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**Open Sesame: A Value Chain Analysis of
Sesame Marketing in Northern Uganda**

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Abstract

Uganda is the world's fifth largest producer of sesame. The northern and eastern regions are the main centres of production. Almost all the sample farmers had grown sesame in the two crop-growing seasons in 2009-2010. The mean area planted to sesame was 0.37 ha across the two seasons, and the mean production was 222 kilograms per household. On average 77 % of the sesame produced reached the market with each household selling 173 kilograms. Gross income from improved varieties produced for grain averaged \$ US 282 per household or \$ US 56 per head assuming a family of five. This represented an additional \$ US 92 per household or \$ US 18 per head over the corresponding income from local varieties of sesame. These results suggest that sesame can make a significant contribution to household income in the Northern Region. The challenges to sesame production at the farm level include: lack of equipment for land preparation, which leads to late planting; crop losses from pests and diseases, which reduces yields; non-availability of seed; and labor, particularly for weeding the crop which is sown broadcast. Smallholders produce small amounts, their bargaining power is weak and prices are low. A sesame value chain map was developed showing the volume handled by the various actors along the chain as the commodity moves from farm gate to the consumers and export markets. The study found that, of the total sesame produced, 77 % is sold. Of the total sesame produced, 42 % is exported, 10 % is sold to urban consumers, and 25 % is sold to rural consumers. Therefore, only half of the sesame that is produced leaves the production regions to regional and export markets. The market structure involves numerous traders, which reduces the farmer's share of the final price. On average, the farmer receives 70 % of the ex-local assembly level price and 60 % of the ex-regional level price. Thus, if farmer were to sell collectively at regional level there is potential for a 10 percent increase in prices compared selling at the farm gate. Traders reported the most important traits were grain color (86%), cleaned grains (71%) and percentage of foreign matter (54%). Traders preferred white colored grains when buying sesame. Sesame II, an improved variety promoted by this project, is white in color and therefore has high market demand. Nonetheless, traders did not report rejection based on grain color. The majority of traders had no shape preference in either buying or selling. Interviews with traders indicated that buyers were satisfied with quality of sesame on offer and 80 % reported that the quality of sesame in the market was improving. Unlike traders, exporters and rural assemblers gave a higher priority to cleanliness. The problem of cleanliness of arises during the shelling and drying stages of sesame harvesting. Most farmers thresh and dry sesame on the bare ground, this leads to unclean sesame grains since sesame becomes mixed with soil. Uganda is the world's sixteenth largest exporter, by volume. All sesame exports from Uganda are as raw seed rather than oil and other processed products. The three major export markets are Europe (Austria, Denmark, Germany and Switzerland), the Middle East (Turkey, Egypt and United Arab Emirates) and the Far East (Singapore, Japan and China). Sesame exported to Europe and the Middle East is used primarily for the cuisine and confectionery industry while exports to the Far East are used primarily for extracting sesame oil. Access to the European market has stringent certification and standardization requirements. Europe pays the highest value per unit for Uganda sesame, but accounts for only a small share of the total volume of exports. Most Uganda sesame is exported to the United Arab Emirates and China which pay the third lowest and the second lowest prices, respectively. Targeting the European market will increase the average unit price of exported sesame and the total value of exports. However,

markets in the Far-East and China do not discriminate based on quality and have little if any requirements for entry. Consequently, farmer and traders have no incentive to invest in practices that will increase eligibility of sesame for access to higher value markets. Only one Ugandan firm (Shares Uganda) exports organically certified sesame creating a niche market and receiving premium prices. However, the distinction between organic and conventional sesame is unclear since few if any growers use inorganic chemicals in sesame production. Shares Uganda had invested in forming producer groups and increased the traceability of producers, as well as investing in mechanized cleaning and sterilization equipment. However, at local and regional levels no difference was found between the price of conventional and organic sesame.

Keywords: *Business Models, Dryland Cereals, Sorghum, Millets*

JEL classification: O200

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Acronyms

| | |
|-----------|--|
| ADA | Austrian Development Agency |
| BMF | Federal Ministry of Finance |
| FAO | Food and Agriculture Organization |
| GLOBALGAP | Global Good Agricultural Practices |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IPGRI | International Plant and Genetic Resources Institute |
| ITC | International Trade Centre |
| MAAIF | Ministry of Agriculture, Animal Industry and Fisheries |
| NARO | National Agricultural Research Organization |
| NaSAARI | National Semi Arid Resources Research Institute |
| NGO | Non-Governmental Organization |
| NOGAMU | National Organic Agricultural Movement of Uganda |
| SWOT | Strengths, Weaknesses, Opportunities, Threats |
| UBOS | Uganda Bureau of Statistics |
| UOSPA | Uganda Oil Seeds Processors Association |

1. Introduction

1.1. Background

Sesame has been cultivated since antiquity (IPGRI 2004). Grown mainly in the tropics, sesame production is dominated by smallholders in developing countries. Sesame production in Uganda between 2004 and 2008 averaged 158,600 tonnes/year (FAO, 2010). Uganda is the world's fifth biggest producer of sesame after India (666,020), China (627,333), Myanmar (511,800) and Sudan (333,600) (FAO, 2010). Until 2002, the production of sesame in Uganda stagnated because of insecurity in the Northern region which is the main centre of production. Recently, with peace and improved security in the main producing region, sesame production has grown both in volume and in value. Between 2002 and 2008 sesame production in Uganda grew by 66 % (from 106,000 to 173,000 tonnes) while the area planted to sesame increased by 38 % (from 211,000 to 286,000 Ha) (Figure 1).

Valued for its small white nutritious seeds, sesame (*Sesamum indicum* L.) is locally known as *simsim* in East Africa. The crop is grown in Northern and some parts of Eastern and Western Uganda (Ashri, 2007). It is a high value crop with ready domestic, regional and international markets. Sesame is produced by smallholder farmers who grow it both for home consumption and as a cash crop. With the recent surge in global demand for sesame and sesame oil, farmers in Uganda have turned increasingly to growing sesame as a cash crop, earning it the nickname 'white gold' in Northern Uganda.

