5)	61.1(11)	60.9(14)	100.0(1)	90.0(9)	48.0(12)	80.0(4)	100.0(1)	50.0(1)	33.3(4)	74.4(32)
<b>Within my district</b>	29.9(52)	23.5(8)	77.8(14)	21.7(5)	100.0(1)	10.0(1)	28.0(7)	0.0(0)	100.0(1)	100(2)	8.3(1)	27.9(12)
<b>None</b>	33.3(58)	50.0(17)	0.0(0)	39.1(9)	0.0(0)	0.0(0)	48.0(12)	20.0(1)	0.0(0)	0.0(0)	83.3(10)	20.9(9)
<b>Have you been able to access agro processing operators, in the last 12months</b>	18.1(31)	42.4(14)	52.9(9)	0.0(0)	100.0(1)	0.0(0)	8.0(2)	20.0(1)	100.0(1)	0.0(0)	0.0(0)	7.5(3)
<b>Average distance of the nearest agro processing operators/ facilities in Kms (sd)</b>	12.9(1.5)	8.9(4.9)	20.2(9.9)	-	4(-)	14.0(1.9)	24.8(16.5)	5(-)	10.0(-)	3(4.2)	29.3(29.4)	10.5(7.8)

## Apiary Value Chain Map



### **Bulkers**

This is majorly done by the local middlemen and/or retailers and sometimes producers. Their aim is to raise adequate quantities for sale to consumers in urban centers. There are producers who buy from others, package, and sell in local retail shops. They usually deal with semi-processed/liquid honey. Major processors such as Bee Natural Uganda (BNU) carry out the bulking through purchasing/ collection from different individual farmers and/or traders or contracted out-growers.

### **Transporters**

Major processors such as BNU offer transport services by collecting honey from designated points from the areas of production. On the other hand, traders and middlemen who sell their honey to urban centers such as Kampala majorly use public transport. However, the public means result to honey losses from contamination.

### **Wholesalers**

Wholesaling quite often forms an integral part of the roles of the major processors such as BNPL who sell in bulk to the local retailers and supermarkets in major urban centers like Moroto, Soroti, Gulu and Lira.

### **Consumers**

Honey is used in households as a preferred sweetener in beverages, especially for diabetics. It is also consumed in its raw state (honeycombs) or spread on bread. It is also used in brewing of liquor and wine. Honey has antiseptic and antibacterial properties been used in first aid

treatment especially for wounds, burns and cuts. Traditional uses of honey include honey mixed with lemon for sore throats and it has also been used for stomach pains.

### 3.3.1 Soya bean Value Chain Analysis

#### **Production**

Although the demand for soya bean is high, most farmers of soya beans are small holder farmers who cultivate relatively small tracks of land. Farmers produced multiple crops at the same time, sometimes on the same piece of land (intercropping) with soya bean cultivated together with cassava, sorghum, or millet.

#### **Input Supply**

The key inputs in the production of soybeans are seed, fertilizers, and agro-chemicals such as inoculum and herbicides. Input supply remains one of the key challenges in the soybeans value chain, particularly for smallholder production. Regarding seed, the bulk of purchased soybeans seed in Uganda is produced by seed companies such as east African seeds and equator seeds and this are sold in input shops across the intervention areas. Most of the soybeans seed varieties used in Uganda are open pollinated, and thus can easily be recycled, the use of farm-saved seed from own harvest is the most widespread among farmers.

#### **Middlemen traders**

Small scale traders who mostly act as middlemen between the farmers and large wholesalers often buy directly from the farmers. Most of these traders had their own transport and earned profit from buying and selling grain at a different price. Often named 'produce dealers, they operate mostly within the villages and sub counties on county-district level. Produce dealers may have a storage location in either one of the sub counties where they do the bulking of the grains selling to processors in major towns such as Lira and other parts of Uganda.

#### **Village agents**

Village agents are petty businessmen with an interest in buying and selling of both inputs and outputs. They facilitated linkages between farmers and output buyers, and sometimes financial institutions. They also help farmers aggregate, or bulk, and market their grain and link farmers to large companies such as Mukwano Industries.

#### **Large scale buyers and processors**

The large-scale buys employ middlemen who buy the grains directly from farmers at individual level who in this case, the large-scale buyer sets the farm-gate prices. Sometimes the employed middlemen bought grain from farmer associations directly, and in some cases, they buy the grains from other buyers. The large-scale buyers and processors also sometimes engage in contract farming, such as arrangements to supply inputs for grain. These include Mukwano, Nile Agro, and Mt. Meru

#### **Constraints**

Soybean suffers attacks from several pests and diseases that occur over a wide range of conditions and plant growth stages. Common biotic constraints to soybean production include pests like groundnut leaf miners, bean leaf beetles, and green clover worms and stink bugs.

Diseases like soybean rust is an economically significant constraint. It is very important for growers and extension agents to have an enhanced capacity to detect and identify soybean diseases in scenarios where symptoms of several diseases co-exist in the same field.

Price fluctuations and persistent drop in prices of soya beans is leaving farmers disappointed despite getting a bumper harvest. In the districts of Kitgum, Abim and Nabilatuk, the harvest of soya bean has been good, but the prices have fallen to below 1,000 shillings per kilo. The biggest buyers of soya beans are Mt Meru millers, and they are buying at just 1,000 shillings.

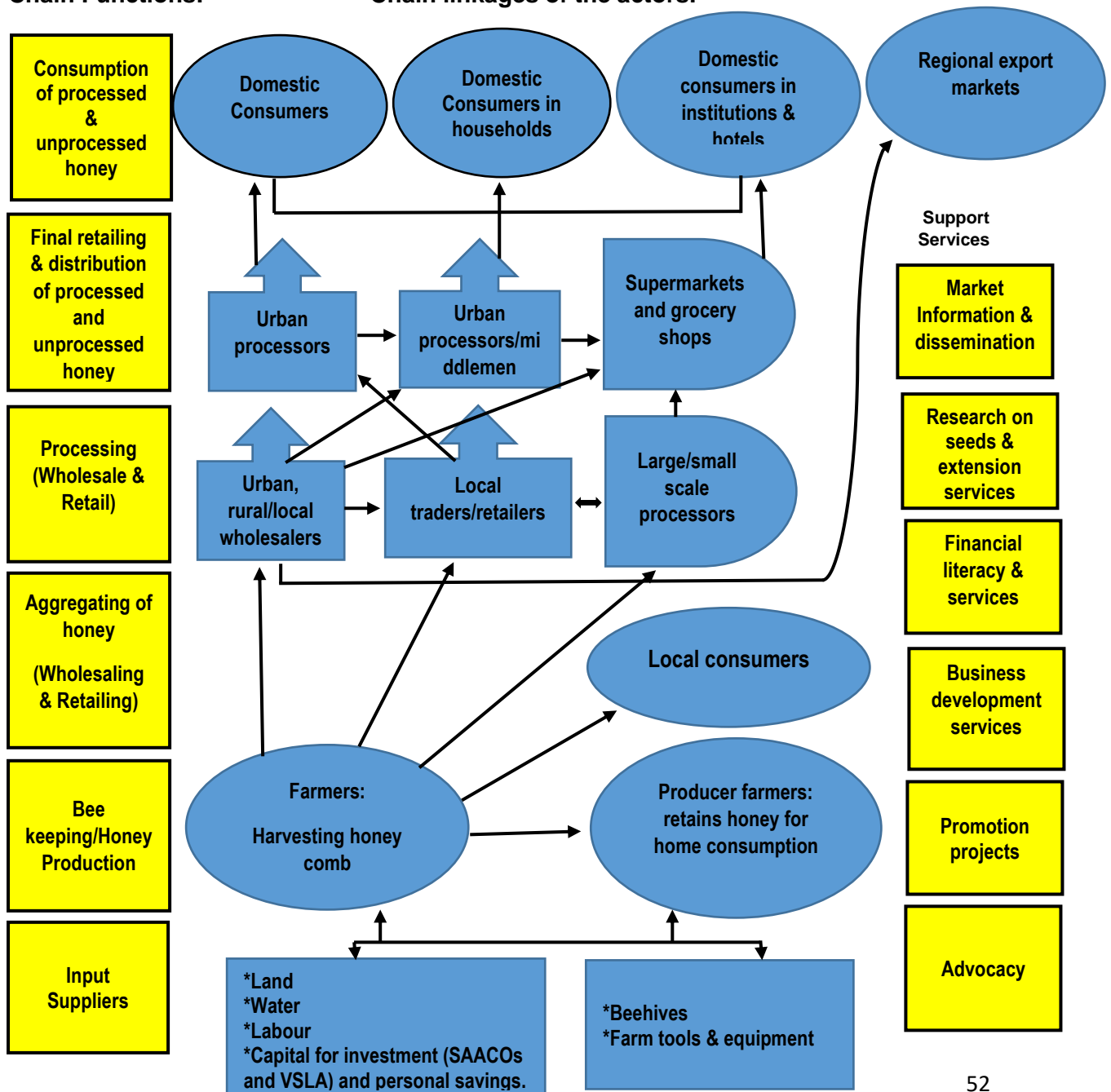
### Opportunities

Farmers can take advantage of the bumper harvest to add value to their soybeans because soya beans are one of the most nutritious foods. Soya beans can be mixed with millet flour and soy milk and cooking oil can be extracted from it.

### The linkages in the flow of honey output along various distributional channels.

#### Chain Functions:

#### Chain linkages of the actors:



**Enabling  
Environment**

**Infrastructure  
development  
such as roads,  
markets, water  
and electricity.**

**Government policy  
regulation at national and  
local levels of the sector  
and provision of export  
and trading licences etc.**

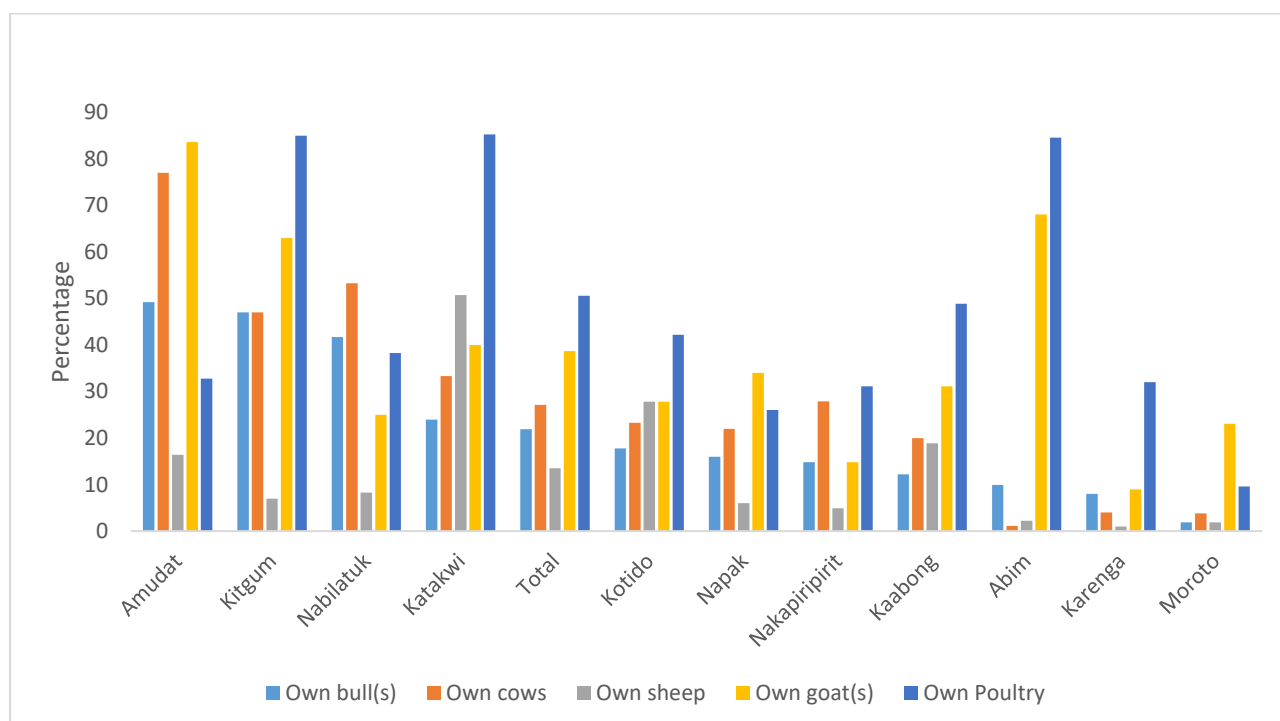
**Institutions for  
quality control  
like Uganda  
Bureau of  
Standards and**

**Global and regional  
trade facilitators  
including WTO, EAC,  
etc.**

### 3.4 Livestock Value Chain Analysis

Livestock is a common commodity in the Karamoja sub region. A large proportion of households own bulls, cows, sheep, goats and poultry. Amudat, Kitgum, Katakwi and Abim are the top districts with the largest number of project beneficiaries owning livestock (Figure 4). About 21.9 percent of all the sampled households own bulls with the highest proportion in Amudat (49.2 percent), see Table 12. As expected, the largest proportion of bulls is owned by males and only less than 5 percent of females own bulls. Most of the putput is sold as live animals within the local market and to middlemen and only 11.4 percent have been able to access agro-processing operators.

**Figure 4 : Ownership of Livestock by district**



#### 3.4.1 Live Animal and Meat Value Chain Analysis

Throughout the study areas, cattle are kept for dairy in both pastoral areas like the Karamoja region and mixed agricultural areas like Kitgum and Katakwi districts. Although most of the cattle type kept were of the local breed type, more market-oriented improved breeds mostly for dairy purpose were also found in urban centers like Kitgum town and Katakwi town. The livestock value chain is more pronounced in districts within the Karamoja region than in any of the other study districts. The livestock animal value chain analysis included cattle and goats. This analysis looks at the live animal, beef, and dairy value chains.

## **Production**

In the Karamoja region, live animal value chain has developed into a complex system involving various actors of producers, Traders, Processors, Transporters, and consumers. The Producers rear cattle, goats, sheep, and poultry in order of importance. Live animal in this assessment included, cattle, goats and sheep, pigs, and poultry. Producer activities range from feeding, watering, and treatment for fattening. Farmer-price of animals depends on the size, health, and sex. When the animals are mature, healthy bulls or Oxen fetch a higher price than calves and heifers or unhealthy animals. Animals play an important role in the social economic lives of people in the region.