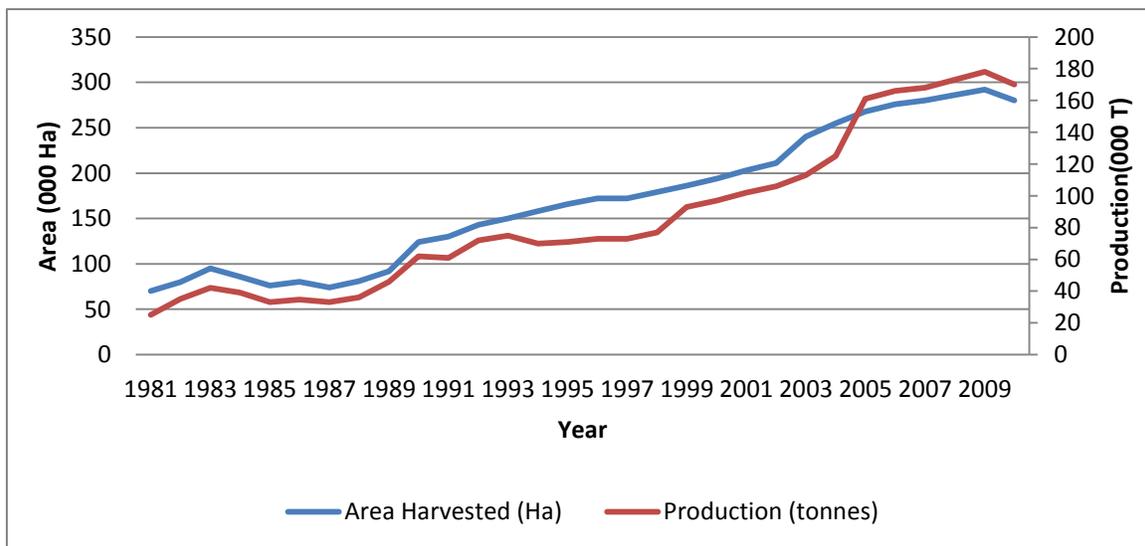


Figure 1: Trends in sesame Area and Production in Uganda 1981-2009

Sesame derives its high value from its many uses both in domestic and export markets. The crop is used as an additive for bread and confectionery industry, for food in Middle Eastern cuisines, and as a source of valuable and high quality oil (44 to 55 % oil content). Sesame oil is traded internationally and is rich in vitamin E and has a significant amount of linoleic acid that can control blood cholesterol levels. In addition, the protein content of the seed is about 26 % and the sulphur containing amino acid methionine is present at a concentration of about 3.4 % (IPGRI 2004) Further, the oil has medicinal and pharmaceutical value and is being used in many health care products. The seed also has antioxidants lignans such as sesamol and sesamin and used as active ingredients in antiseptics, bactericides, viricides and disinfectants. After oil extraction, the remaining meal contains high amount of proteins and calcium which is an ingredient in the animal feed industry. These qualities make sesame a prime commodity in the global market and therefore one with great potential for poverty alleviation, food and nutrition security, household income generation and an important earner of foreign exchange for Uganda.

1.2. Sesame Improves Livelihoods for Farmers Project

This report is an output from *Sesame improves livelihoods of farmers: Enhancing agricultural productivity and profitability in Northern Uganda*, a project funded by Federal Ministry of Finance (BMF), through the Austrian Development Agency (ADA). The overall objective of the project was to increase incomes of smallholder farmers in West Nile, Acholi, Lango and Teso regions of Uganda (Figure 2). The project envisioned that more than 20,000 farmers would benefit with at least a 20 % increase in income. The project explored alternative institutional arrangements for linking farmers to markets, standardizing quality grades, strengthening value chains and providing reliable market information to facilitate smallholder market participation and trade at different levels. One viable strategy to reduce transaction costs is for smallholder producers to evolve new forms of organization through collective action that would help coordinate production and marketing functions.

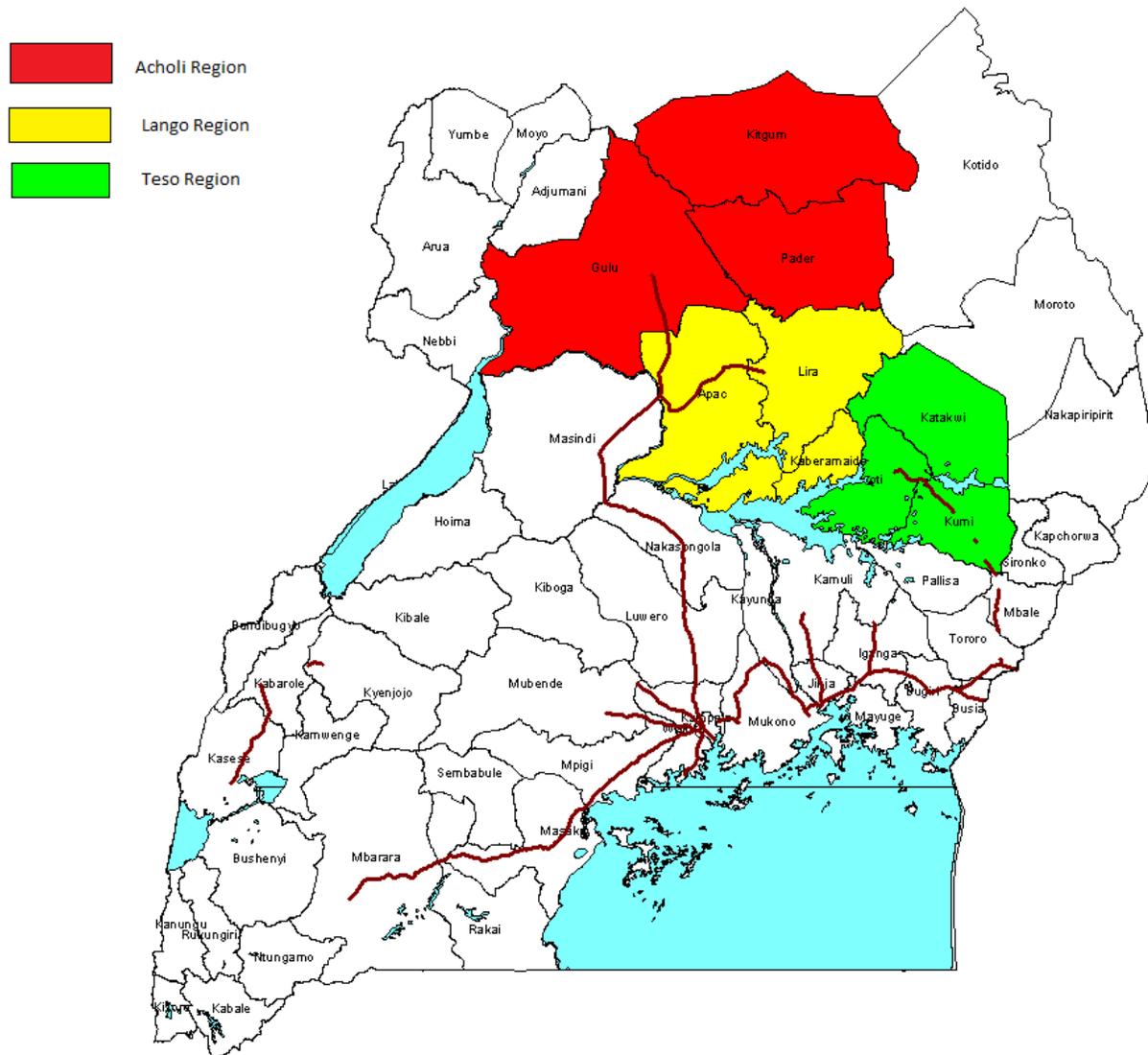


Figure 2: Map of Project Regions

2. Objectives

2.1. Sesame Improves Livelihoods for Farmers Project

The general objective of this study was to map the value chain for sesame for both the local and export markets, in order to identify opportunities to enhance the incomes of growers and other actors in the value chain.

The four specific objectives were to:

1. Describe the structure and functioning of the value chain;

2. Measure the economic returns to participants along the value chain;
3. Identify market constraints and opportunities; and
4. Identify opportunities for market expansion.

3. Data and Methods

3.1. Value Chain Analysis

The challenges of sesame marketing can be addressed through a better understanding of the linkages between the farmers, traders and other actors along the commodity value chain. The value chain concept is a systems approach that draws from different disciplines; as a systems approach it combines component and functional relationships (Da Silva and De Souza Filho, 2007).

There are a variety of approaches to conducting a value chain analysis. Some rely heavily on qualitative tools while others propose a combination of qualitative and quantitative tools in carrying out a value chain analysis. Hellin (2006) proposed that the value chain analysis should commence with delineating the value chain by creating a map of the market. This market map aids in building an understanding of different players or actors in an input or output value chain. The market map also helps in identifying the relationships between the actors as well as the factors that determine how well or badly the value chain is working. After understanding the different actors one is able to identify the different tools to use for different actors such as trader surveys.

Value chain mapping involves creating visual representation between businesses in value chains as well as other market players. It helps illustrate and understand the process that an agricultural commodity goes through from the farm gate until it reaches the final consumer. A value chain map is also useful in identifying and categorizing key market players and support organizations. The value chain illustrates the different market channels that a product takes before reaching the final consumer. Therefore a value chain is an important tool to use for identifying bottlenecks, as well as possible opportunities that may not be apparent otherwise.

3.2. Survey Methods

A combination of qualitative tools and quantitative tools were used for different categories of actors along the value chain. Structured questionnaire were used to collect quantitative data from farm households and local traders. Checklists and unstructured interviews were used to obtain qualitative data from key actors along the value chain, including established sesame dealers at regional markets, exporters, officials from the Ministry of Agriculture, Non-Governmental Organisations (NGOs) and industry associations.

A Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis was used with sesame seed traders to assess the internal and external factors that affect the performance of the trade now and in the future. The SWOT tool is a 2 x 2 way analysis where strengths/weaknesses (internal factors) and opportunities/threats (external factors) are presented. A SWOT analysis is a subjective assessment of data organized in a logical order that helps in understanding, presentation, discussion and decision making.

The field work for the study was carried out in two phases. A reconnaissance visit was made in November, 2010 to interview various stakeholders in order to familiarize ourselves with the issues of sesame production and marketing and to identify the data to be collected by a formal quantitative survey. This was followed by a value chain survey in February, 2011. Since marketing of sesame peaks in January and February, this was the most appropriate period to meet producers, traders, transporters, processors, exporters as well as other organizations that play important roles in the regulation of sesame trade.

3.3. Sampling

The sample farmers and traders were selected using a multistage sampling procedure based on the following criteria and considerations. First, we purposely selected three regions (Teso, Lango and Acholi) that constituted the project area. To capture the marketing activity from the grassroots (sub-county) level to the regional markets, two grass roots centres and the major regional centre were selected for the study, giving a total of six sub-counties in the three regions. Secondly, with the assistance of NaSSARI, two farmer groups were randomly selected from the list of groups that had participated in each selected centre.. A list of members for each farmer group was made and three respondents were drawn using systematic random selection to participate in the survey. To capture project spill overs and capture the behaviour of non-group members, two neighbours for each group member were interviewed as a control. In total 71 farm households were sampled.

Traders were randomly selected from the trading centre nearest to the farmer group as well as from the regional centres to capture the flow of sesame from the grassroots to regional centres and eventually to the capital city. Qualitative information was collected from stakeholder in all the grassroots to the national level using snowballing technique. In total 48 traders were sampled.

Tables 1 and 2 present the sample distribution for the farmer and traders, respectively.

Table 1: Distribution of Sampled Farmers

| Item | Region | | | | Total |
|---------------------------|--------|-------|------|---------|-------|
| | ACHOLI | LANGO | TESO | Kampala | |
| No of farmers by region | 17 | 19 | 35 | | 71 |
| No of farmers by district | | | | | |
| Alebtong | 0 | 10 | 1 | | 11 |
| Amuria | 0 | 0 | 6 | | 6 |
| Dokolo | 0 | 9 | 0 | | 9 |
| Kaberamaido | 0 | 0 | 15 | | 15 |
| Kole | 0 | 0 | 13 | | 13 |
| Pader | 17 | 0 | 0 | | 17 |
| No of Districts | 1 | 2 | 3 | | 6 |
| No of Sub counties | 3 | 2 | 3 | | 8 |
| No of Villages | 6 | 4 | 7 | | 17 |

Table 2: Distribution of Sampled Traders

| Traders | Markets | ACHOLI | LANGO | TESO | Kampala | |
|-------------------|---|--------|-------|------|---------|----|
| | Egwenya | 1 | 0 | 0 | | 1 |
| | Kaberamaido | 0 | 0 | 4 | | 4 |
| | Kangai | 0 | 3 | 0 | | 3 |
| | Lira | 0 | 11 | 0 | | 11 |
| | Okapel | 2 | 0 | 0 | | 2 |
| | Otongodel | 1 | 0 | 0 | | 1 |
| | Owalo | 2 | 0 | 0 | | 2 |
| | Soroti | 0 | 0 | 4 | | 4 |
| | Total | 6 | 14 | 8 | | 28 |
| Trader Categories | Rural open air retailers/ assemblers | 2 | 2 | 1 | | 5 |
| | Rural wholesalers | 3 | 2 | 0 | | 5 |
| | Urban wholesalers | 0 | 7 | 5 | | 12 |
| | Exporters | 0 | 2 | 0 | 4 | 6 |
| | Urban retail shopkeepers | 0 | 3 | 1 | 3 | 7 |
| | Supermarkets | 0 | 0 | 0 | 4 | 4 |
| | Urban open air retailers | 0 | 0 | 1 | | 1 |
| | Lango organic | 1 | 0 | 0 | | 1 |
| | Total | 6 | 14 | 8 | 11 | 41 |

4 Results and Discussion

4.1. Actors Along the Value Chain

Figure 3 presents a schematic picture of the sesame marketing system. The sesame value chain is composed of various actors who include producers, traders at different administrative levels (sub-county, county, district and regional levels), transporters, small-scale and large-scale processors and exporters. Other institutions that have a bearing on sesame marketing include: the Ministry of Agriculture, the National Agricultural Research System, (particularly the National Semi-Arid Resource Research Institute (NaSSARI), which is mandated to develop improved sesame varieties), Uganda Oil Seed Producers Association (UOSPA) an oil industry stakeholder association, Non-Governmental Organisations (NGOs) working to improve livelihoods in the north and eastern regions of Uganda as well as certification bodies especially certification of organic products.

The study identified the following major actors in the sesame value chain, described below:

Farmers: 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.

Traders: 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. 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 centres 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 urban wholesale traders: these actors are found at regional market centres such as Soroti, Lira, Jinja 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 centres or transport bulked sesame to exporters based in Kampala.

Exporters and Processors: Most exporters and processors are found in the capital city Kampala. However, some exporters have buying centres in the production regions, mainly West Nile Gulu and Lira. In Kampala, exporters screen, clean and bag sesame into 50 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. Domestic processors are smaller 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 groups and 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.

Governmental bodies and the National Agricultural Research System: The Ministry of Agriculture is involved in framing agricultural policy and regulations while the National

Agricultural Research Organisation (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 as a whole.