Large animal herds are considered signs of affluence and prestige in the Karamojong culture and in both Katakwi and Kitgum, cattle ownership holds significant cultural value as well. As a

**Table 13: Ownership and marketing of bulls amongst the sampled beneficiaries**

Variable	Total	Abim	Kotido	Karenga	Kaabong	Moroto	Amudat	Nakapiri pirit	Nabilatuk	Napak	Katakwi	Kitgum
<b>Own bull(s)</b>	21.9(182)	9.9(9)	17.8(16)	8.0(8)	12.2(11)	1.9(1)	49.2(30)	14.8(9)	41.7(25)	16.0(8)	24.0(18)	47.0(47)
<b>Primary owner of the bull(s)</b>												
<b>Male</b>	57.1(104)	66.7(6)	68.8(11)	100.0(8)	18.2(2)	100.0(1)	90.0(27)	66.7(6)	100.0(25)	75.0(6)	27.8(5)	14.9(7)
<b>Female</b>	4.9(9)	22.2(2)	6.3(1)	0.0(0)	0.0(0)	0.0(0)	10.0(3)	22.2(2)	0.0(0)	0.0(0)	0.0(0)	2.1(1)
<b>Joint</b>	37.9(69)	11.1(1)	25.0(4)	0.0(0)	81.8(9)	0.0(0)	0.0(0)	11.1(1)	0.0(0)	25.0(2)	72.2(13)	83.0(39)
<b>Have been able to access community based veterinary services</b>	69.8(125)	88.9(8)	87.5(14)	25.0(2)	72.7(8)	0.0(0)	69.0(20)	88.9(8)	83.3(20)	37.5(3)	76.5(13)	61.7(29)
<b>Sold to the market the bull/bull product</b>	16.3(29)	0.0(0)	12.5(2)	0.0(0)	18.2(2)	0.0(0)	13.8(4)	22.2(2)	56.5(13)	0.0(0)	17.6(3)	6.4(3)
<b>Form one sold the output from bull(s)</b>												
<b>Live animal</b>	88.9(24)	0.0()	100.0(2)	0.0()	100.0(2)	0.0()	100.0(3)	100.0(1)	84.6(11)	0.0()	100.0(3)	66.7(2)
<b>Unprocessed meat</b>	3.7(1)	0.0()	0.0(0)	0.0()	0.0(0)	0.0()	0.0(0)	0.0(0)	0.0(0)	0.0()	0.0(0)	33.3(1)
<b>9. Who is your biggest buyer?</b>												
<b>Local market</b>	40.7(11)	0.0()	100.0(2)	0.0()	100.0(2)	0.0()	66.7(2)	100.0(1)	0.0(0)	0.0()	100.0(3)	33.3(1)
<b>Middlemen</b>	40.7(11)	0.0()	0.0(0)	0.0()	0.0(0)	0.0()	33.3(1)	0.0(0)	61.5(8)	0.0()	0.0(0)	66.7(2)
<b>Exporters</b>	18.5(5)	0.0()	0.0(0)	0.0()	0.0(0)	0.0()	0.0(0)	0.0(0)	38.5(5)	0.0()	0.0(0)	0.0(0)
<b>Markets one has been able to access for the animal/animal product, in the last 12 months</b>												
<b>Local markets/ Sub County</b>	33.1(49)	0.0(0)	100.0(6)	16.7(1)	33.3(3)	0.0()	44.0(11)	11.1(1)	75.0(15)	37.5(3)	37.5(3)	12.8(6)
<b>Within my district</b>	25.0(37)	0.0(0)	100.0(6)	16.7(1)	22.2(2)	0.0()	20.0(5)	0.0(0)	75.0(15)	62.5(5)	0.0(0)	6.4(3)
<b>National markets (Outside the district)</b>	0.7(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0()	0.0(0)	0.0(0)	0.0(0)	12.5(1)	0.0(0)	0.0(0)
<b>None</b>	64.9(96)	100.0(0)	0.0(0)	83.3(5)	66.7(6)	100.0(1)	56.0(14)	88.9(8)	25.0(5)	25.0(2)	62.5(5)	87.2(41)
<b>One played any of the roles</b>												
<b>Producer</b>	81.4(105)	100.0(9)	100.0(6)	100.0(8)	100.0(9)	100.0(1)	90.0(18)	100.0(3)	6.3(1)	28.6(2)	100.0(6)	95.5(42)
<b>Trader</b>	18.6(24)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	10.0(2)	0.0(0)	93.8(15)	71.4(5)	0.0(0)	4.5(2)
<b>Have been able to access agro processing operators, .in the last 12months</b>	11.4(17)	0.0(0)	14.3(1)	0.0(0)	0.0(0)	0.0(0)	3.6(1)	0.0(0)	38.1(8)	0.0(0)	0.0(0)	15.6(7)



result, many producers only go to market when they want to buy food, financial problems, or face drought. Sell of animals though not common at household level, it is the means through which other requirements are met. Live animals are a medium through which farmers access other requirements through the market. Animal producers sell to buy food, pay medication, and school fees, settle debts, and buy daily necessities. Poultry, goats, and sheep supports the family especially women as source of income and food in form of meat protein. The value sold by farmers of oxen, cows and bulls range from 700,000 – 1,200,000 shillings depending on the age, size, sex, and health of the animal.

### **Input dealers**

The input dealers include suppliers of animal feed and animal health products, artificial Insemination, veterinary and extension services. The most sourced inputs according to the dealers includes pest/tick control in animals and treatment when animals are sick. Majority of the animals graze on natural grass.

### **Traders**

There are both animal traders buying on large-scale and transport to Kampala, Kenya, and Juba as well as traders who buy at small scale supplying abattoirs and local market. Large-scale traders are few but are established in the value chain of live animals. Large-scale traders operate in different markets purchasing animals usually healthy bulls, oxen, and health cows. Small-scale traders on the other hand trade within each of the study districts while in the case of Karamoja, some traders come from out of the region, from Kampala, Soroti, Katakwi, Mbale and Kenya.

The average number of animals bought by a trader in a month is 10 animals. But there are traders who bought and sold more than 100 animals. The traders go to the farmers and buy the animals or buy from the market where farmers bring the animals and transport the live animals to distant markets such as Lira, Soroti, Mbale as well as Juba, Kampala, and Kenya. The profit margin per animal ranges from 150,000 – 200,000 shillings for the traders along the value chain. In most instances, the farmers herd their animals to market but in circumstances where there are large numbers of cattle, labor is hired.

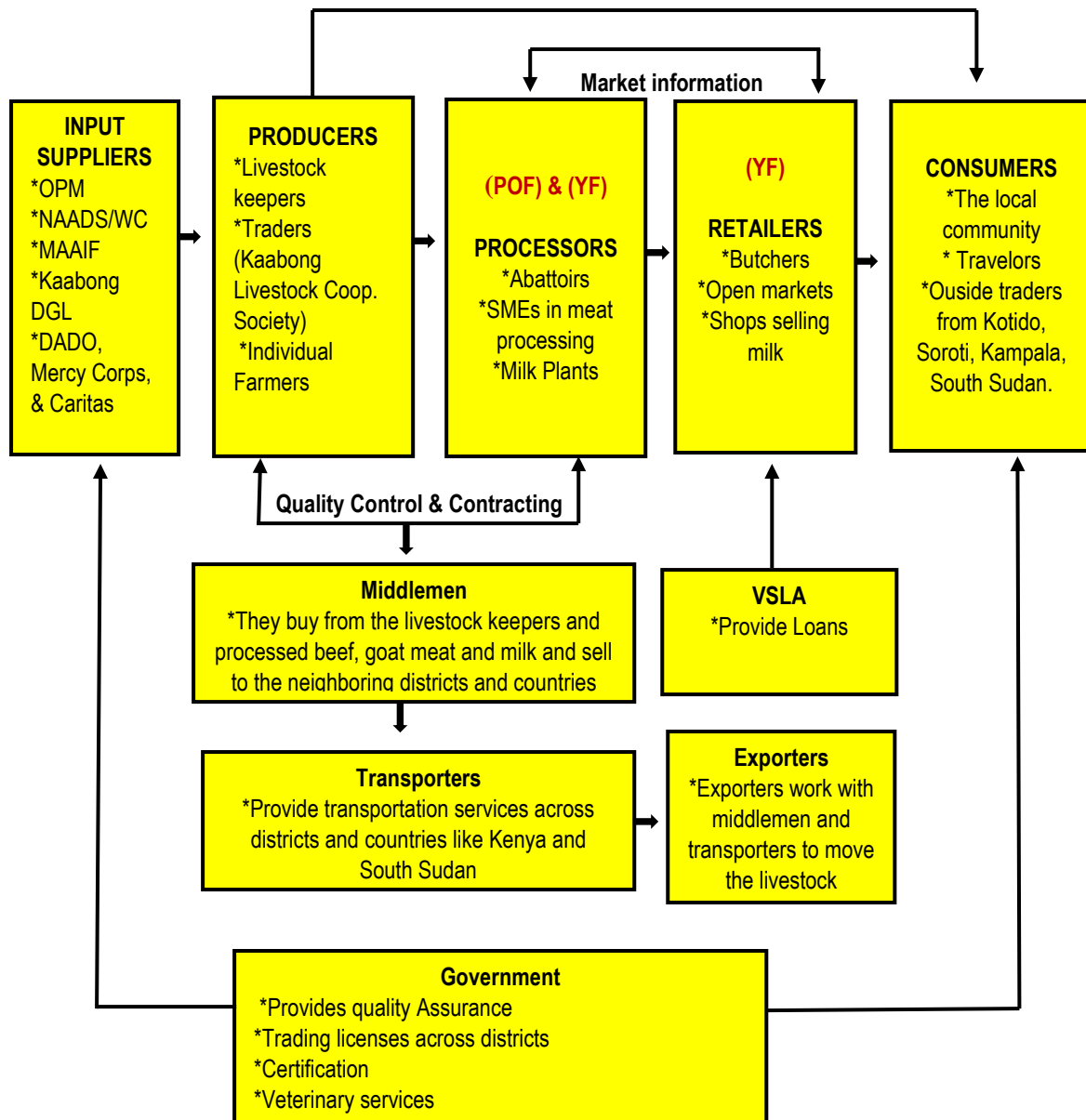
The small-scale traders take their animals to the abattoirs and abattoir operators helps to slaughter and clean the meat and the trader incurs costs for processing at the abattoir. The meat is then transported to the butcher often transported cheaply with wheelbarrows at an average price of 2000 shillings. From the butchers, the offal and hooves are separated as products along the chain while in most cases customers prefer a mixture of meat and offal.

### **Processors**

Processor's role in adding value on meat. From slaughtering animals cleaning they sell meat to downstream traders who take meat to their butchers. Processors include those who buy animals and slaughter them purposely to sell meat and other products such as offal, hides and skin and hooves. Processors play an important role in value addition of the animal into meat. Processors buy animals from producers/farmers at an average of 800,000 shillings. The processing involves slaughtering and the meat is sold as beef, offal, hooves and skin and hides. The processors slaughter, skin, wash and clean the meat, which is then put on market directly. Some processors have their own butchers where they sell meat to consumers direct at between 8,000 – 9,000 in Nabilatuk, Napak, Amudat, Karenga, Kaabong and some parts of Moroto and Kotido while in Kitgum, Abim, Katakwi the price ranges from 10,000 to 12,000 shillings per kilo. On average, the profit margin for processors ranges from 200,000 to 400,000 shillings depending on the size and health of the animal. Meat processing in all districts is

carried out in abattoirs where after slaughtering meat transported by use of wheelbarrows to butchers but also with minimal value addition.

### Livestock Value Chain Map



### Transporters

Transportation of live animals to the market is usually done by the farmers who usually herd the animals to the cattle market. In some instances, the traders buy directly from the farmers and in this case the farmers trucks (commonly Fuso tracks) to transport the animals. Poultry, goats, and sheep are sometime transported with cattle, but normally separated where smaller trucks transport them. Poultry is also sometimes transported on motorcycles.

A Fuso truck is usually loaded with 15-22 heads of cattle. Loading and off-loading of cattle to the Fuso employs between 3-12 strongly bodied men. Loading and off-loading cattle could cost 25,000-250,000UGX and is dependent on the number of cattle. All the person involved in transporting animals need to have movement permit which are issued by the vet officer in each district. The transporters pay for the cattle movement permit which costs 5000-25,000 shillings per head of cattle. Because of the long distances to the slaughter place, the costs of transporting live cattle are high ranging from 120,000 – 250,000 shillings per day.

### **Consumers and end users**

Consumers are the last in the value chain of meat/beef. Consumers pay for the highest price of the product a value of 9,000shillings in Moroto, Kotido, Kaabong Nakapiripirit, karenga and 8,000 shillings in Napak, Amudat while in Kitgum a kilo goes for 12,000 shillings. Meat consumers also include those that consume it when animals are sold out of the study area.

### **3.4.2 Diary Value Chain Analysis**

Throughout the study areas, cattle are kept for both dairy and meat in both pastoral areas like the Karamoja region and mixed agricultural areas like Kitgum and Katakwi districts. More market-oriented smallholder dairy enterprises, usually of improved breeds of between one to three cattle were also found in specific urban centers like Kitgum town and Katakwi town. Most diary is produced on subsistence basis.

#### **Small processors/cottage industry:**

There are numerous small-scale/cottage milk processors majority of which are not registered and licensed by the DDA. The exact number of these actors is not known as many operate in the 'backyard' and hence are not licensed by the DDA. DDA does not have any operational bulking or collection point in any of the study districts.

#### **Transport chain actors**

Milk is usually transported from the farm gate by bicycle or by motorcycle boda board by the farmers themselves to the collection/bulking point trader. In some instances, the bulking point traders buys from the farmers directly and incurs the cost of transporting the milk from the farmers to the bulking point.

#### **Regulators:**

Although the Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) is responsible for the regulation of the dairy industry it is spearheaded by the semi- autonomous DDA. DDA does not have any bulking or collection point in any of the study districts.

Whereas MAAIF is responsible for all functions in the agriculture and livestock sub-sectors, there are several agencies/organizations playing different roles that govern the dairy sector: The Dairy Development Authority (DDA): established as a semi-agency of MAAIF under the revised Dairy Industry Act in 2000, it has a mandate to regulate, coordinate, and harmonize the liberalized sector in order to achieve and maintain self-sufficiency in milk production and dairy products.

The National Animal Genetic Resources Centre and Data Bank: responsible for the promotion, regulation and control of import, export, and market animal genetic material, including quality assurance.

The National Agricultural Advisory Services: established in 2001, is a government agency mandated to implement the transition from the funded to private sector funded agricultural advisory/extension services.

### **Constraints**

Karamoja producers are constrained during the dry months of January to April (and sometimes into May), resulting in the selling of livestock at very low prices to brokers in the kraals. In this period of dry spell there is the problem of extreme scarcity of pasture and water. This leads to poor animal health and quality leading to low prices for the animals.

Women are largely excluded from the cattle value chain due to cultural limitations and mindset that places ownership of cattle to the men. Opportunities for women though may exist in the dairy value chain.

Low adoption of improved management practices and technologies in the cattle value chain. Management of the cattle value chain is still based on traditional production and marketing. There is a widespread practice of producers selling livestock to brokers in the kraals at very low prices.

### **Opportunities**

The commissioning of new cattle markets in rural areas within the Karamoja region may bring more producers to markets through increased proximity hence less transaction from the kraals where farmers fetch very low prices. This market access may guarantee that market transactions will be carried out directly by producers.

The government of Uganda has been supporting mass vaccination of animals in the Karamoja region. Cattle farmers can take advantage of this mass vaccination to reduce on incidences of widespread livestock diseases and controlled pockets of outbreaks through improved surveillance and response.

The government in collaboration with FAO also equipped all the districts in the region with cold chains and established a response mechanism comprising of central Government, District Local Governments, NGOs, and Community Animal Health Workers (CAHWs), which have been vital in times of disease outbreaks.

The government has also been promoting and building capacity of frontline veterinary extension staff in the region on the International Livestock Emergency Guidelines and Standards (LEGS). This initiative has improved livestock relief interventions during disease outbreaks in the region.

### 3.5 Nonagricultural value chains

The nonagricultural value chains cited include brick laying, stone quarrying, the sale of local brew and the sale of wood (Table 13). We exclude the charcoal value chain in the discussion because of the negative consequences that it has on the environment. Most sale revenues from the nonagricultural value chains are controlled by male even when women are participating. Potential nonagricultural value chains that can benefit women and men include setting up businesses such as agro input dealer shops, processing businesses for cereals, grocery stores and other forms of retail shops.

#### 3.5.1 Bamboo Value Chain Analysis

Bamboo value chain in Karamoja sub-region is found in Abim district. However, this is not a well-developed enterprise, thus it requires efforts to build it into a sustainable value chain. The Bamboo trees are mainly used as an affordable alternative to timber for construction and cooking purposes. They grow wildly on top of the mountains public land and not privately owned land.

##### **Resource production**

This stage involves entrepreneurs and farmers who actively engage in cultivating and producing Bamboo trees for commercial purposes, but in Karamoja sub-region, Bamboo trees are neither planted by farmers nor entrepreneurs, they grow naturally on top of mountains

##### **Collectors or harvesters**

Ideally, this stage would involve interested community members harvesting the Bamboo from the forests for sustenance use, making handicrafts and ornaments for sale. While in Karamoja sub-region district the community members harvest for sale to the builders/middlemen mainly for construction purposes and households use it for firewood.