Non-Governmental Organizations: Several NGOs operate in northern and eastern Uganda, working with clusters of farmers to promote improved livelihoods through promotion of improved technologies, linking farmers to markets through formation of groups and dissemination of market information, promotion of organic agricultural practices through farmer training and facilitation of certification of organic produce. The NGOs included NGETA and Concern International (CI) that work on improving rural livelihoods, Lango organic farming, and National Organic Agricultural Movement of Uganda (NOGAMU), two NGOs that promote certification of organic products in Uganda.

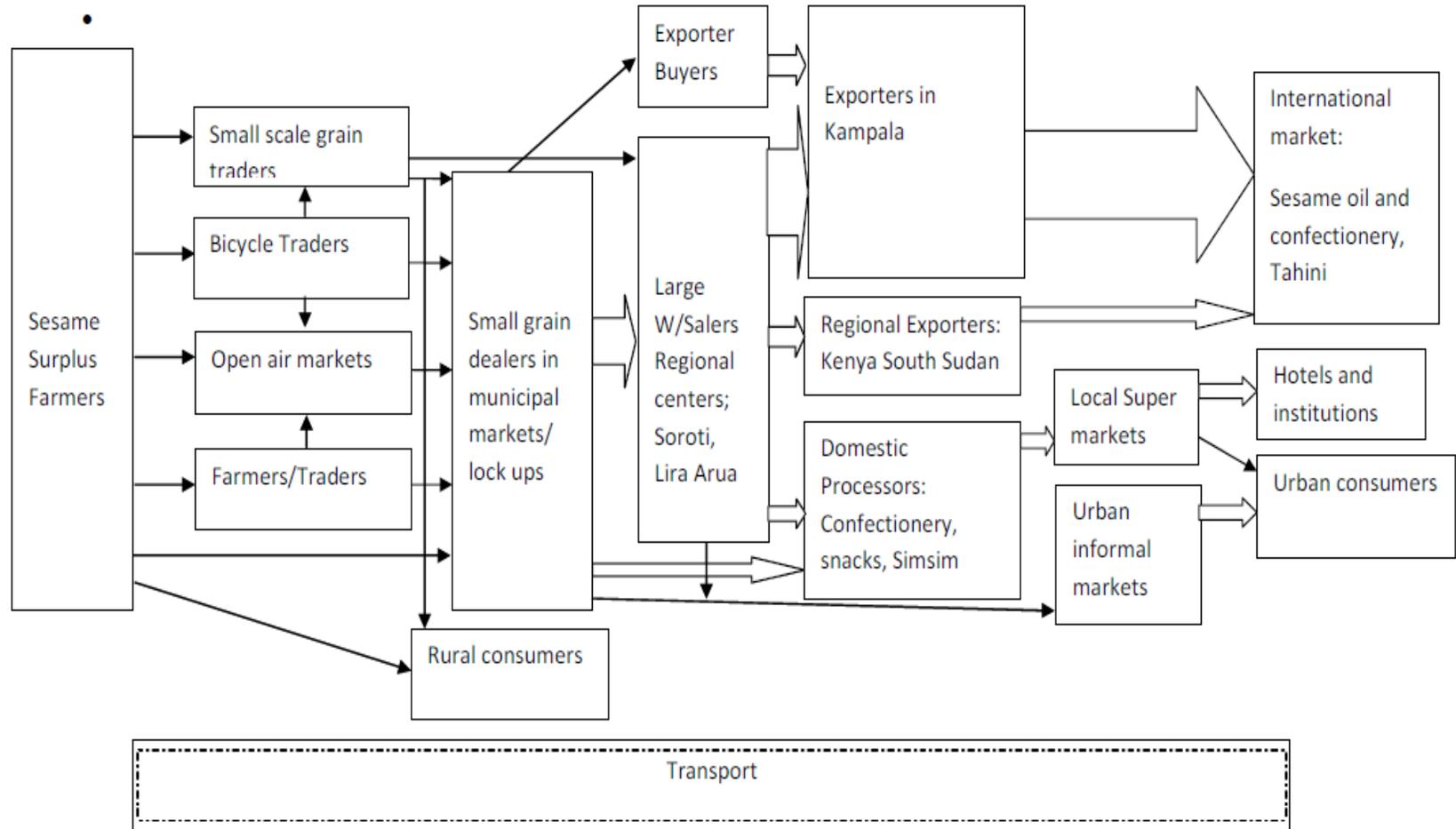


Figure 3: Structure of Sesame Marketing System in Uganda

4.2. Sesame Production

4.2.1 Cropping Systems in Northern Uganda

Table 3 shows the average number of farmers growing each crop and the mean area planted to different crops in the survey regions. Of the sample farmers, 97 % grew sesame, and the area planted to sesame averaged 0.37 ha across the two seasons. A higher share of sesame growers grew the crop in the first season (63 %) compared to the second season (56 %).

Sesame was the most popular oil crop. About 30 % of the sample planted sunflower and 23 % planted soybean. However, the average area planted to these crops (0.5 ha for sunflower and 0.43 ha for soybean) was larger than the average area planted to sesame. Growers in Lango region had the largest area planted to sesame (0.42 ha), followed by Teso (0.32 ha). The agro-ecology in the Lango region is more favorable for sesame production and the marketing system is well-developed.

Table 3 Crop Area by season (ha)

| Crop | First Season | | Second Season | | Total | | Area Under Crop by Region | | |
|--------------|-----------------|-----------|-----------------|-----------|-----------------|-----------|---------------------------|-------|------|
| | Percent Growing | Mean Area | Percent Growing | Mean Area | Percent Growing | Mean Area | ACHOLI | LANGO | TESO |
| Sesame | 63 | 0.28 | 56 | 0.26 | 97 | 0.37 | 0.33 | 0.43 | 0.35 |
| Cassava | 63 | 0.21 | 20 | 0.20 | 65 | 0.27 | 0.22 | 0.26 | 0.29 |
| Millet | 46 | 0.21 | 23 | 0.12 | 48 | 0.26 | 0.35 | 0.33 | 0.20 |
| Maize | 45 | 0.36 | 25 | 0.46 | 49 | 0.57 | 0.31 | 0.45 | 0.75 |
| Beans | 39 | 0.25 | 39 | 0.25 | 68 | 0.29 | 0.27 | 0.37 | 0.27 |
| Soybean | 24 | 0.36 | 7 | 0.27 | 24 | 0.43 | 0.35 | 0.40 | 0.49 |
| Groundnuts | 24 | 0.16 | 4 | 0.15 | 23 | 0.20 | 0.21 | 0.17 | 0.19 |
| Sunflower | 18 | 0.30 | 21 | 0.44 | 30 | 0.50 | 0.00 | 0.42 | 0.59 |
| Sorghum | 14 | 0.23 | 17 | 0.23 | 27 | 0.27 | 0.28 | 0.00 | 0.26 |
| Sweet potato | 11 | 0.10 | 6 | 0.10 | 14 | 0.12 | 0.15 | 0.10 | 0.07 |

Source: Authors

4.2.2 Sesame Seed Yields

Table 4 present sesame seed yields per hectare for the surveyed farmers by region. On average, farmers in Teso region harvested 785 kg/ha, followed by Acholi region with 693 kg/ha, and Lango region with the lowest yields of 615 kg/ha. Average yields were higher in the first growing season (705 kg/ha) than in the second season (636 kg/ha). The average yield in both seasons for all three regions was 673 kg/ha. The project baseline survey in the same region found average yields of 797 kg/ha for improved sesame varieties and 537 kg/ha for local varieties (Muricho, 2010).