##### **Processors**

Here, the community members and farmers are involved in the production of Bamboo crafts and furniture products. In Karamoja sub-region, this stage is not functional as most of the Bamboo harvested is sold to middlemen and traders who in turn sell it in the neighboring districts such as Mbale district where its demand is high.

##### **Middlemen/Traders**

These trade in Bamboo poles and processed products. They collect Bamboo poles from the farmers; Bamboo products from the processors; Provide logistics, transportation to nearby town and surrounding cities and districts. In Karamoja sub-region the middlemen and traders buy the Bamboo from the community members and sell it to builders for construction, they also provide transportation from the community member's locality to the markets.

##### **Consumers**

Purchase edible bamboo shoots (fresh, smoked, and dried), bamboo poles for domestic use, bamboo poles for processing, bamboo baskets, bamboo furniture, bamboo for construction, bamboo for arts and crafts ornaments, and charcoal. Similarly, in Karamoja sub-region the major consumers for Bamboo are the builders and middlemen who buy to sale in other districts such as Mbale where it is consumed as a traditional culinary (Malewa in the local dialect)

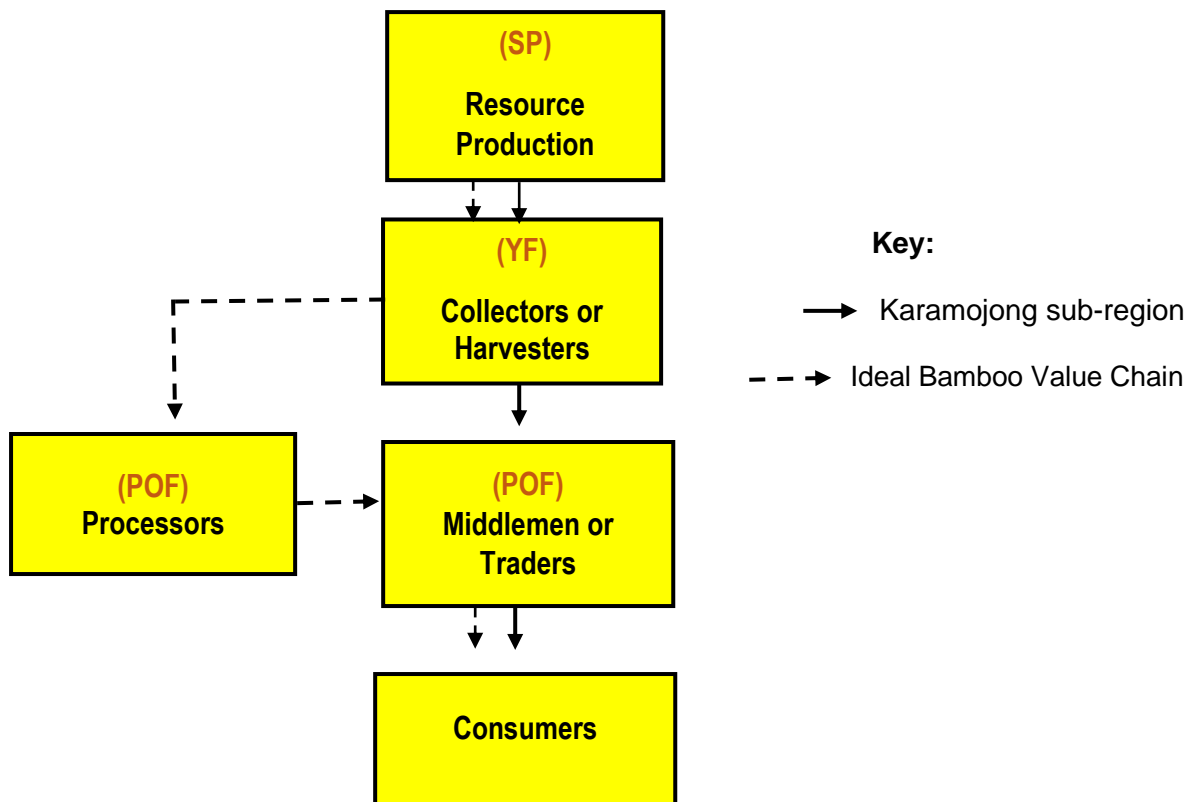
## **Challenges**

- This enterprise favors men over women due to the laborious activities involved, for example, the women might not be able to climb the high mountains without protective gears and gadgets to harvest the Bamboo trees.
- Relatedly, physically ferrying the harvest Bamboo trees from up the high mountains is hectic thus would also favor men over women.
- Due to the poor population, majority of the women and men do not have money to hire the manpower for ferrying of the harvested Bamboo from the mountains and transport them for processing.
- There is also a heavy local government tax levied on the Bamboo which chews up on the profit margins.
- The entire enterprise lacks financial and technical support from government and development partners within the area to develop it into a sustainable value chain.

## **Opportunities**

- Due to the Bamboo trees being vast in the mountains, they are harvested at no financial cost thus the youths can take them up as a business through value addition. Also, their abundance would keep the supply constant.
- Document small scale farmers who engage in the Bamboo value chain as an enterprise to sensitize them and build the value chain commercially and sustainably.
- The development partners could leverage the gap in processing stage to assist the community members harvesting Bamboo for sale to add value and benefit on profits.
- In addition, the community members should leverage the gap in processing by creating ornaments, handicrafts, and furniture to boost their household incomes and also contribute to the BUBU (Buy Uganda Build Uganda) policy.
- Development partners could also use this value chain to sensitize and create awareness amongst the community members about conservation of the Bamboo trees through cultivating individual nurseries and Bamboo trees to commercial purposes. This would create sustainability of the value chain while protecting the ecological system.

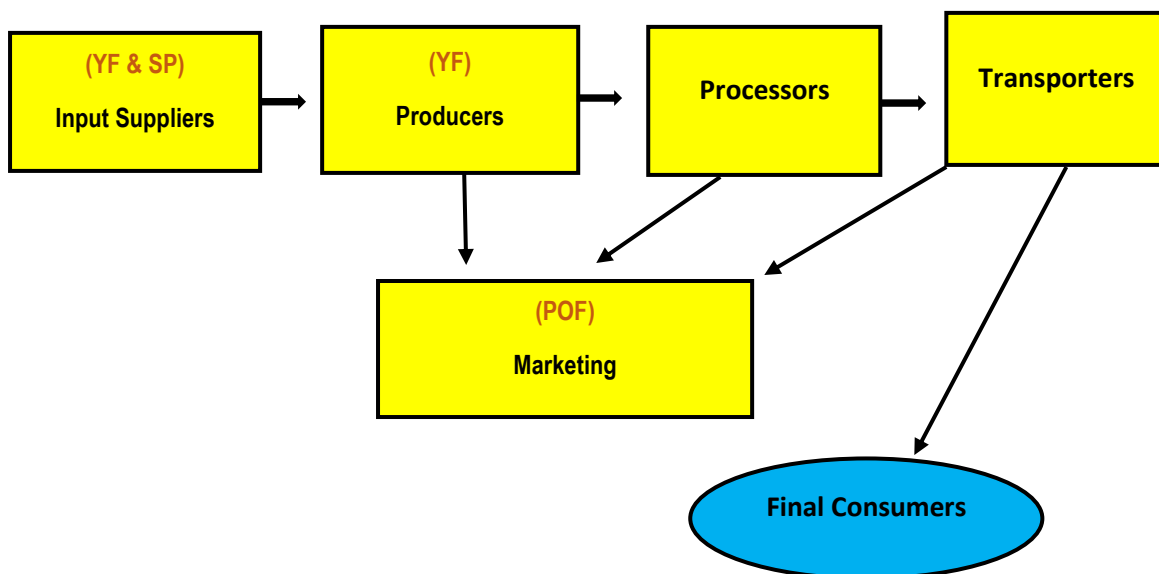
### Bamboo Value Chain Map



(YF) shows nodes where women are currently participating and (POF) shows nodes that a were promising, profitable opportunities for employment or self-employment for females

### 3.5.2 Brick Making Value Chain Analysis

#### Brick Laying Value Chain



## **Input suppliers**

The input supplies for brick making include hand hoes, shovels, mattocks, and picks as well as jerry cans and water drums for collecting water. The input supply chain also includes carpenters who make the wooden molds for making the bricks. The carpenters are usually contacted well in advance to make the required number of molds and they also make repairs to broken molds. The youth groups plan well in advance and procure all the necessary tools well in advance. Hand hoes costs between 6,000 to 10,000 shillings in the local market, a shovel costs between 15,000 to 25,000 shillings depending on the material made of while the mattock costs 45,000 shillings, a wheelbarrow costs 60,000 and jerry cans costs 500,000 each. These items are purchased once and used recurrently. Women are primarily involved in fetching water for the molding process.

## **Producers**

The production process in the brick making is typically direct and short. Bricks are usually molded and sold directly at the extraction sites. Extraction of the soil, processing, and commercialization are carried out at the same location. Four types of actors usually dominate the brickmaking process, and this includes the input suppliers, the processors, transporters, and final consumers. Production usually takes place on individual land. In Kitgum, Abim and Katakwi, the production is dominated by youth groups and bricks are strictly made for commercial purposes. Each member of the youth group participates in the brickmaking process. Following the clearing of vegetation and topsoil, shallow pits are dug using spades and hoes and the soil is covered with grasses for up to a week. After this, water is added to the mound, mixed, and compacted by foot, and left to rest for another three days. Water is then added to clay and mixed using a hoe. The semi-solid soil is then pressed firmly into a wooden mould. An average moulder can produce 200–300 of these green bricks in a single day

## **Processors**

Bricks are placed in a drying area and covered with grasses for two to three days, then stacked up to 2–3 meters high and covered again with grasses to prevent the bricks from cracking due to heat from the sun until dry or stored until firewood is purchased. The bricks are then stacked upwards ranging from 4 to 5 meters high and containing bricks ranging from 15,000 to 20,000. Depending on the size, each stack is equipped with two to five heating gates where firewood is placed. At some sites, exterior of the stack walls are plastered with soil to retain heat internally and grasses are placed across the top to protect from rainfall. Dry wood is placed in the gates, ignited, and kept burning for two to five days before gates are sealed with bricks and the pile is left to cool. The stacked piles are typically deconstructed as Lorries arrive to purchase them. The main input at this stage is firewood which costs 30,000 shillings per trip and transportation using tipper lorry ranges from 60,000 to 120,000 depending on the distance to the site. The other costs include hired labor for stacking the bricks and burning the bricks which are usually done at night.

Depending mainly on weather conditions and the expertise of the workforce affecting time frames applied, the entire production process typically takes three to five weeks. Work mainly is carried out by members of the youth group, who share the proceeds from the work. Though both women and men carry out all activities, women are engaged less frequently in the stacking and deconstruction of the molds construction and participate at much lower rates overall. Discussions with the producers reveal that groups typically make a profit of between 1,500,000 to 2,500,000 shillings for a stack of bricks. Losses mainly occur when the bricks do not burn properly hence attacking low prices or when the bricks over burn and break.



### Buyers/transporters

The buyers are typically construction sites who come to the site of brick making and negotiate the price with the group. The price of the bricks depends on the size of the bricks ranging from 120 for the smallest size to 180 shillings for the biggest size. The buyers usually move with their own hired trucks with a full truck commonly known as a trip. A trip costs between 60,000 to 120,000 shillings depending on the size of the truck and the distance of the site. The transporters usually move with their own loaders to load the bricks onto to the trucks. In some cases, the members of the youth group associations act as loaders and charge a fee of 20,000 for loading a truck.

### Consumers

The consumers are construction sites around the major urban centers. Because of the clay soil type for Katakwi, buyers sometimes come from as far as Soroti Town and other districts in eastern Uganda.

### Challenges and Constraints

In Katakwi district, the main environmental impacts relate to wetland destruction because much of the bricks are made in wetlands. In the other bricks producing districts like Kitgum and Abim, the main concern is deforestation. Wood is used to burn nearly 100% of the bricks which greatly impacts the environment.

Some children were observed directly engaged in the brick making work, with the age of the children ranging from 12 – 14 years of age. This would therefore go against the national labor laws and affect children’s participation in schools.

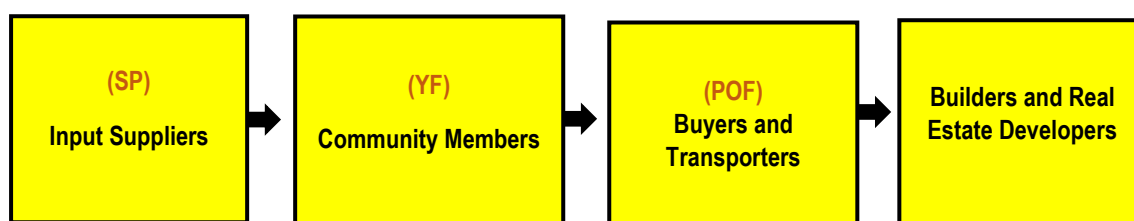
Women have lower participation levels than men in the brick making value chain. Even in districts where the production is dominated by youth groups, the brick making business is mostly carried out by male dominated youth groups. This means that women are less likely to benefit from the proceeds from the business. Furthermore, women’s participation in the transportation is minimal. Ownership of Lorries and engagement in the wood trade is extremely uncommon for women.

### Opportunities

The relatively short production period makes the turnover high within a short period of time. The producers spend approximately 700,000 shillings to produce bricks from laying to selling and make profits of between 1,500,000 to 2,500,000 shillings depending on the quality.

## 3.5.3 Stone Quarry Value Chain Analysis

### Stone Quarry Value Chain Map



## **Producers**

The stone quarry business is practiced throughout most of the Karamoja region but was more pronounced in Abim district. The production process generally includes digging (rock breaking and extraction), hauling (sometimes by diggers), crushing, sieving, and loading onto trucks. Individual landowners typically get a trading license to mine stone from the area. Trading license costs 1,000,000 shillings a year and this paid through contribution from all miners and middlemen operating from the site. The landowners then divide the land into sites or quarters and invite individual miners who are allocated sites to mine. Miners then dig large stones (hardcore) and sell the hard core to middlemen in 3-ton trucks locally known as trips. Discussions with the stakeholders revealed that one trip goes for 150,000 shillings of which the miners pay the landowner 30,000 shillings per trip.

## **Middlemen**

The middlemen buy the mined stones (hardcore) from miners at approximately 150,000 shillings. The middlemen are also allocated specific plots/sites within the quarry site, and they pay ground rent to the quarry/landowner ranging from 70,000 to 100,000 per year. The middlemen are mostly men and are typically businessmen with some amount of money who can secure a site and pay ground rent. The middlemen then hire local laborers who crush the large stones into smaller aggregates. The middlemen sell the crushed stones at between 250,000 – 300,000 shillings per trip depending on the size and quality of the crushed stones. The middlemen typically make a profit of between 30,000/= to 60,000 shillings per trip.

## **Laborers**

The laborers are typically members of the community from the surrounding areas. These are mostly made up of women and underage children, but a few men also participate in the process. Organization of labor is informal and ad hoc where laborers come and work and are paid for the number of stones crushed and the laborer chooses whether to return to work the next day or not. Sometimes labor is organized along family lines where individual laborers bring their family members to help in crushing the stones. The amount of stone crushed is measured using a 20-litter jerry can which is cut on the top. Laborers are paid 500 shillings for each jerry can be full of crushed stones. A laborer typically crushes between 30 to 50 jerry cans a day earning between 15,000 to 25,000 shillings. Discussions with the laborers revealed sometimes due to depletion at the site, some middlemen bring their hardcore stones from other stone quarries and crush them at the site because of the available market at the site.

## **Buyers/transporters**

The buyers are typically drivers of tipper Lorries who ferry construction materials to building sites. These are usually given money by contractors to buy the aggregate and they come and negotiate with individual middlemen. A trip of 14 size aggregate stone goes for 300,000 shillings while small size and the bigger size aggregates goes for 250,000 shillings. Discussions with the participants revealed that sometimes the transporters want to make a cut for themselves, so they buy using the cut jerry cans and 100 jerry cans sells at 300,000 shillings, 80 jerry cans at 280,000 shillings while 70 jerry cans go for 250,000 shillings. In this way the transporters make a profit of between 10,000 to 30,000 shillings depending on their negotiating power.

## **Consumers**

The consumers are construction sites around the major urban centers. For Abim district, sometimes contractors come from as far as Lira and Kitgum districts to buy the stone aggregates depending on the grade of the stones.

## **Challenges**

Processing of the quarry is very labor intensive and expensive for the producers. This makes the producers to produce stone aggregate in small quantity which does not satisfy the available market forcing some traders to look for stones from other districts.

Due to poor regulation the producers suffer from price fluctuation. The price for the stone aggregates typically depends on the availability of construction projects which tends to be seasonal. In periods where there are limited construction activities, the demand for the aggregates is low.

Heavy and double taxation from the district and sub county authorities. The producers typically pay license fees to operate the quarries and pay market dues for selling the aggregate stones from the sites.

## **Opportunities**

The enterprise does not require extensive skills set so any members of the community can join without prior skill. All one needs is to have the necessary tools and patience to engage in the business.

**Table 14: Other nonagricultural activity**

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amuda t n=61	Nakapiri pirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Sale of beverages or local brew												
<b>All sample</b>	26.4(219)	27.5(25)	47.8(43)	20.0(20)	36.7(33)	28.8(15)	0.0(0)	31.1(19)	11.7(7)	28.0(14)	20.0(15)	28.0(28)
<b>Gender</b>												
<b>Male</b>	14.7(520)	5.9(2)	13.8(4)	8.3(5)	34.6(19)	20.0(4)	0.0(0)	21.1(4)	0.0(0)	9.5(2)	14.3(6)	13.3(6)
<b>Female</b>	35.1(167)	40.4(23)	63.9(39)	37.5(15)	40.0(14)	34.4(11)	0.0(0)	35.7(15)	14.3(7)	41.4(12)	27.3(9)	40.0(22)
There is Income from the Sale of beverages or local brew	96.3(211)	100.0(25)	100.0(43)	100.0(20)	100(33)	93.3(14)	0.0()	100(19)	100.0(7)	100.0(14)	100(15)	75.0(21)
There are Costs involved in securing income from the Sale of beverages or local brew	91.9(194)	100.0(25)	97.7(42)	95.0(19)	100(33)	50.0(7)	0.0()	100(19)	57.1(4)	85.7(12)	80.0(12)	100.0(21)
Form of income received from the Sale of beverages or local brew												
Cash	74.2(155)	92.0(23)	85.7(36)	50.0(10)	12.1(4)	100.0(14)	0.0()	94.7(18)	85.7(6)	100.0(14)	80.0(12)	90.0(18)
Both cash and no cash	25.8(54)	8.0(2)	14.3(6)	50.0(10)	87.9(29)	0.0(0)	0.0()	5.3(1)	14.3(1)	0.0(0)	20.0(3)	10.0(2)
Who in the household is responsible for the Sale of beverages or local brew												
Myself	68.0(149)	92.0(23)	88.4(38)	85.0(17)	18.2(6)	73.3(11)	0.0()	47.4(9)	100.0(7)	85.7(12)	33.3(5)	75.0(21)
spouse	12.3(27)	4.0(1)	7.0(3)	0.0(0)	30.3(10)	6.7(1)	0.0()	5.3(1)	0.0(0)	7.1(1)	20.0(3)	25.0(7)
Jointly household head and spouse	18.3(40)	0.0(0)	2.3(1)	15.0(3)	51.5(17)	13.3(2)	0.0()	47.4(9)	0.0(0)	7.1(1)	46.7(7)	0.0(0)
Another household member	1.4(3)	4.0(1)	2.3(1)	0.0(0)	0.0(0)	6.7(1)	0.0()	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Who in the household is responsible for the proceeds from the Sale of beverages or local brew												
Myself	63.8(139)	92.0(23)	81.4(35)	85.0(17)	12.1(4)	66.7(10)	0.0()	47.4(9)	71.4(5)	78.6(11)	33.3(5)	74.1(20)
spouse	7.3(16)	4.0(1)	4.7(2)	5.0(1)	3.0(1)	0.0(0)	0.0()	5.3(1)	0.0(0)	0.0(0)	20.0(3)	25.9(7)
Jointly household head and spouse	28.0(61)	4.0(1)	11.6(5)	10.0(2)	84.8(28)	26.7(4)	0.0()	47.4(9)	28.6(2)	21.4(3)	46.7(7)	0.0(0)
Another household member	0.9(2)	0.0(0)	2.3(1)	0.0(0)	0.0(0)	6.7(1)	0.0()	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
<b>Brick making</b>												
<b>All sample</b>	8.9(74)	20.9(19)	2.2(2)	11.0(11)	1.1(1)	0.0(0)	0.0(0)	6.6(4)	1.7(1)	2.0(1)	5.3(4)	31.0(31)
<b>Gender</b>												
<b>Male</b>	14.7(52)	44.1(15)	6.9(2)	13.3(8)	1.8(1)	0.0(0)	0.0(0)	10.5(2)	9.1(1)	0.0(0)	9.5(4)	42.2(19)
<b>Female</b>	4.6(22)	7.0(4)	0.0(0)	7.5(3)	0.0(0)	0.0(0)	0.0(0)	4.8(2)	0.0(0)	3.5(1)	0.0(0)	21.8(12)
There is income from the Brick making	64.9(48)	73.7(14)	100.0(2)	100.0(11)	100.0(1)	0.0(0)	0.0(0)	100.0(4)	100.0(1)	100.0(1)	75.0(3)	35.5(11)
There are Costs involved in securing this income from the Brick making	91.7(44)	100.0(14)	100.0(2)	100.0(11)	0.0(0)	0.0(0)	0.0(0)	100.0(4)	0.0(0)	100.0(1)	66.7(2)	90.9(10)
Form of income received from Brick making												
Cash	97.9(47)	92.9(13)	100.0(2)	100.0(11)	100.0(1)	0.0(0)	0.0(0)	100.0(4)	100.0(1)	100.0(1)	100.0(3)	100.0(11)

Non-Cash	2.1(1)	7.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Who in the household is responsible for the Brick making activity												
oneself	66.2(49)	84.2(16)	100.0(2)	90.9(10)	100.0(1)	0.0(0)	0.0(0)	50.0(2)	100.0(1)	0.0(0)	50.0(2)	48.4(15)
spouse	2.7(2)	5.3(1)	0.0(0)	9.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Jointly household head and spouse	25.7(19)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	50.0(2)	0.0(0)	100.0(1)	50.0(2)	45.2(14)
Another household member	5.4(4)	10.5(2)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	6.5(2)
Who in the household is responsible for the proceeds from the Brick making activity												
Myself	67.6(50)	68.4(13)	50.0(1)	100.0(11)	100.0(1)	0.0(0)	0.0(0)	50.0(2)	100.0(1)	100.0(1)	50.0(2)	58.1(18)
spouse	1.4(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	3.2(1)
Jointly household head and spouse	27.0(20)	26.3(5)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	50.0(2)	0.0(0)	0.0(0)	50.0(2)	35.5(11)
Another household member	4.1(3)	5.3(1)	50.0(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	3.2(1)

### 3.6 Women and youth participation in the value chains

We also assessed the extent to which women and youth are participating at various nodes of the value chains for each of the districts. Along each value chain map, nodes were marked PoF if they were promising, profitable opportunities for employment or self-employment for females and youth and YF if females and or youth were already participating to some extent. Table 14 illustrates these areas for each value chain. 71.2 percent of groups received training, 11.2 percent had partnered with organizations to be able to access financial and institutional support and 8.3 percent had engaged in some form of contract farming. A list of some organizations cited by farmers as having provided supported them is in Appendix

For most value chains, women can potentially participate as wholesalers, middlemen and processors. Some value chains such bamboo and stone quarrying in as much as they might be a source of income risks depletion but also are of high risks in terms of health hazards to women and youth.

**Table 15: Points at which women and youth are participating in the identified value chains**

Value chain	Points at which women /youth are participating	Points at which women/youth can potentially participate	Contribution and potential for improving nutrition	Contribution and potential for improving household income
Beans	As largescale farmers	Middlemen	As body building foods, High potential in improving nutrition	High potential improving household income
	As small-scale farmers	Wholesaler Market		
Sorghum	As large-scale farmer	Middlemen	As energy giving good, High potential for improving nutrition	High potential improving household income
	As small-scale farmer	Wholesaler Market		
Cassava	Large scale farmers,	As middlemen	As energy giving foods, High potential for improving nutrition	High potential improving household income
	OWC and CSO's in small businesses like processing cassava chips into flour	As wholesalers		
Groundnuts	As input dealers, in fertilizers, pesticides		As bodybuilding foods, High potential for improving nutrition	High potential improving household income

<b>Value chain</b>	<b>Points at which women /youth are participating</b>	<b>Points at which women/youth can potentially participate</b>	<b>Contribution and potential for improving nutrition</b>	<b>Contribution and potential for improving household income</b>
	As producers, they cultivate as individual farmers or farmer groups, They also participate in processing (grind the nuts into peanut butter They do sort of groundnuts for sale			
Sunflower	As individual farmers As processors As retailers	As processors (in women SACCO) As producers	As source of heart healthy fats and protein, high potential in boosting immunity	High contribution to household income
Pulses	As input suppliers As producers on small scale		As body building foods, High potential in improving nutrition	High contribution to household income
Sesame	As input dealers As retailers As wholesalers	As input dealers As retailers As wholesalers In financial institutions	Nutritious source of plant proteins, hence body building	High contribution to household income
Honey	As producers, As processors, As retailers As wholesalers, Middlemen	As group beekeepers	As energy giving foods, High potential improving nutrition (gut health)	High contribution to household income
Livestock (both cows and goats)	As producers, in individual groups/ Associations As middlemen brokers, As retailers	As processors As transporters	As body building foods, High potential in improving nutrition	High contribution to household income
Poultry	As input dealers As producers As middlemen		As body building foods, High potential in improving nutrition	High contribution to household income
Cotton		As input dealers As input suppliers		High contribution to household income
<b>Nonagricultural value chain products</b>				
Bamboo	As community members	As middlemen	Income sales may be used for purchase of nutritional foods	High contribution to household income
Stone quarrying	As community members	As community members	Might be a health hazard for women and youth participation because of the falling debris.	Relatively low to high contribution to household income but risk depletion

Value chain	Points at which women /youth are participating	Points at which women/youth can potentially participate	Contribution and potential for improving nutrition	Contribution and potential for improving household income
Brick laying	As processors	As input dealers In providing financial services As processors in covering and burning bricks		High contribution to household income
Block laying	As input suppliers As processors	As producers		Some contribution to household income

Across the value chains especially in the agricultural sector, we see variation in the participation of women and youth as actors. For example for most of the value chains, women are participating at production level although at a relatively small scale. At the retail level, about 60 percent of the retailers are women and 40 percent are males. Males dominate at wholesaling and at processing level. Women's participation is hindered by liquidity constraints especially in processing which requires expensive equipment which women can not afford. For non agricultural value chains such as bamboo construction chain and brick making, men dominate these activities for example in transporting stones from the mines to outside for sale. Even if women are engaged in breaking the stones and selling them, the actual control of revenues is by males. In some districts in the Karamoja region, majority if not all people in the livestock value chain are males, and rigidity around quality versus quantity becomes difficult to address. Men and young boy's participation in herding of cattle is social and cultural phenomena. Probably, if there were both males and females, it would be easy to engage and improve on the livestock value chain. The apiary business interfaced with were at family level—female interviewees indicated they are jointly running the company business with the husband and children although in most incidences' males controlled the revenue. Rural traders include both males and females. However, one of the challenges to women trans versing remote location was insecurity and bad roads. Insecurity risk causes fear in traders but more particularly women and conditions of the bad roads that requires sleeping on the way, pushing cars etc is riskier and more difficult to women

For some value chains like vegetable growing and pulses, women dominate these value chains especially because of the nutritional value associated with these enterprises. Processing of products from oil crops value chain such as groundnuts paste are also dominated by women. Most of the models under the DINU rotates around groups and this is the best way the women and youth can be engaged and have direct access and control of the process and income from their engagements in the value chain. VSLA groups for example were a common in many districts except Moroto were only 57 percent belonged to groups (Table 16). From our engagements with women, we find that most are structured around VSLA groups were some are only women only groups hence the leadership positions are held by women. This translates to the other structures in the value chain such as producer associations where the leadership of some of the produce buyers are women and youthful people.



Table 16: Collective undertakings

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiri pirit n=61	Nabilatu k n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Top 4 community groups that members of the HH belong to												
Religious groups	7.2(60)	1.1(1)	10.0(9)	0.0(0)	22.2(20)	1.9(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	24.0(18)	11.0(11)
VSLA	88.6(736)	95.6(87)	100.0(90)	100.0(100)	93.3(84)	57.9(30)	77.1(47)	85.3(52)	76.7(46)	80.0(40)	90.7(68)	92.0(92)
Agriculture Producers	34.2(284)	74.7(68)	22.2(20)	13.0(13)	2.2(2)	7.7(4)	57.4(35)	39.3(24)	30.0(18)	52.0(26)	24.0(18)	56.0(56)
Livestock Producers	7.1(59)	4.4(4)	2.2(2)	1.0(1)	1.1(1)	1.9(1)	18.0(11)	8.2(5)	0.0(0)	36.0(18)	5.3(4)	12.0(12)
Type of the organization <sup>1</sup>												
Association (Legally registered)	50.8(388)	63.7(58)	97.8(87)	96.7(88)	3.7(3)	71.9(23)	17.0(10)	1.8(1)	3.5(2)	88.4(38)	40.3(27)	52.6(51)
Cooperatives (Legally Registered)	8.4(64)	3.3(3)	2.3(2)	2.2(2)	0.0(0)	3.1(1)	30.5(18)	50.0(28)	0.0(0)	2.3(1)	3.0(2)	7.2(7)
Informal group (with notary process ongoing)	33.8(258)	28.6(26)	40.5(36)	0.0(0)	67.1(55)	18.8(6)	52.5(31)	46.4(26)	38.6(22)	14.0(6)	7.5(5)	46.4(45)
Informal group (No notary process ongoing)	10.5(80)	3.3(3)	15.7(14)	1.1(1)	12.2(10)	6.3(2)	6.8(4)	1.8(1)	50.9(29)	2.3(1)	19.4(13)	2.1(2)
None	11.0(84)	3.3(3)	1.1(1)	2.2(2)	18.3(15)	3.1(1)	32.2(19)	1.8(1)	12.3(7)	0.0(0)	37.3(25)	10.3(10)
How often does the group meet?												
Weekly	94.1(729)	96.6(86)	100.0(89)	100.0(100)	97.6(82)	93.8(30)	78.9(45)	90.7(49)	76.3(45)	95.8(46)	95.5(64)	96.9(93)
Bi-weekly (Each 15 days)	1.7(13)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	8.8(5)	0.0(0)	11.9(7)	0.0(0)	1.5(1)	0.0(0)
Monthly	1.8(14)	1.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	10.5(6)	1.9(1)	5.1(3)	0.0(0)	3.0(2)	1.0(1)
The group has received any training from and project or organization	71.2(547)	87.6(78)	87.8(79)	64.0(64)	75.9(60)	60.0(18)	67.2(39)	64.9(37)	96.4(53)	76.6(36)	22.7(15)	70.1(68)
Group has partnered or connected with any other institutions such as financial institution, technical institutions to receive more support such as access to credits, technical knowledge to perform a business task	11.2(87)	24.4(22)	2.2(2)	1.0(1)	7.7(6)	25.8(8)	8.6(5)	34.5(20)	3.6(2)	6.1(3)	10.0(7)	11.2(11)
Have engaged in undertaking any form of contract farming	8.3(69)	20.9(19)	1.1(1)	1.0(1)	2.2(2)	42.3(22)	18.0(11)	6.6(4)	6.7(4)	4.0(2)	0.0(0)	3.0(3)
<b>Contractual undertakings engaged in</b>												
Sale and purchase of a crop	15.9(11)	0.0(0)	0.0(0)	100.0(1)	0.0(0)	31.8(7)	0.0(0)	50.0(2)	0.0(0)	50.0(1)	0.0(0)	0.0(0)
Sale and purchase of livestock product	2.9(2)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	25.0(1)	50.0(1)	0.0(0)	0.0(0)
Supply of inputs	11.6(8)	0.0(0)	0.0(0)	100.0(1)	100.0(2)	4.6(1)	18.2(2)	0.0(0)	50.0(2)	0.0(0)	0.0(0)	0.0(0)
Land preparation	79.7(55)	89.5(17)	100.0(1)	0.0(0)	0.0(0)	100.0(22)	100.0(11)	0.0(0)	25.0(1)	50.0(1)	0.0(0)	66.7(2)
Cultivation/ planting	75.4(52)	73.7(14)	100.0(1)	0.0(0)	0.0(0)	100.0(22)	81.8(9)	50.0(2)	50.0(2)	0.0(0)	0.0(0)	66.7(2)
Harvesting	56.5(39)	63.2(12)	0.0(0)	0.0(0)	0.0(0)	72.7(16)	63.6(7)	50.0(2)	25.0(1)	0.0(0)	0.0(0)	33.3(1)
Other (specify)	2.9(2)	10.5(2)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)