Table 4 Mean household sesame seed yields area and production

| Region | Season 1 | | | Season 2 | | | Annual household | | |
|--------|-----------|-----------|-----------------|-----------|-----------|-----------------|--------------------|-----------------|-----------------------|
| | Yield/ ha | Area (ha) | Production (kg) | Yield/ ha | Area (ha) | Production (kg) | Total Yields Kg/ha | Total Area (ha) | Total production (Kg) |
| ACHOLI | 693 | .31 | 215 | 505 | .30 | 155 | 576 | .33 | 206 |
| LANGO | 615 | .40 | 189 | 588 | .20 | 108 | 610 | .43 | 205 |
| TESO | 785 | .20 | 146 | 707 | .30 | 174 | 745 | .35 | 236 |
| Total | 705 | .30 | 173 | 636 | .29 | 161 | 674 | .37 | 222 |

Source: Authors

4.2.3 Seasonality of Production

Figure 4 presents the seasonal calendar for sesame production and marketing activities. The rainfall pattern in Northern and Eastern Uganda regions is bimodal. The long rains start in March to May and the short rains in September and October. Sesame is grown twice a year coinciding with these two rainy seasons. The marketing seasons follow immediately after the harvest seasons in August and September for the first season crop and January to February for the second season crop. Sesame sold in the second season was found to be of a higher quality because of the longer period available for drying the crop after harvest. However, farmers allocated more land to sesame in the first season.

The ability to grow sesame in two seasons gives the crop greater potential to raise household incomes. However, many farmers were rotating two oil crops (sesame with sunflower), which reduced the yield of the second sesame crop. Farmers require information on the appropriate cropping patterns.

| Month | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb |
|---------------|----------|---------|-----|---------------------|-----|-----------|---------|---------------------|-----|-----------|-----|-----|
| First season | Planting | Weeding | | Harvesting & drying | | Marketing | | | | | | |
| Second season | | | | | | Planting | Weeding | Harvesting & drying | | Marketing | | |

Figure 4: Sesame production and marketing calendar

4.2.4 Regional Sesame Production and Sales

Table 5 presents mean household and aggregate volumes of sesame harvested and sold by region for all seasons. Overall, the sample households sold 78 % of the total volume of sesame produced. Farmers in Lango region sold the highest proportion (88 %) of harvest, followed by Teso (79 %) and Acholi (62 %). At the aggregate level, Lango region again sold the highest proportion of harvested sesame (84 %). Thus, in all three regions sesame is grown primarily as a cash crop. The high proportion of sales suggests that sesame has the potential to raise farm income.

Table 5 Sesame Production and Sales, by Region

| Region | Mean household | | | Regional aggregate | | |
|--------|----------------|-------------|--------------------|--------------------|-------|--------------------|
| | Total harvest | Total sales | % sales to harvest | Harvest | Sales | % sales to harvest |
| ACHOLI | 206 | 128 | 62% | 3296 | 2050 | 62% |
| LANGO | 205 | 180 | 88% | 4304 | 3597 | 84% |
| TESO | 236 | 187 | 79% | 9682 | 7682 | 79% |
| Total | 222 | 173 | 78% | 17282 | 13329 | 77% |

Source: Authors

The average sales volume of 173 kg/household shows that sesame production is predominantly small-scale and fragmented. Therefore, a considerable effort is required to assemble and bulk the sesame into volumes that are viable for trade. Besides problems of volume, small-scale production presents challenges of quality control, including adulteration with soil during threshing, which makes it difficult to meet the stringent standards (such as farm to fork traceability) required to access premium markets. Low average sale volumes also limit the market opportunities available to the farmer. It is uneconomic to transport small quantities of sesame to regional markets which offer higher prices. This forces farmers to sell at the farm gate or in local markets where prices are lower.

4.2.5 Household Income from Sesame

Household income from sesame was estimated by linking the partial budget for sesame from the baseline survey with the estimates of mean area planted and volumes quantity sold from the value chain survey.

Table 6 shows the net income from sesame for improved and local varieties. The cost-benefit ratio for improved varieties is above 2 either when sold as grain or sold as seed, meaning that for every shilling invested farmers receive two or more in return. The higher cost-benefit ratio for sesame seed reflects the higher price for seed. Farmers generally prefer to keep their own seed since to avoid the risk of buying poor-quality sesame seed on the open market.

Table 7 shows household income from sesame. Two measures of income are shown. Net income includes the variable cost of labor, while gross income excludes labor costs. Over 40 % of the variable costs are accounted for by labor for weeding, harvesting, and transport in the field to drying racks. Weeding and harvesting is mainly done by women, carrying to the drying racks is done by children, and making drying racks is done exclusively by men. Since the labor of women and children has a low opportunity cost (meaning that it has no alternative employment), the cost of this labor may be excluded in estimating income from sesame.

Gross income from improved varieties produced for grain averaged \$ US 282 per household or \$ US 56 per head assuming a family of five. This represented an additional \$ US 92 per household or \$ US 18 per head over the corresponding income from local varieties of sesame. Gross income from improved varieties produced for seed averaged \$ US 454 per household or \$ US 91 per head. This represented an additional \$ US 148 per household or \$ US 30 per head compared to local varieties. These results suggest that sesame can make a significant contribution to household income in the Northern Region.

Table 6 Partial Budget for Sesame, Northern Uganda (Ugs/Ha)

| Activity | Sesame | |
|----------------------------------|------------------|------------------|
| | Grain | Seed |
| Total revenue | | |
| All varieties | 1,452,978 | 2,343,099 |
| Improved varieties | 1,647,399 | 2,656,401 |
| Local varieties | 1,109,979 | 1,789,821 |
| Yield | | |
| All varieties | 703 | 703 |
| Improved varieties | 797 | 797 |
| Local varieties | 537 | 537 |
| Price | | |
| | 2,067 | 3,333 |
| Variable costs | | |
| Land preparation | 130,293 | 123,500 |
| Seed | 21,613 | 21,613 |
| Planting/sowing | 60,309 | 31,801 |
| Weeding and thinning | 137,908 | 151,288 |
| Field pest and disease control | 11,115 | 16,673 |
| Harvesting and transport to rack | 170,842 | 182,163 |
| Rack building and racking | 104,975 | 98,800 |
| Threshing and winnowing | 47,959 | 47,856 |
| Field -homestead transportation | 39,829 | 52,179 |
| Bagging and storage | 720 | 0 |
| Storage pest control | 720 | 0 |
| Transportation to the market | 11,733 | 14,820 |
| Total variable costs | | |
| | 738,016 | 740,693 |
| Net margins | | |
| All varieties | 714,962 | 1,602,406 |
| Improved varieties | 909,383 | 1,915,708 |
| Local varieties | 371,963 | 1,049,128 |
| Benefit-cost ratio | | |
| All varieties | 2.03 | 3.16 |
| Improved varieties | 2.23 | 3.59 |
| Local varieties | 1.50 | 2.42 |