<sup>1</sup> Multiple response possible (Percentage of cases are considered)

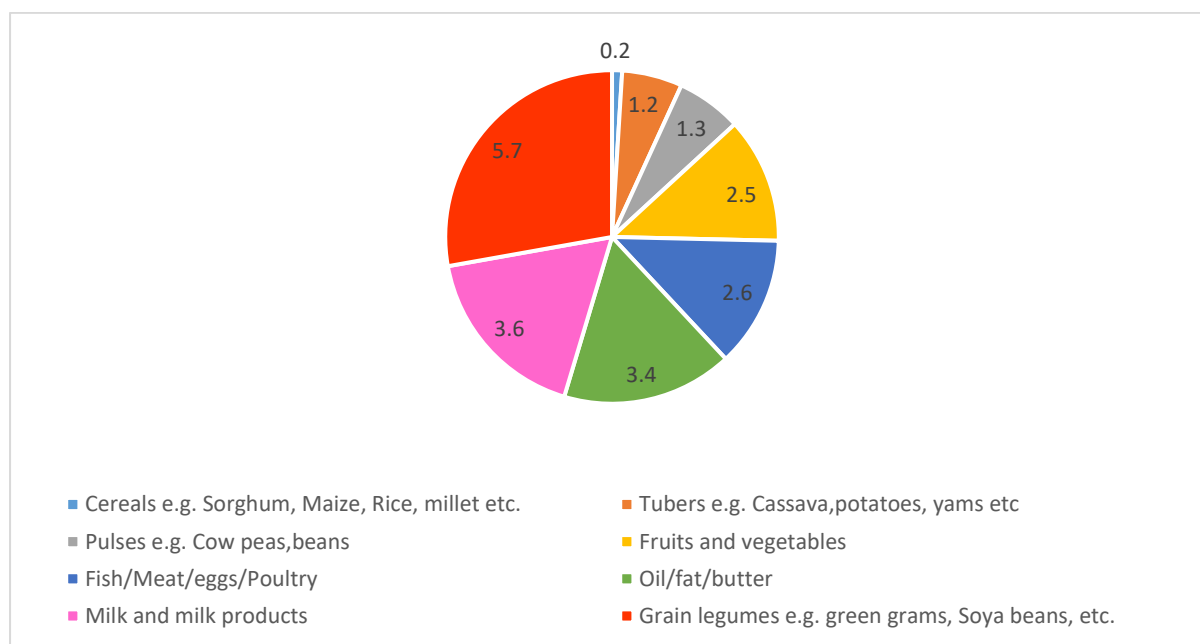
### 3.7 Nutrition and Food Security in relation to the agricultural activities

We explored household nutrition and food security and related it to their participation in agricultural and nonagricultural value chains. For example, we explored if there had been some time that the families did not have enough food in the house in the last 30 days or a household member went a whole day and night without eating anything at all because there was not enough food, in the past 30 days. We also asked how they can cope with such situations and disaggregated the responses depending on the gender of the respondent. 76 percent reported that the family did not have enough food in the past 30 days and 28.4 percent report that this happens sometimes. The incidence was highest amongst female respondents all through the districts. The most affected districts in terms of food insecurity were Karenga, Kabong and Nabilatuk who had more than 90 percent of the respondents reporting that they had been food insecure in the past 30 days.

In terms of nutrition security, on average households will consume majorly grains in 5.7 out of the 7 days, will consume milk and milk products and oils and fats in 3.6 and 3.4 days out of the 7 days (Figure 5). There is less consumption of meat products, fruits, and vegetables; these are indicators of a non-balanced diet.

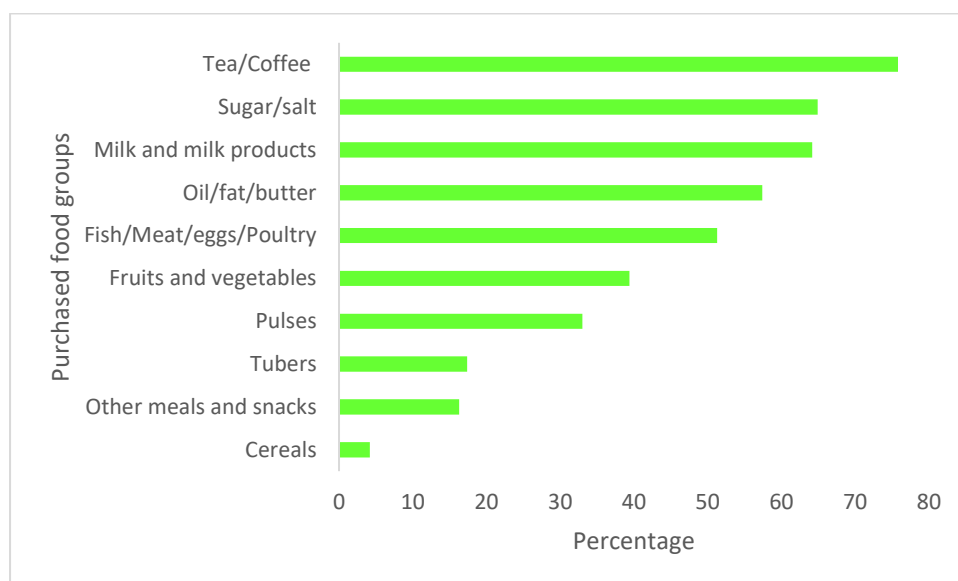
There has been some time that the family did not have enough food, in the past 30 days

**Figure 5: Number of days households consume the following food groups in 7 days**



The foods less eaten at household level are also the ones that need to be purchased (Figure 6). For example, 70 percent of the households indicate that they purchase milk and milk products and less than 10 percent purchase cereals (Figure 6).

Figure 6: Food groups usually purchased by households



To cope with food and nutrition insecurity, households cited the following coping strategies: borrowing of food on credit, engaging in casual jobs, reducing the number of meals in a day, or reducing food portions served. Others also relied on the sale of assets. Most of the nutrition practices adopted in most of the districts are the vegetable gardens entirely controlled by women in most of the areas. Figure 7 shows the relationship between engaging in different agricultural activities and the number of meals consumed in a day. Those engaged in livestock production have the highest proportion of people who report eating at least three meals a day, followed by those engaged in both crop and livestock production. Also, those engaged in both crop and livestock production report the least percentage of people who report having only one meal a day. Overall, engaging in both livestock and crop production enables households to be more food secure than if they were engaged in one agricultural activity like crop production alone or livestock production only.

Figure 7: Number of meals consumed in a day vis-à-vis agriculture activity engaged in

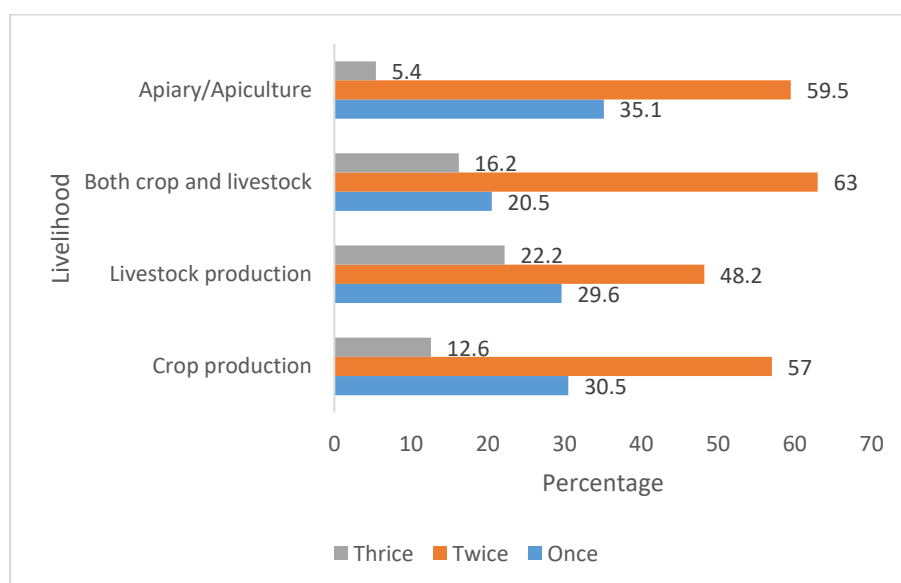


Table 17: Food and Nutrition security amongst the sampled respondents

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiri pirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Number of times family members have a meal in a day												
Once	26.0(216)	41.8(38)	26.7(24)	33.0(33)	47.8(43)	25.0(13)	34.4(21)	27.9(17)	23.3(14)	6.0(3)	10.7(8)	2.0(2)
Twice	59.6(495)	46.2(42)	54.4(49)	62.0(62)	44.4(40)	59.6(31)	45.9(28)	60.7(37)	68.3(41)	70.0(35)	58.7(44)	86.0(86)
Thrice	14.2(118)	11.0(10)	18.9(17)	5.0(5)	7.8(7)	15.4(8)	19.7(12)	11.5(7)	8.3(5)	24.0(12)	30.7(23)	12.0(12)
More than thrice a day	0.1(1)	1.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
<b>Male</b>												
Once	25.7(91)	44.1(15)	17.2(5)	36.7(22)	47.3(26)	25.0(5)	22.2(4)	15.8(3)	27.3(3)	14.3(3)	7.1(3)	4.4(2)
Twice	59.6(211)	52.9(18)	58.6(17)	56.7(34)	45.5(25)	65.0(13)	44.4(8)	73.7(14)	72.7(8)	66.7(14)	57.1(24)	80.0(36)
Thrice	14.7(52)	2.9(1)	24.1(7)	6.7(4)	7.3(4)	10.0(2)	33.3(6)	10.5(2)	0.0(0)	19.1(4)	35.7(15)	15.6(7)
More than thrice a day	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
<b>Female</b>												
Once	26.3(125)	40.4(23)	31.2(19)	27.5(11)	48.6(17)	25.0(13)	39.5(17)	33.3(14)	22.5(11)	0.0(0)	15.2(5)	0.0(0)
Twice	59.7(284)	42.1(24)	52.5(32)	70.0(28)	42.9(15)	59.6(31)	46.5(20)	54.8(23)	67.4(33)	72.4(21)	60.6(20)	90.9(50)
Thrice	13.9(66)	15.8(9)	16.4(10)	2.5(1)	8.6(3)	15.4(8)	14.0(6)	11.9(5)	10.2(5)	27.6(8)	24.2(20)	9.1(5)
More than thrice a day	0.2(1)	1.7(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
There has been some time that the family did not have enough food, in the past 30 days												
All sample	76.0(631)	82.4(75)	83.3(75)	96.0(96)	90.0(81)	57.7(30)	83.6(51)	83.6(51)	96.7(58)	54.0(27)	81.3(61)	26.0(26)
<b>Male</b>	72.9(258)	73.5(25)	82.8(24)	93.3(56)	89.1(49)	50.0(10)	66.7(12)	68.4(13)	100.0(11)	57.1(12)	76.2(32)	31.1(14)
<b>Female</b>	78.4(373)	87.7(50)	83.6(51)	100.0(40)	91.4(32)	62.5(20)	90.7(39)	90.5(38)	95.9(47)	51.7(15)	87.9(29)	21.8(12)
How often this happened in the past 30 days												
Rarely (1-2 times)	64.8(409)	29.3(22)	57.3(43)	86.5(83)	60.5(49)	60.0(18)	37.3(19)	60.8(31)	81.0(47)	96.3(26)	90.2(55)	61.5(16)
Sometimes (3-10 times)	28.4(179)	56.0(42)	36.0(27)	11.5(11)	39.5(32)	40.0(12)	27.5(14)	27.5(14)	19.0(11)	3.7(1)	8.2(5)	38.5(10)
Often (more than 10 times)	6.5(41)	14.7(11)	6.7(5)	0.0(0)	0.0(0)	0.0(0)	35.3(18)	11.8(6)	0.0(0)	0.0(0)	1.6(1)	0.0(0)
Household member went to sleep at night hungry, in the past 30 days												
<b>All sample</b>	64.3(534)	62.6(57)	73.3(66)	81.0(81)	86.7(78)	57.7(30)	85.2(52)	85.2(52)	73.3(44)	52.0(26)	37.3(28)	20.0(20)
<b>Male</b>	60.7(215)	52.9(18)	75.9(22)	80.0(48)	85.5(47)	50.0(10)	66.7(12)	79.0(15)	72.7(8)	57.1(12)	26.2(11)	26.7(12)
<b>Female</b>	67.0(319)	68.4(39)	72.1(44)	82.5(33)	88.6(31)	62.5(20)	93.0(40)	88.1(37)	73.5(36)	48.3(14)	51.5(17)	14.6(8)
How often this happened												
Rarely (1-2 times)	65.7(351)	43.9(25)	53.0(35)	92.6(75)	61.5(48)	60.0(18)	36.5(19)	65.4(34)	77.3(34)	96.2(25)	96.4(27)	55.0(11)
Sometimes (3-10 times)	28.5(152)	54.4(31)	40.9(27)	4.9(4)	38.5(30)	40.0(12)	30.8(16)	23.1(12)	22.7(10)	3.8(1)	0.0(0)	45.0(9)
Often (more than 10 times)	5.2(28)	1.8(1)	6.1(4)	0.0(0)	0.0(0)	0.0(0)	32.7(17)	11.5(6)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
A household member went a whole day and night without eating anything at all because there was not enough food, in the past 30 days												

<b>All sample</b>	53.6(445)	38.5(35)	66.7(60)	75.0(75)	86.7(78)	50.0(26)	80.3(49)	82.0(50)	71.7(43)	24.0(12)	10.7(8)	9.0(9)
<b>Male</b>	50.6(179)	35.3(12)	75.9(22)	71.7(43)	85.5(47)	40.0(8)	66.7(12)	68.4(13)	72.7(8)	33.3(7)	9.5(4)	6.7(3)
<b>Female</b>	55.9(266)	40.4(23)	62.3(38)	80.(32)	88.6(31)	56.3(18)	86.1(37)	88.1(37)	71.4(35)	17.2(5)	12.1(4)	10.9(6)
How frequently												
Rarely (1-2 times)	68.7(305)	65.7(23)	53.3(32)	92.0(69)	68.8(53)	57.7(15)	36.7(18)	66.0(33)	86.0(37)	91.7(11)	87.5(7)	77.8(7)
Sometimes (3-10 times)	25.0(111)	34.3(12)	43.3(26)	5.3(4)	31.2(24)	42.3(11)	30.6(15)	22.0(11)	14.0(6)	8.3(1)	0.0(0)	11.1(1)
Often (more than 10 times)	5.4(24)	0.0(0)	3.3(2)	0.0(0)	0.0(0)	0.0(0)	32.7(16)	12.0(6)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
How one coped with the situation when you did not have enough food												
Borrow food on credit	67.9(302)	31.4(11)	70.0(42)	78.7(59)	88.5(69)	0.0(0)	57.1(28)	92.0(46)	74.4(32)	58.3(7)	37.5(3)	55.6(5)
Engage in casual jobs	54.4(242)	74.3(26)	43.3(26)	33.3(25)	84.6(66)	65.4(17)	22.5(11)	28.0(14)	90.7(39)	66.7(8)	37.5(3)	77.8(7)
Reduce food portions	47.6(212)	37.3(13)	55.0(33)	25.3(19)	48.7(38)	38.5(10)	83.7(41)	48.0(24)	60.5(26)	0.0(0)	62.5(5)	33.3(3)
Support from NGOs, Government	14.8(66)	0.0(0)	1.7(1)	33.3(25)	9.0(7)	3.9(1)	8.2(4)	8.0(4)	53.5(23)	8.3(1)	0.0(0)	0.0(0)
Sale of assets	26.1(116)	20.0(7)	1.7(1)	52.0(39)	55.1(43)	38.5(10)	22.5(11)	4.0(2)	2.3(1)	0.0(0)	0.0(0)	22.2(2)
Take loans	17.3(77)	42.9(15)	6.7(4)	2.7(2)	15.4(12)	61.5(16)	0.0(0)	48.0(24)	4.7(2)	16.7(2)	0.0(0)	0.0(0)
Reduce the number of meals in a day	45.4(202)	8.6(3)	56.7(34)	14.7(11)	48.7(38)	42.3(11)	69.4(34)	44.0(22)	83.7(36)	0.0(0)	75.0(6)	77.8(7)
Others specify	2.9(13)	17.1(6)	6.7(4)	1.3(1)	0.0(0)	3.9(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	12.5(1)	0.0(0)

### 3.8 Barriers and challenges in the value chains

Barriers and challenges exist for the actors within the various value chains. Some are unique for some districts but most of the challenges are crosscutting across districts. Figure 11 shows some of the challenges for farmers in crop production. Generally weather variability and more largely climate change is one of the most cited challenges amongst farmers followed by parasites and diseases. Farmers also indicate a low support from NGOs and Government and insecurity and theft. The rigidity around women’s participation in herding of (cows) in some districts because it is regarded as a men activity has hindered the uptake of some improved practices that would increase the productivity of the given value chain.

**Figure 8; Challenges for farmers in crop production.**

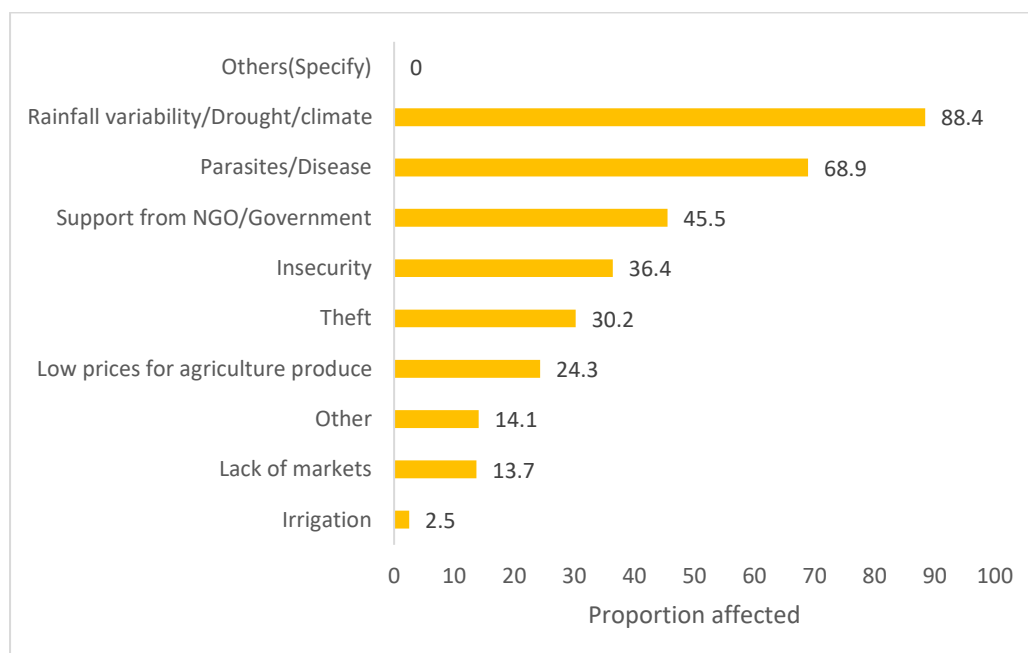


Table 12 shows some of the value chains and challenges identified and corresponding solutions by district. In Kotido for example, the inputs node is faced with lack of access to inputs; delays in delivery of inputs; high cost of inputs while the retailing node is faced with; high taxes; insecurity; competition; lack of market for commodities. In Abim, the livestock farmers are facing problems of feeds and supplies, drought and clan conflicts including cattle raiding which leads to death, conflict, displacement, and loss of livelihood.



Table 18: Key challenges cited by district and the likely solutions

Districts	Challenges experienced in the agricultural value chains in Karamojong and parts of Northern Sub-region	Recommendations/way forwards
Abim	<ul style="list-style-type: none"> <li>▪ The local farmers have very low level of finances, which reduces their purchasing power</li> <li>▪ There are transport challenges, the local producers and the retailers find it very difficult to transport these agricultural commodities. This results from the bad road that exist in the district.</li> <li>▪ There is also a problem of inadequate processing center. The machines for grinding sorghum and cassava are very scarce. This sometimes deny them the opportunity to process their raw materials.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Offering loans with low interest rates, to facilitate farmers in borrowing some money that can help them buy necessary inputs required for use within the chains.</li> <li>▪ There is need for government intervention in construction of feeder roads to help improve transport network for easy movement of commodities from point of production to points of consumption</li> <li>▪ Installation of processing industries or centers, to help in production of materials from raw forms</li> </ul>
Amudat	<ul style="list-style-type: none"> <li>• Lack of adequate information {lack of training, poor access to extension services]</li> <li>• Lack of storage facilities for the maize farmers. They normally store the produce in the sacks or in tins.               <ul style="list-style-type: none"> <li>• Poor seed supplies, pests and diseases, low price for the produce and many other.</li> </ul> </li> <li>• There is a challenge of drought, lack of proper materials to make KTB hives, inadequate fund, lack of ready market, poor location of site and so on.</li> <li>• The livestock farmers are facing problems of feed and vet supplies, drought and clan conflicts i.e., cattle raiding which leads to death, conflict, displacement and loss of livelihoods.]]</li> </ul>	<ul style="list-style-type: none"> <li>• Regarding loans from formal institutions, banks showed willingness to grant loans to individuals in the various departments but only if they could meet the collateral terms.</li> <li>• Training farmers on storage management to keep their produce from damage by pests and weather,</li> <li>• Training farmers how to build simple storage facilities using simple readily available local materials.</li> <li>• Educating and encouraging, farmers on use of improved, high yielding, pest, and disease tolerant varieties</li> <li>• Introduction of the Kraal protection local personnel as strategies presented by Government to tackle cattle rustling,</li> <li>• Encouraging farmers to form associations through which they can increase their bargaining power for their produce at better prices</li> <li>• Promotion of smart agricultural practices that include insitu-rainwater harvesting techniques when planting crops, drip irrigation practices that use less water, use of drought tolerant cop varieties</li> <li>• training livestock farmers on how to make animal feeds that can be fed to animals in dry seasons e.g hay</li> </ul>



	<ul style="list-style-type: none"> <li>• Access to wholesale markets is a problem because it is out of the district.</li> </ul>	<p>making, this saves the farmer the hustle of looking for pastures during dry seasons</p>
Karenga	<ul style="list-style-type: none"> <li>▪ Lack of sufficient capital for business expansion.</li> <li>▪ Climate change that affects the productivity and production.</li> <li>▪ Poor transport infrastructure linking the production site to the markets had hindered marketing the agricultural commodities making it expensive.</li> <li>▪ Insufficient farm tools and equipment's for mechanization.</li> <li>▪ Lack of good storage facilities leading to poor post-harvest handling.</li> <li>▪ High fuel prices.</li> <li>▪ Lack of access to credit.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government offering loans with low interest rates, to facilitate farmers in borrowing some money that can help them buy necessary inputs required for use within the chains</li> <li>▪ Adoption of climate smart agricultural practices like insitu- rainwater harvesting techniques for crop production, Provision of improved quality seeds/certified that are early maturing, drought resistant, tolerant to pest and disease outbreaks. <ul style="list-style-type: none"> <li>• There is need for government intervention in construction of feeder roads to help improve transport network for easy movement of commodities from point of production to points of consumption</li> <li>• Need for government policy on tax waiver for import of agricultural tools, to increase their availability on market, and easy access by farmers</li> <li>• Training farmers on storage management to keep the produce from damage by pests and weather, training farmers how to build simple storage facilities using simple readily available local materials.</li> <li>• High fuel prices require a government policy implementation that regulates or controls the prices.</li> <li>• need for government to use available fuel reserves within the country, which will help create stability of fuel prices within the country</li> <li>• Need for the government to support the establishment of a rural or agricultural development bank that prioritises agricultural financing.</li> </ul> </li> </ul>
Katakwi	<ul style="list-style-type: none"> <li>▪ Natural disasters such as drought and floods.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Having disaster risk management systems such as early warning to provide timely and reliable climate information to help governments and communities</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Inadequate access to and control of land by women.</li>   <li>▪ Pests and diseases.</li> <li>▪ Inadequate agricultural knowledge and skills uptake.</li> <li>▪ Adulterated and fake agro-inputs on the market.</li> <li>▪ High cost of technologies.</li>   <li>▪ Inadequate access to financial services</li>   <li>▪ Poor storage.</li> </ul>	<p>better prepare for weather related hazards to avert disasters.</p> <ul style="list-style-type: none"> <li>• Intervention by the state and other agencies to alleviate the plight of women and ensure their full access to land and other property rights</li> <li>• Use of pest and disease tolerant crop varieties, Integrated Pest Management practices</li> <li>• Training small farmers on counterfeit goods, identification and their effects using videos</li> <li>• Government subsidy on available agricultural technologies, which will encourage farmers to buy</li> <li>• Need for the government to support the establishment of a rural or agricultural development bank that prioritizes agricultural financing</li> <li>• Training farmers on storage management to keep their produce from damage by pests and weather, training farmers how to build simple storage facilities using simple readily available local materials.</li> </ul>
Kotido	<ul style="list-style-type: none"> <li>▪ The inputs node is faced with: Lack of access to inputs; Delays in delivery of inputs; High cost of inputs.</li> <li>▪ The retailing node is faced with; High taxes; Insecurity; Competition; Lack of market for commodities.</li> <li>▪ The wholesaling node is faced with; High taxes; Insecurity; Competition; Lack of market for commodities.</li> <li>▪ The processing node is faced with; Poor storage facilities; Poor roads transport; Expensive agro equipment's.</li> </ul>	<p>Encouraging farmers to open agro-input stores as business ventures to meet the gaps in delays</p> <ul style="list-style-type: none"> <li>• Need to venture into other marketing strategies such as online selling direct to the consumers</li> <li>• Forming farmer association groups who can be able to secure financing loans that would help in building storage facilities to maintain good equality produce</li> <li>• Training farmers on storage management to keep their produce from damage by pests and weather, training farmers how to build simple storage facilities, using simple readily available local materials.</li> <li>• There is need for government intervention in construction of feeder roads to help improve transport network for easy movement of commodities from point of production to points of consumption.</li> <li>• Government subsidy on available agricultural equipment, which will encourage farmers to buy</li> </ul>

Nabilatuk	<ul style="list-style-type: none"> <li>▪ Insufficient capital to procure inputs</li>   <li>▪ Low demand locally because most people are engaged in agricultural commodities on a subsistence level.</li> <li>▪ Cattle rustlers affect the livestock value chain, making a risky enterprise to engage</li>   <li>▪ Delay in delivery of inputs by the agro-input dealers.</li>   <li>▪ Lack of skilled personnel in processing the agricultural commodities.</li> <li>▪ There is a long payback period on returns on capital invested for some agricultural commodities.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Building the capacity of rural credit cooperatives in increasing access to agricultural finance by smallholder farmers along key commodity value chains</li> <li>▪ Government offering loans with low interest rates, to facilitate farmers in borrowing some money that can help them buy necessary inputs required for use within the chains</li> <li>▪ Introduction of the Kraal protection local personnel as strategies presented by Government to tackle cattle rustling,</li> <li>▪ Encouraging farmers to open agro-input stores as business ventures to meet the gaps in delays</li> <li>▪ Building the capacity of extension agents to train people operating in different value chains on tangible skills and knowledge when dealing with a variety of commodities</li> <li>▪ Training of women and youth on the various aspects regarding processing of agricultural commodities, to give them knowledge and skills</li> <li>▪</li> </ul>
Nakapiririt	<ul style="list-style-type: none"> <li>▪ Delay in supply of inputs by the input suppliers affects the time for time for planting which in turn affects the entire value chains.</li> <li>▪ Inadequate funds for stocking inputs by the agro-inputs dealers.</li> <li>▪ Government seeds and seeds provided by the political leaders discourage farmers from buying the inputs from the agro-input dealers hence distorting the market for agro-inputs.</li> <li>▪ The producers still use local and rudimentary tools for ploughing, weeding, and harvesting which leads to low yields.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Need to encourage some farmers to buy input supplies and stock, as business venture to supply other farmers, this makes it available and nearer to other farmers in need</li> <li>▪ Government offering loans with low interest rates, to facilitate farmers in borrowing some money that can help them buy necessary inputs required for use within the chains</li> <li>• Government subsidy on improved farm implements, to encourage farmers in buying modern tools that allows them to cultivate better</li> </ul>



## 4.0 Conclusions and Recommendations

### 4.1 Conclusions

The study provided a value chain and market analysis as part of conducting an inclusive market-based development for small holder farmers in Karamoja region and parts of Northern Uganda. Livestock, maize, beans sorghum, groundnuts, apiary, sunflower, sorghum, pulses were some of the crucial agricultural value chains identified for boosting household food and nutrition security, household income and women empowerment. In Katakwi and Kitgum, additionally important value chains include cotton and sesame. Nonagricultural value chains identified include brick making, stone quarrying and charcoal burning. Women played an important role as small scale producers although they could potentially be active in the various value chains as middlemen, wholesalers, processors, and input dealers.

The biggest bottleneck to market access for Karamoja region is its' geographical location that isolates it from the other districts in Uganda. However, Karamoja has opportunities to supply the external markets in South Sudan and Kenya although this has not been fully exploited. Focus needs to be channeled towards producing for the external markets by improving product quality. Also, opportunities exist in upgrading for many value chains including milk, meat, and livestock. The growth of urban areas and improved connectivity within many districts in Karamoja and in some parts of Northern Uganda offer opportunities for vertical integration.