Source: Adapted from Muricho (2010). Note: 1 \$ US = UGS 2166 in 2010

Table 7 Household Income from Sesame, Northern Uganda (\$ USD/Household)

| Variable | Improved varieties | | Local varieties | |
|---------------------------|--------------------|------|-----------------|------|
| | Grain | Seed | Grain | Seed |
| Total area planted (ha) | 0.37 | 0.37 | 0.37 | 0.37 |
| Yield (kg/ha) | 797 | 797 | 537 | 537 |
| Production/household (kg) | 295 | 295 | 199 | 199 |
| Household income: | | | | |
| Including labor costs | 155 | 327 | 64 | 179 |
| Excluding labor costs | 282 | 454 | 190 | 306 |
| Income per head: | | | | |
| Including labor costs | 31 | 65 | 13 | 36 |
| Excluding labor costs | 56 | 91 | 38 | 61 |

Note: in 2010, 1 \$US = UGS 2166

4.2.6 Market outlets at the farm gate

Figure 4 presents the marketing channels and the share of aggregate volume as reported by the farmers at the farm gate. Household consumption accounts for 23 % of aggregate production, while 50 % is sold to rural assemblers, 14 % is sold through rural brokers, and 11 % is sold to rural retail shopkeepers who have permanently stationed at trading centres. Direct sales between farmer to farmer/rural consumers account for 8 %. Only 2 % of total production is sold directly to urban wholesalers in regional centres.

Figure 5 shows the numerous categories of traders involved in sesame marketing especially at the grass roots. However, only 8 % of the harvested sesame goes directly to wholesale traders who offer better prices. This reflects the problem of low and uneconomical volumes highlighted earlier. Rural assemblers account for 50 % of the aggregate volume. Because these are seasonal and non-permanent traders who operate only on market days it can be concluded that majority of sesame is sold through spot transactions which are not governed by contracts or institutions. Consequently, it is difficult to enforce quality standards or contracts between the actors, which limits access to markets that have stringent quality requirements. Farmers may also engage in opportunistic behavior such as adulteration of sesame with sand or soil since there are no feedback channels between traders and farmers or traceability.

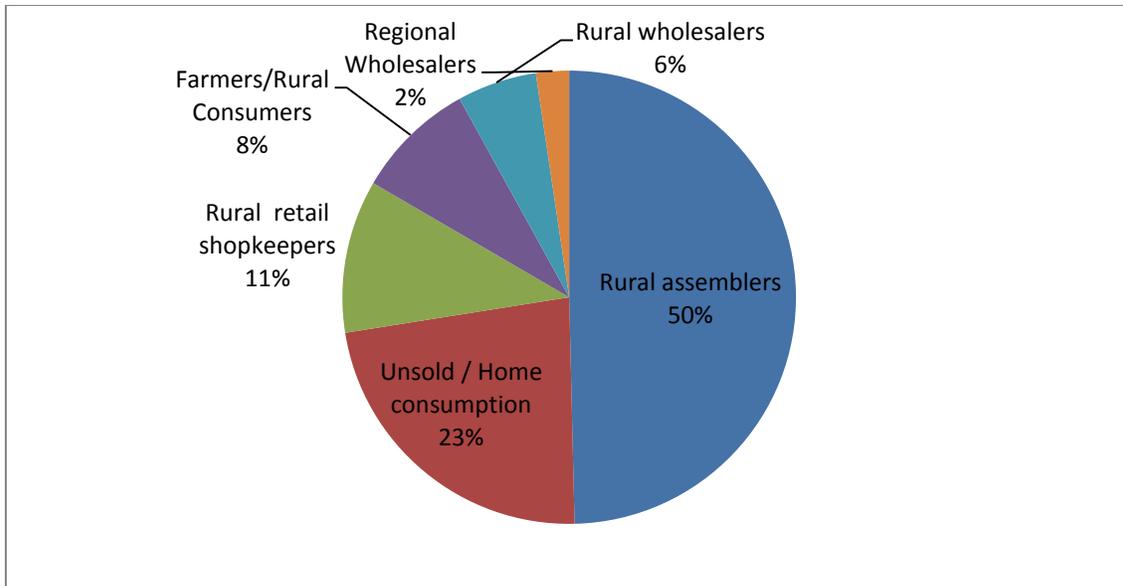


Figure 5: Shares of Aggregate Market Volume by Market Channel

The challenges to sesame production at the farm level include: lack of equipment for land preparation, which leads to late planting; crop losses from pests and diseases, which reduces yields; non-availability of seed; and labour, particularly for weeding the crop which is sown broadcast. Because smallholders produce small amounts, their bargaining power is weak. Collective marketing would allow farmers to bargain for better prices or sell directly at regional level where the returns are higher. However, availability of land was not a constraint as farmers had spare land under fallow that could be used to expand sesame production.

4.3 Sesame Marketing

4.3.1 Value Chain Map

Figure 6 presents the volume flows of sesame from the production sector to the market. Uganda produced 158,600 metric tons of sesame in 2008 (FAO, 2011). Results from our farm household survey showed that 77 % of total production (or 122,122t) enters the market. The remaining 23 % is consumed at the household level.

Sesame is consumed in variety of ways, including sesame ground into paste, made into stew and consumed with other foods such as the popular smoked meat. Sesame paste is also mixed with groundnut paste and spread on bread. Sesame oil is also believed to have some medicinal properties and it is applied to small children and on sores as an ointment. Sesame is also processed by roasting sesame seeds, mixing with honey and sugar, and then rolled into balls or pellets to be eaten as a snack. At the household level, the most popular use of sesame was either roasted or ground into paste. Despite the fact that sesame yields up to 55 % of sesame oil, processing of sesame oil was not prevalent at household level.