- The study identified and assessed various value chains including the market structure and their interlinkages, entry barriers and challenges faced by the different players. Important cross cutting challenges across all value chains in all the districts include a lack of access to credit, poor connectivity that increases transaction costs of moving commodities from producers to the final consumers and a lack of equipment for value addition.
- The study also found that some value chains especially nonagricultural value chains like stone quarrying score lowly in regards to their contribution to women empowerment majorly because women don't control the equipment, they don't have the required skills needed to allow them upgrade to higher levels of the value chains and they are geographically located far from their households or communities making it impossible for them to engage in other household duties and increasing the transaction costs.
- The study also found that women's participation in some value chains like apiary as producers and traders of both honey and its products in shops and supermarkets is hindered by cultural rigidities (stereotypes) around beliefs that beekeeping is purely a male's role. Other constraints include insecurity, since honey harvesting is done at night and this makes women vulnerable, lack of

access to capital for buying inputs like packing equipment, good quality beehives.

- Integration of farmers in groups is crucial to be able to exploit opportunities along the chain. Currently farmers are only organized at producer level and there exist weak linkages between input dealers and farmers, producers, and the processors. Overall low volumes are produced.
- The study also found limited linkages and coordination along the value chains and between actors. The lack of a synergistic relation between actors such as between producers and processors means that production remains at low levels and one group of actors specifically remain exploited from price inequalities and high transaction costs.
- Constraints identified along the value chains include the lack of finances, skills, and knowledge for participation of women and youth at higher levels of the value chain and in new value chains that are potentially more profitable and can bring about economic growth and women empowerment.

## 4.2 Recommendations

The following recommendations emanate from this study.

- Opportunities exist in upgrading along the value chains in the apiary and livestock value chains. Given that most of the farming is done by small holder farmers, strengthening the farmer groups to cultivation of crops might be necessary to have large harvest volumes for sale within the farmer group. Formation of cooperative societies is also key, if collective bargaining for higher prices for crop produce is to be possible, especially for maize and honey whose market spans out of Uganda.
- Poor farming practices like lack of application of pesticides, fungicides, or fertilizers continues to be a major challenge for producers of crops and animals. Investment in post-harvest handling equipment is crucial to meet quality standards for trade. Intervention towards inputs support to farmers will help in adoption to improved farming methods. The Government of Uganda through the Ministry of Agriculture, Animal Industry and Fisheries rolled out an input subsidy approach in 2019, the Agricultural Cluster Development Program, with the E-voucher component whereby farmers contribute a specified percentage of the total costs of the input for which the Government tops up to meet to the full costs. It allows for farmers to own the inputs and the program has benefited many farmers in the districts for which it has rolled out in terms of access to improved inputs. Unfortunately, the ACDP program is currently not in Karamojong region, but the project should consider this approach to promote a sustainable way in which farmers can access inputs.

- Value addition and industrialization within the region is also key to rural development of the region. Karamoja has potential for development off farm value chains that can help to diversify efforts of women and youth empowerment. Investment in processing of sunflower oil within the region, maize processing and honey into various products are some of the avenues for value addition. Establishing of processing facilities and centers in the regions through public private partnerships arrangements could benefit farmers
- Climate change adaptability. Investment in extension is also key to train farmers in proper agronomic practices and Farming methods for climate change adoptability. Given that there are also opportunities in nonagricultural enterprises, financial literary skills may be handy to the women VSLAs, so that opportunities in other value chains like bamboo sale, tourism, and small trade in trading centers can be explored.
- To increase women participation in most of the value chains at higher nodes there is need for: financial literacy, business management training, and gender mainstreaming (for example having women driven saving groups, being intentional in training interventions targeting women) to allow for women participation for example in hoisting beehives, access to resources, ownership and decision making. Many opportunities can be created for women in processing and branding. Although most of the female roles are linked to cultural aspects. Involvement of women in new labor opportunities can promote the income status of women who were formerly more involved in non-income activities. Youth can be trained or given hands on skills in food safety and product quality to allow them to compete at higher levels of the value chains.

The lack of access to credit can be improved through supporting the formation of new and boosting current savings and credit cooperation's to facilitate access to finance. The access to finances will play a role in the commercialization of value chains such as cereals for technology upgrade and value addition such as processing and packaging.

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## Appendix 1: Demographic characteristics

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiripirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Sex of the respondent												
Male	42.7(354)	37.4(34)	32.2(29)	60.0(60)	61.1(55)	38.5(20)	29.5(18)	31.1(19)	18.3(11)	42.0(21)	56.0(42)	45.0(45)
Female	57.3(476)	62.6(57)	67.8(61)	40.0(40)	38.9(35)	61.5(32)	70.5(43)	68.9(42)	81.7(49)	58.0(29)	44.0(33)	55.0(55)
Age of household head in complete years												
14-29 yrs	34.0(282)	18.7(17)	40.0(36)	37.0(37)	60.0(54)	40.4(21)	18.0(11)	36.1(22)	43.3(26)	44.0(22)	18.7(14)	22.0(22)
30-39 yrs	34.2(284)	25.3(23)	37.8(34)	33.0(33)	26.7(24)	32.7(17)	49.2(30)	37.7(23)	48.3(29)	36.0(18)	30.7(23)	30.0(30)
40-49 yrs	17.3(144)	24.2(22)	15.6(14)	9.0(9)	4.4(4)	19.2(10)	21.3(13)	14.8(9)	6.7(4)	10.0(5)	29.3(22)	32.0(32)
50-59 yrs	10.0(83)	19.8(18)	4.4(4)	11.0(11)	7.8(7)	3.8(2)	9.8(6)	8.2(5)	1.7(1)	10.0(5)	13.3(10)	14.0(14)
60+ yrs	4.5(37)	12.1(11)	2.2(2)	10.0(10)	1.1(1)	3.8(2)	1.6(1)	3.3(2)	0.0(0)	0.0(0)	8.0(6)	2.0(2)
Marital Status of the household head												
Single	6.1(51)	7.7(7)	4.4(4)	10.0(10)	14.4(13)	3.8(2)	3.3(2)	3.3(2)	3.3(2)	4.0(2)	2.7(2)	5.0(5)
Married	82.9(688)	67.0(61)	87.8(79)	68.0(68)	83.3(75)	84.6(44)	96.7(59)	88.5(54)	96.7(58)	74.0(37)	85.3(64)	89.0(89)
Separated	1.3(11)	1.1(1)	2.2(2)	1.0(1)	0.0(0)	3.8(2)	0.0(0)	3.3(2)	0.0(0)	0.0(0)	1.3(1)	2.0(2)
Widow/widower	5.3(44)	16.5(15)	5.6(5)	10.0(10)	2.2(2)	5.8(3)	0.0(0)	4.9(3)	0.0(0)	0.0(0)	4.0(3)	3.0(3)
Single parent	0.2(2)	1.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.0(1)
Co-habiting	4.1(34)	6.6(6)	0.0(0)	11.0(11)	0.0(0)	1.9(1)	0.0(0)	0.0(0)	0.0(0)	22.0(11)	6.7(5)	0.0(0)
Level of Education of the household head												
None	40.0(332)	16.5(15)	55.6(50)	33.0(33)	30.0(27)	75.0(39)	86.9(53)	55.7(34)	86.7(52)	32.0(16)	1.3(1)	12.0(12)
Primary	32.4(269)	42.9(39)	25.6(23)	24.0(24)	35.6(32)	15.4(8)	6.6(4)	13.1(8)	8.3(5)	46.0(23)	46.7(35)	68.0(68)
O'level	19.4(161)	28.6(26)	12.2(11)	32.0(32)	26.7(24)	7.7(4)	0.0(0)	19.7(12)	5.0(3)	14.0(7)	40.0(30)	12.0(12)
A'level	2.2(18)	2.2(2)	2.2(2)	3.0(3)	6.7(6)	1.9(1)	0.0(0)	3.3(2)	0.0(0)	2.0(1)	0.0(0)	1.0(1)
Vocational Institution	2.2(18)	0.0(0)	2.2(2)	0.0(0)	0.0(0)	0.0(0)	3.3(2)	4.9(3)	0.0(0)	2.0(1)	8.0(6)	4.0(4)
Tertiary institution, University	3.4(28)	6.6(6)	2.2(2)	8.0(8)	1.1(1)	0.0(0)	1.6(1)	3.3(2)	0.0(0)	4.0(2)	4.0(3)	3.0(3)
Others	0.5(4)	3.3(3)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.6(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Level of Education of the spouse of the respondent												
None	50.2(417)	19.8(18)	55.6(50)	56.0(56)	65.6(59)	78.8(41)	91.8(56)	55.7(34)	85.0(51)	52.0(26)	5.3(4)	22.0(22)
Primary	29.8(247)	52.7(48)	20.0(18)	22.0(22)	16.7(15)	13.5(7)	3.3(2)	6.6(4)	10.0(6)	28.0(14)	62.7(47)	64.0(64)
O'level	12.4(103)	12.1(11)	11.1(10)	15.0(15)	10.0(9)	7.7(4)	3.3(2)	23.0(14)	5.0(3)	12.0(6)	26.7(20)	9.0(9)
A'level	1.3(11)	0.0(0)	3.3(3)	1.0(1)	4.4(4)	0.0(0)	0.0(0)	3.3(2)	0.0(0)	0.0(0)	1.3(1)	0.0(0)
Vocational Institution	1.4(12)	0.0(0)	2.2(2)	0.0(0)	2.2(2)	0.0(0)	1.6(1)	6.6(4)	0.0(0)	0.0(0)	2.7(2)	1.0(1)
Tertiary institution, University	1.7(14)	0.0(0)	1.1(1)	3.0(3)	0.0(0)	0.0(0)	0.0(0)	4.9(3)	0.0(0)	8.0(4)	1.3(1)	2.0(2)
Others	3.1(26)	15.4(14)	6.7(6)	3.0(3)	1.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	2.0(2)
Religion of household head												
Catholic	77.6(644)	81.3(74)	84.4(76)	94.0(94)	96.7(87)	96.2(50)	0.0(0)	49.2(30)	95.0(57)	80.0(40)	89.3(67)	69.0(69)
Protestant	10.6(88)	9.9(9)	5.6(5)	5.0(5)	1.1(1)	3.8(2)	34.4(21)	6.6(4)	0.0(0)	16.0(8)	6.7(5)	28.0(28)
Pentecostal	8.0(66)	8.8(8)	8.9(8)	1.0(1)	1.1(1)	0.0(0)	62.3(38)	8.2(5)	3.3(2)	2.0(1)	1.3(1)	1.0(1)
Seventh Day Adventist	2.5(21)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	3.3(2)	31.1(19)	0.0(0)	0.0(0)	0.0(0)	0.0(0)

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiripirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Muslim	0.7(6)	0.0(0)	1.1(1)	0.0(0)	1.1(1)	0.0(0)	0.0(0)	3.3(2)	1.7(1)	0.0(0)	1.3(1)	0.0(0)
Not religious	0.1(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.0(1)
Others	0.5(4)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.6(1)	0.0(0)	2.0(1)	1.3(1)	1.0(1)
Current main occupation												
Paid employee	3.9(32)	1.1(1)	10.0(9)	5.0(5)	5.6(5)	1.9(1)	0.0(0)	1.6(1)	0.0(0)	2.0(1)	8.0(6)	3.0(3)
Non-agricultural: self-employed WITH employees	3.4(28)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.9(1)	0.0(0)	0.0(0)	3.3(2)	24.0(12)	17.3(13)	0.0(0)
Non-agricultural: self-employed WITHOUT employees	15.3(127)	2.2(2)	35.6(32)	0.0(0)	4.4(4)	13.5(7)	11.5(7)	0.0(0)	66.7(40)	20.0(10)	30.7(23)	2.0(2)
Other unpaid family work	4.1(34)	0.0(0)	6.7(6)	0.0(0)	21.1(19)	5.8(3)	4.9(3)	0.0(0)	5.0(3)	0.0(0)	0.0(0)	0.0(0)
Domestic work	16.0(133)	0.0(0)	1.1(1)	38.0(38)	35.6(32)	30.8(16)	57.4(35)	8.2(5)	8.3(5)	0.0(0)	0.0(0)	1.0(1)
Seeking work	3.9(32)	1.1(1)	3.3(3)	3.0(3)	18.9(17)	13.5(7)	1.6(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
unpaid agricultural work (farming)	45.5(378)	91.2(83)	34.4(31)	50.0(50)	5.6(5)	3.8(2)	16.4(10)	83.6(51)	8.3(5)	36.0(18)	40.0(30)	93.0(93)
Paid agricultural work	1.3(11)	1.1(1)	4.4(4)	1.0(1)	1.1(1)	0.0(0)	0.0(0)	1.6(1)	1.7(1)	0.0(0)	1.3(1)	1.0(1)
None/too young	2.8(23)	0.0(0)	1.1(1)	0.0(0)	2.2(2)	25.0(13)	8.2(5)	0.0(0)	0.0(0)	4.0(2)	0.0(0)	0.0(0)
Others(specify)	2.7(22)	1.1(1)	3.3(3)	1.0(1)	1.1(1)	3.8(2)	0.0(0)	3.3(2)	6.7(4)	14.0(7)	1.3(1)	0.0(0)
Household size												
<3	0.7(6)	0.0(0)	0.0(0)	1.0(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	1.4(1)	4.0(4)
4-Mar	15.9(130)	13.2(12)	18.2(16)	9.1(9)	13.3(12)	16.7(8)	11.5(7)	13.1(8)	5.0(3)	34.0(17)	24.3(17)	21.0(21)
6-May	29.1(238)	33.0(30)	29.5(26)	22.2(22)	27.8(25)	35.4(17)	21.3(13)	18.0(11)	26.7(16)	40.0(20)	41.4(29)	29.0(29)
>6	54.3(444)	53.8(49)	52.3(46)	67.7(67)	58.9(53)	47.9(23)	67.2(41)	68.9(42)	68.3(41)	26.0(13)	32.9(23)	46.0(46)

## Appendix 2: Agriculture land and Assets ownership by Gender

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiripirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Have access to land for cultivation												
<b>All sample</b>	93.1(773)	100.0(91)	96.7(87)	96.0(96)	96.7(87)	61.5(32)	95.1(58)	86.9(53)	91.7(55)	92.0(46)	100.0(75)	93.0(93)
<b>Gender</b>												
<b>Males</b>	94.9(336)	100.0(34)	100.0(29)	95.0(57)	96.4(53)	65.0(13)	94.4(17)	89.5(17)	90.9(10)	95.2(20)	100.0(42)	97.8(44)
<b>Females</b>	91.8(437)	100.0(57)	95.1(58)	97.5(39)	97.1(34)	59.4(19)	95.4(41)	85.7(36)	91.8(45)	89.7(26)	100.0(33)	87.1(49)
Average size of land that one can access (in acres)												
<b>All sample</b>	5.5(0.3)	5.7(3.8)	7.0(6.3)	3.6(2.2)	4.2(2.7)	2.8(1.7)	2.5(1.3)	2.8(2.3)	3.1(1.5)	3.1(2.7)	4.9(1.9)	12.2(12.3)
<b>Gender</b>												
<b>Males</b>	6.0(6.4)	6.9(4.6)	8(7.8)	4.0(2.4)	4.3(2.5)	3.1(1.8)	2.9(1.3)	3.6(2.9)	3.4(1.8)	3.4(3.2)	5.2(1.9)	14.2(12.1)
<b>Females</b>	4.6(5.4)	5(3.1)	6.6(5.5)	2.9(1.7)	4.0(3.0)	2.6(1.6)	2.4(1.2)	2.4(1.9)	3(1.4)	2.8(2.2)	4.6(1.8)	10.4(12.2)
Own land												
<b>All sample</b>	74.1(615)	80.2(73)	70.0(63)	66.0(66)	93.3(84)	57.7(30)	90.2(55)	85.2(52)	65.0(39)	60.0(30)	80.0(60)	63.0(63)
<b>Gender</b>												
<b>Males</b>	79.7(282)	85.3(29)	82.8(24)	68.3(41)	96.4(53)	65.0(13)	94.4(17)	84.2(16)	90.9(10)	57.1(12)	80.0(34)	73.3(33)
<b>Females</b>	70.0(333)	77.2(44)	63.9(39)	62.5(25)	88.6(31)	53.1(17)	88.4(38)	85.7(36)	59.2(29)	62.1(18)	78.8(26)	54.6(30)
Average size of land owned alone in (SD)	4.1(0.2)	3.2(3.3)	6.3(7.3)	2.0(2.7)	4.0(2.7)	3.3(2.4)	1.8(1.8)	2.7(2.1)	2.1(1.1)	2.9(2.3)	4.5(2.2)	9.5(7.9)
Average size of land owned Jointly (SD)	5.0(0.2)	4.5(3.9)	5.6(7.2)	3.6(2.5)	5.6(3.6)	3.3(2.2)	3.6(4.0)	3.2(2.6)	3.7(1.9)	2.6(2.4)	4.1(2.4)	12.2(12.0)
Household own a mobile phone												
<b>All sample</b>	69.0(573)	63.7(58)	75.6(68)	68.0(68)	73.3(66)	57.7(30)	50.8(31)	70.5(43)	50.0(30)	80.0(40)	84.0(63)	76.0(76)
<b>Gender</b>												

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiripirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
<b>Males</b>	82.6	73.5(25)	86.2(25)	78.3(47)	85.5(47)	65.0(13)	88.9(16)	84.2(16)	81.8(9)	90.5(19)	92.9(39)	82.2(37)
<b>Females</b>	58.8	57.9(33)	70.5(43)	52.5(21)	54.3(19)	53.1(17)	34.9(15)	64.3(27)	42.9(21)	72.4(21)	72.7(24)	70.9(39)
Mobile phone in a functioning state	94.6(542)	79.3(46)	97.1(66)	97.1(66)	98.5(65)	76.7(23)	87.1(27)	100.0(43)	100.0(30)	100.0(40)	100.0(63)	96.1(73)
Household own a bicycle												
<b>All sample</b>	32.7(271)	29.7(27)	36.7(33)	21.0(21)	15.6(14)	28.8(15)	1.6(1)	8.2(5)	23.3(14)	46.0(23)	80.0(60)	58.0(58)
<b>Gender</b>												
<b>Males</b>	40.4(143)	41.2(14)	51.7(15)	21.7(13)	18.2(10)	25.0(5)	5.1(1)	0.0(0)	54.6(6)	61.9(13)	88.1(37)	64.4(29)
<b>Females</b>	26.9(128)	22.8(13)	29.5(18)	20.0(8)	11.4(4)	31.3(10)	0.0(0)	11.9(5)	16.3(8)	34.5(10)	69.7(23)	52.7(29)
Bicycle in a functioning state	73.4(199)	25.9(7)	87.9(29)	81.0(17)	78.6(11)	60.0(9)	100.0(1)	100.0(5)	78.6(11)	78.3(18)	86.7(52)	67.2(39)
Household own a radio												
<b>All sample</b>	30.7(255)	29.7(27)	20.0(18)	23.0(23)	20.0(18)	26.9(14)	13.1(8)	21.3(13)	11.7(7)	32.0(16)	74.7(56)	55.0(55)
<b>Gender</b>												
<b>Males</b>	38.7(137)	38.2(13)	34.5(10)	23.3(14)	23.6(13)	35.0(7)	27.8(5)	26.3(5)	18.2(2)	47.6(10)	78.6(33)	55.6(25)
<b>Females</b>	24.8(118)	24.6(14)	13.1(8)	22.5(9)	14.3(5)	21.9(7)	7.0(3)	19.1(8)	10.2(5)	20.7(6)	69.7(23)	54.6(30)
Radio in a functioning state	85.1(217)	74.1(20)	100.0(18)	78.3(18)	88.9(16)	92.9(13)	75.0(6)	92.3(12)	71.4(5)	87.5(14)	87.5(49)	83.6(46)
Household own a motorcycle												
<b>All sample</b>	6.6(55)	3.3(3)	5.6(5)	6.0(6)	8.9(8)	7.7(4)	6.6(4)	6.6(4)	0.0(0)	6.0(3)	18.7(14)	4.0(4)
<b>Gender</b>												
<b>Males</b>	6.8(24)	0.0(0)	10.3(3)	3.3(2)	3.6(2)	0.0(0)	5.6(1)	10.5(2)	0.0(0)	4.8(1)	28.6(12)	2.2(1)
<b>Females</b>	6.5(31)	5.3(3)	3.3(2)	10.0(4)	17.1(6)	12.5(4)	7.0(3)	4.8(2)	0.0(0)	7.0(2)	6.1(2)	5.5(3)

Variable	All sample n=830	Abim n=91	Kotido n=90	Karenga n=100	Kaabong n=90	Moroto n=52	Amudat n=61	Nakapiripirit n=61	Nabilatuk n=60	Napak n=50	Katakwi n=75	Kitgum n=100
Motorcycle in a functioning state	83.6(46)	66.7(2)	80.0(4)	83.3(5)	62.5(5)	100.0(4)	100.0(4)	100.0(4)	0.0()	100.0(3)	78.6(11)	100.0(4)

### Appendix 3: Maize marketing

Variable	All sample	Abim	Kotido	Karenga	Kaabong	Moroto	Amudat	Nakapiripir it	Nabilatuk	Napak	Katakwi	Kitgum
Maize	55.9(464)	67.0(61)	47.8(43)	48.0(48)	85.6(77)	42.3(22)	80.3(49)	65.6(40)	38.3(23)	36.0(18)	62.7(47)	36.0(36)
Sold the output from the maize crop	26.8(124)	29.5(18)	9.3(4)	35.4(17)	11.8(9)	13.6(3)	18.8(9)	60.0(24)	34.8(8)	44.4(8)	38.3(18)	16.7(6)
Average quantity of the sold crops/yield in (kgs)(sd)	249.4(44.5)	181.6(234.5)	224(155.8)	252.5(254.6)	81.3(80.7)	47.3(46.5)	588(1037.5)	428.2(996.2)	62.8(60.7)	244.6(509.1)	264.2(148.9)	195.8(201.1)
Form sold the output from the crop												
Processed	42.8(62)	10.5(2)	0.0(0)	58.8(10)	81.0(17)	0.0(0)	73.3(11)	0.0(0)	44.4(4)	0.0(0)	73.7(14)	66.7(4)
Unprocessed	57.2(83)	89.5(17)	100.0(4)	41.2(7)	19.0(4)	100.0(2)	26.7(4)	100.0(24)	55.6(5)	100.0(9)	26.3(5)	33.3(2)
Markets have you been able to access for this crop												
Local markets/ Sub County	42.7(132)	26.7(16)	100.0(19)	81.0(17)	30.0(15)	100.0(3)	35.0(14)	63.2(24)	46.7(7)	25.0(2)	34.6(9)	20.7(6)
Within my district	17.2(53)	1.7(1)	79.0(15)	33.3(7)	12.0(6)	33.3(1)	2.5(1)	0.0(0)	53.3(8)	25.0(2)	46.2(12)	0.0(0)
National markets (Outside the district)	2.9(9)	0.0(0)	0.0(0)	4.8(1)	2.0(1)	0.0(0)	65.0(26)	0.0(0)	0.0(0)	75.0(6)	3.9(1)	0.0(0)
None	51.8(160)	73.3(44)	0.0(0)	14.3(3)	72.0(36)	0.0(0)	0.0(0)	36.8(14)	46.7(7)	0.0(0)	26.9(7)	79.3(23)
Role played for the crop												
Input supplier	0.3(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	2.5(1)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Producer	95.0(322)	98.4(60)	95.0(19)	91.3(42)	100(58)	66.7(2)	97.5(39)	100.0(25)	76.5(13)	66.7(6)	92.0(23)	100.0(35)
Trader	2.9(10)	1.6(1)	5.0(1)	0.0(0)	0.0(0)	33.3(1)	0.0(0)	0.0(0)	23.5(4)	33.3(3)	0.0(0)	0.0(0)
Processor	1.8(6)	0.0(0)	0.0(0)	8.7(4)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	8.0(2)	0.0(0)
challenges have you encountered in each of the roles?												
Fluctuating prices	63.2(180)	6.4(3)	95.0(19)	46.0(17)	72.7(40)	100.0(3)	70.0(21)	91.7(22)	63.6(7)	55.6(5)	78.3(18)	96.2(25)
High transportation costs	51.6(147)	10.6(5)	75.0(15)	62.2(23)	56.4(31)	33.3(1)	83.3(25)	54.2(13)	72.7(8)	77.8(7)	56.5(13)	53.9(14)
Distance	47.0(134)	21.3(10)	85.0(17)	35.1(13)	30.9(17)	33.3(1)	63.3(19)	75.0(18)	0.0(0)	77.8(7)	65.2(15)	34.6(9)
Others	21.8(62)	78.7(37)	35.0(7)	5.4(2)	5.5(3)	0.0(0)	6.7(2)	0.0(0)	18.2(2)	11.1(1)	30.4(7)	3.9(1)
Have been able to access agro processing operators in the last 12months	25.4(87)	41.7(25)	7.1(1)	40.0(18)	3.6(2)	33.3(1)	0.0(0)	51.5(17)	50.0(8)	55.6(5)	23.1(6)	11.4(4)
How far are the nearest agro processing operators/ facilities? (Km)												
<5 KMs	45.9(84)	66.7(20)	100.0(2)	100(22)	41.0(16)	0.0(0)	0.0(0)	59.4(13)	27.3(3)	22.2(2)	50.0(3)	10.0(3)
5-10kms	21.9(40)	30.0(9)	0.0(0)	0.0(0)	0.0(0)	100.0(2)	10.0(1)	36.4(8)	63.6(7)	11.1(1)	33.3(2)	33.3(10)
>10kms	32.2(59)	3.3(1)	0.0(0)	0.0(0)	59.0(23)	0.0(0)	90.0(9)	4.6(1)	9.1(1)	66.7(6)	16.7(1)	56.7(17)

## Appendix 4: Beans marketing

Variable	All sample	Abim	Kotido	Karenga	Kaabong	Moroto	Amudat	Nakapiripirit	Nabilatuk	Napak	Katakwi	Kitgum
Beans	43.7(363)	86.8(79)	47.8(43)	17.0(17)	70.0(63)	25.0(13)	24.6(15)	50.8(31)	78.3(47)	22.0(11)	24.0(18)	26.0(26)
Sold the output from the crop	26.1(94)	34.6(27)	9.3(4)	47.1(8)	19.4(12)	16.7(2)	13.3(2)	45.2(14)	21.3(10)	27.3(3)	33.3(6)	23.1(6)
8. Form one sold the output from the beans												
Processed	47.7(53)	7.1(2)	75.0(3)	62.5(5)	88.0(22)	0.0(0)	0.0(0)	7.7(1)	83.3(10)	0.0(0)	83.3(5)	71.4(5)
Unprocessed	52.3(58)	92.9(26)	25.0(1)	37.5(3)	12.0(3)	100.0(2)	100.0(1)	92.3(12)	16.7(2)	100.0(5)	16.7(1)	28.6(2)
Role played for the bean production												
Producer	94.4(251)	98.7(78)	90.5(19)	75.0(12)	100.0(47)	100.0(2)	100.0(13)	100.0(15)	80.0(24)	100.0(5)	91.7(11)	96.2(25)
Trader	4.1(11)	1.3(1)	9.5(2)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	20.0(6)	0.0(0)	8.3(1)	3.8(1)
Processor	1.5(4)	0.0(0)	0.0(0)	25.0(4)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)	0.0(0)
Have been able to access agro processing operators in the last 12months	12.0(31)	16.4(12)	0.0(0)	13.3(2)	4.7(2)	0.0(0)	0.0(0)	25.0(6)	14.8(4)	20.0(1)	16.7(2)	7.7(2)

### Appendix 3: Potential investment opportunities in Karamoja

Sectors	Opportunities	Stakeholders	Sources
Minerals and Natural Resources	<p>300 million tonnes of marble (NPA, 2021).</p> <p>A 2011 survey by the Uganda department of geological survey and mines at the Ministry of Energy found that Karamoja is endowed with minerals including gold, limestone, uranium, marble, graphite, gypsum, iron, wolfram, nickel, copper, cobalt, lithium, tin, zircon, columbite, magnetite, beryl, cuprite, mica, hematite, and talc (UIA, 2016).</p>	<p>Uganda Investment Authority.</p> <p>Ministry of Energy and Minerals Development.</p>	<p>NPA, (NDPIII)</p> <p>Uganda Investment Authority (UIA)</p>
Trade and Industry, Manufacturing	<p>Support restaurants and MSME's with financing to boost trade and employment of women and youth.</p>	<p>Private Sector Foundation Uganda (PSFU).</p> <p>Uganda Small Scale Association (USSA)</p>	
Energy	<p>Taking advantage of the large number of cattle in the region to venture into biogas enterprises for domestic and small and medium businesses to avert climate change.</p>	<p>Ministry of Agriculture Animal Industry and Fisheries (MAAIF).</p> <p>Ministry of Energy and Minerals Development.</p>	<p>Uganda Investment Authority (UIA)</p>
Agriculture	<p>80 percent of the household's own livestock and this represents approximately 20 percent of the national cattle herd, 16 percent of the goats, 50 percent of the goats, and 50 percent of the sheep. Economically, the people obtain products such as dairy products milk, ghee, yoghurt; meat, skins, leather, tanning, and slaughter cull stocks (UIA, 2016).</p> <p>Invest in the development of the apiary industry through creating reliable and consistent market supply chain for honey and other hive products. Further, investment in sustainable harvesting of valuable indigenous tree products with a particular focus on shea butter, khat, desert date, and sandalwood. Also, in fruit orchards like mangoes, oranges (UIA, 2017).</p> <p>Karamoja sub-region has one of the most fertile soils in Uganda and with one rainy season, crop production is</p>	<p>Ministry of Agriculture Animal Industry and Fisheries (MAAIF).</p> <p>Uganda Investment Authority.</p>	<p>NPA, (NDPIII),</p> <p>USAID (Karamoja CSI)</p> <p>Uganda Investment Authority (UIA)</p>



	<p>mainly rain fed. Dominant Crops grown are sorghum, maize, finger millet and cowpeas but these are supplemented by beans, groundnuts, cassava, and sweet potatoes (UIA, 2016). Furthermore, this can be enhanced through value addition and contracting farming by providing seeds, inputs, Training and adoption of smart climate change techniques and market linkages.</p> <p>Cereals (Sorghum); Vegetable oil (sunflower) (NPA, 2021).</p> <p>Livestock export to Kenya and South Sudan (USAID, 2017).</p> <p>Livestock opportunities are not limited to cattle, but also smaller animals such as sheep, goats, and poultry (USAID, 2017).</p> <p>Opportunities for promoting food security, business, increased incomes, and labour (as with draught animals), exist along the entire livestock value chain from production, supply, and processing to the final consumer level (USAID, 2017).</p>		
Tourism	<p>The region is endowed with wildlife, forestry, landscape, palaeontological and cultural tourism assets. Wildlife conservation covers 12 percent and 41 percent of land respectively. These offers untapped comparative advantage for local economic development, several herbs and medicinal products for livestock and livestock are derived from the trees, building materials, gums, resins, are extracted from these different tree species (UIA, 2021).</p>	<p>Ministry of Tourism, Wildlife and Antiquities.</p> <p>National Forestry Authority (NFA)</p>	
Human Capital Development	<p>Expanding off-farm livelihoods, especially outside of agriculture and livestock, including but not limited to, literacy, business skills, vocational and “soft” skills, financial inclusion, access to credit or grants, and employability to assist communities and households manage the risks inherent in climate-sensitive livelihoods, and engage youth and vulnerable urban populations (USAID, 2017).</p>	<p>Ministry of Education and Sports (MOES). Private Sector Foundation Uganda (PSFU). Vocational Institutions, Directorate of Industrial Training. Uganda Banking Institute (UBI).</p>	USAID (Karamoja CSI)

		Uganda Bankers Association (UBA). Ministry of Gender Labour and Social Development	
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