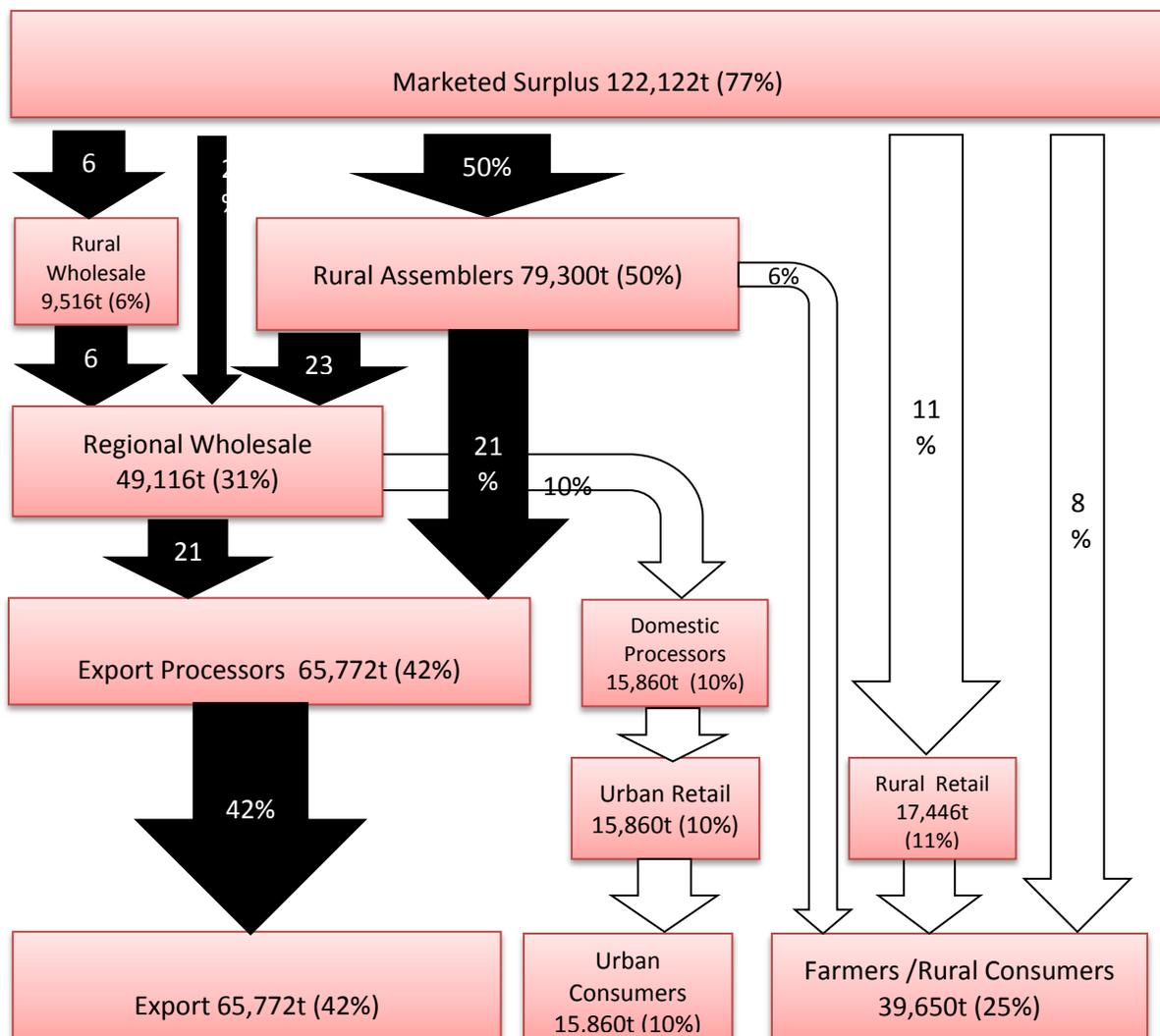


Figure 6: Value Chain Map for Sesame in Northern Uganda

Of the 77 % of sesame production that enters the market, 50 % (79,300t) passes through rural assemblers, which includes foot traders, bicycle traders, open air retailers. Six percent (9,516 t) is handled by rural wholesale buyers, namely bulk buyers who buy and transport sesame to regional centres where it is sold to regional wholesale traders (23 %), Export processors (21 %) and six percent is sold to farmers and rural consumers. Cumulatively, Twenty five percent (39,650 t) of sesame that leaves the farm gate into the market is bought by other farmers and rural consumers. Therefore, only half of the sesame produced leaves the production regions to regional and export markets. This suggests that sesame is equally important for local consumption as for trade with other regions.

At the regional trading centres, sesame is aggregated into larger volumes. Collectively, regional trading centres handle 31 % (49,116 t) of the total sesame produced. Regional traders are fewer and transactions involve large volumes with both vertical and horizontal transactions between traders. Regional traders then sell to export and domestic processors in the capital city Kampala and other border towns such as Busia and Kitgum on the Ugandan and South Sudan border respectively. A number of exporters were found to have buying centres in these regional markets where they buy from directly from rural wholesalers or regional Wholesalers.

Approximately 42 % (65,772 t) of sesame produced is exported. Exporters are based in the capital city Kampala where processing for export is done. Processing is either manual or mechanized where sesame is cleaned, bagged into 50 kg bags and packed into 20 foot containers ready for export. Domestic processors and urban retail traders are responsible for the remaining 10 % (15,860 t). The processors clean the sesame and pack into smaller packages. Besides snacks, sesame is used in the confectionery industry, and can be milled together with groundnut into paste, a popular delicacy eaten as a side dish or applied on bread as butter.

4.3.2 Trader profile

Table 8 presents a socio-economic profile of the sample traders. Results indicate that majority of businesses (86 %) are owned by men. Only urban wholesale businesses and urban retail shop keepers reported ownership by women. Whereas other traders move from one market to another, these two types of trader operate from fixed locations.

Years of schooling ranged from six years of primary education to 14 years of tertiary education. The mean of nine years indicates a relatively high level of literacy. Urban wholesalers had the highest level of schooling (10 years) while rural assemblers had the lowest (six years). The relatively high level of literacy among traders shows that they have the capacity to benefit from training on various aspects of sesame trade. Most of the sample traders have considerable experience in the sesame trade, ranging from 8 to

13 years, suggesting that that sesame trade is profitable and sustainable over the long term.

The high number of buying centres shows that buying is well organized. On average, traders have three buying points within the district and four buying points outside. Urban wholesalers and exporters have the largest number of buying points outside the district, showing the effort required to acquire large volumes of sesame. The majority of the businesses (89 %) had operating licenses to trade in sesame and other agricultural commodities. The cost of these licenses may present a barrier of entry or, if other traders can operate freely without a license, penalize licensed businesses.

Sesame trading is an source of rural employment for rural labor, both skilled and unskilled. On average, 1.5 workers are directly employed as loaders, drivers, and store attendants either on a casual or permanent basis. Larger wholesalers and exporters engage skilled labor to run the sesame processing and export business. Annual turnover shows that urban wholesalers handle US \$ 1.4 million of sesame each year. The lowest turnover is found among urban open air retailers (US \$ 739). Turnover was calculated only from sesame proceeds. The healthy turnover from the majority of the traders indicates that sesame has the potential to support a strong business.

Table 8 Trader Profiles and Organization of the Sesame Marketing Activities

| Type of trader | Gender | | Education | | Management | | | Licensed business enterprise | | Buying Centres | | Mean annual Turnover (\$ US) | | |
|----------------------------|-----------|------------|-----------|-----------|---------------------------|----------------------------|----------------------------|------------------------------|--------------------------|----------------|-----------|------------------------------|---------------------|----------------------|
| | No | Percent | Female | Male | Years of education (mean) | Years of experience (mean) | Permanent employees (mean) | Salaries (Us\$) | rent for premises (Us\$) | No | Yes | | within the district | outside the district |
| Rural assemblers | 3 | 10.7 | 0 | 3 | 6 | 12.67 | 1 | 28.6 | 34.03 | 0 | 3 | 2 | | 25,313 |
| Rural wholesalers | 5 | 17.9 | 0 | 5 | 7.6 | 7.8 | 0 | 0 | 8.54 | 0 | 5 | 2 | 1 | 38,787 |
| Urban/Regional wholesalers | 12 | 42.9 | 2 | 10 | 10.36 | 10.83 | 2.25 | 357.6 | 171.97 | 1 | 11 | 3 | 8 | 1,421,090 |
| Urban exporters | 2 | 7.1 | 0 | 2 | 7 | 14 | N/A | 0 | 0 | 0 | 2 | 11 | 1 | - |
| Urban retail shopkeepers | 4 | 14.3 | 2 | 2 | 10 | 8.5 | 2.75 | 44 | 48.4 | 1 | 3 | 5 | 2 | 70,349 |
| Urban open air retailers | 1 | 3.6 | 0 | 1 | 14 | 10 | 0 | 0 | 2.64 | 1 | 0 | 1 | | 739 |
| NGO/ Agent | 1 | 3.6 | 0 | 1 | 10 | 2 | N/A | 0 | 19.8 | 0 | 1 | 3 | | 19,319 |
| Total | 28 | 100 | 4 | 24 | 9.24 | 10.04 | 1.46 | 260.4 | 86.59 | 3 | 25 | 3 | 4 | 629,443 |

Source: Authors

Table 9 Trader Asset Holding for Selected Items (Number of Traders who Reported Owning Asset)

| Type of trader | Office | Warehouse | mobile | Radio | Truck | landline | Weighing scale | Bicycle |
|--------------------------|--------|-----------|--------|-------|-------|----------|----------------|---------|
| Rural assemblers | 0 | 3 | 3 | 3 | 0 | 1 | 3 | 3 |
| Rural wholesalers | 0 | 5 | 4 | 5 | 0 | 1 | 4 | 5 |
| Urban wholesalers | 4 | 8 | 8 | 8 | 6 | 1 | 9 | 9 |
| Urban exporters | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 |
| Urban retail shopkeepers | 0 | 1 | 3 | 4 | 0 | 0 | 4 | 3 |
| Urban open air retailers | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| NGO/ Agent | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| Total | 4 | 21 | 19 | 21 | 6 | 4 | 23 | 21 |

Source: Authors

Table 9 presents asset ownership by sesame traders. The assets considered were those that were considered important in handling, transportation and trading of sesame. The most common assets owned include weighing scales (82 %), bicycles (75 %), stores and warehouses for storage (75 %), radios and mobile telephones. Trucks and offices were only found among large wholesale traders. Urban wholesalers had the most assets, enabling them to handle large volumes and achieve a high turnover.

4.4 Prices

Table 10 presents the price received by a market actor from sales of sesame through different sales channels. The rows show the actors while the columns show the actors to whom sesame is sold. The intersection of the rows and columns shows the price which the seller receives from this particular buyer. Table 8 also shows the market channels available to a particular actor. Prices were converted from Uganda shillings to \$ US using at the January 2010 exchange rate (1 \$ US = Ugsh. 2273). These prices are gross revenues received by the seller and include transportation and transaction costs incurred in concluding the transaction.

Farmers have nine separate market channels to choose from. The price ranges from \$ US 0.70 when sold to rural open-air retailers and rural shopkeepers to \$US 1.1 when the farmer sells directly to urban exporters or urban retail shopkeepers. The mean selling price by farmers was \$ US 0.90. However, given that rural assemblers account for 27 % of total sesame production (Figure 4), we consider \$ US 0.80 as the most common price received by farmers.

Rural assemblers have five sales channels available. The price received by rural assemblers ranges from \$ US 1 when selling to urban wholesalers and \$ US 1.2 when sold to urban processors. The mean price is \$ US 1.1. The dominant outlet for the rural assembler is selling to urban wholesalers. The farmer receives 84 % of the rural assembler sale price.

Urban wholesalers have a choice of four sales channels to choose from. These are horizontal transactions between the urban wholesalers (\$ US 1.1), urban processors (\$ US 2), urban exporters (\$ US 1.3) and urban retail shopkeepers (\$ US 1.1). The mean price received by this type of trader is \$ US 1.4. However, the dominant sales channel is urban exporters who account for 20% of total sesame production. The proportion of the farm gate price to the regional wholesale price is 60 %.

These results suggest that the market at the grassroots level is competitive, as shown by the numerous actors at the lower levels of the chain. However, it can be seen that as sesame moves to higher levels of the chain and aggregation takes place the number of actors is reduced, shifting market power in favour of a few dominant players. The share of the price received by farmers falls from 90 % of the ex-assembly price to 60% of the ex-regional wholesale price. This gap can be further reduced through adoption of institutional innovations such as formation of producer marketing groups where farmers can aggregate their produce and market collectively or sell at regional markets where they stand to gain higher returns by selling to urban wholesalers as compared to rural assemblers.

Table 10 Sesame Selling Prices in Different Marketing Channels (\$ Us/Kg)

| Actor | Channel | | | | | | | | | | | |
|----------------------------|-------------------------|--------------------------|--------------------------|------------------|-------------------|-------------------|------------------|-----------------|-----------------|--------------------------|--------------------------|--------------------|
| | Rural consumers/farmers | Rural open air retailers | Rural retail shopkeepers | Rural assemblers | Rural wholesalers | Urban wholesalers | Urban processors | Urban exporters | Urban consumers | Urban retail shopkeepers | Urban open air retailers | Mean selling Price |
| Farmer | 0.9 | 0.7 | 0.7 | 0.8 | 0.8 | 1.0 | - | 1.1 | - | 1.1 | 1.0 | 0.9 |
| Rural open air retailers | - | 1.0 | - | 1.0 | - | - | - | - | 1.2 | - | - | 1.1 |
| Rural assemblers | 1.1 | - | 1.1 | - | - | 1.0 | 1.2 | - | - | 1.1 | - | 1.1 |
| Rural retail shopkeepers | - | - | - | - | - | 1.1 | - | - | - | 1.0 | - | 1.0 |
| Urban/Regional wholesalers | - | - | - | - | - | 1.1 | 2.0 | 1.3 | - | 1.1 | - | 1.4 |
| Urban retail shopkeepers | - | - | - | - | - | - | - | - | 2.1 | - | - | 2.1 |
| Rural wholesalers | 1.1 | - | - | - | - | 0.9 | 1.2 | - | - | - | - | 1.1 |

Source: Authors, Note: 1 \$ US = UGS 2273 (Jan. 2011).

4.5 Access to Credit

Sesame is a high value commodity and substantial sums are invested in the business. Access and availability of credit are important in the easing financial constraints on start-up and working capital. Table 9 presents the results from the surveyed traders on credit access in the trading year 2010/2011. Overall, one third of the traders surveyed had attempted to get credit during the year for use in their sesame business, but only one third of the traders who applied received credit. Commercial banks were the largest source of credit, accounting for 90 % of those who obtained credit. Credit from relatives was the only other source of credit cited in the survey. Urban wholesale traders have the highest proportion accessing and getting credit, which makes it possible for them to handle large volumes of sesame seed. Most of the traders surveyed used the credit obtained for sesame trade while 20 % used the credit obtained for other commodities as well.

Table 11 Access to Credit by Traders

| Type of trader | Did you try to get any credit during the 2010/11 for your sesame business | | Did you receive the amount that you tried to obtain | Source of credit | | How was the cash used | |
|--------------------------|---|-----|---|------------------|-----------------|-----------------------|-----------------|
| | No | Yes | Yes | Commercial bank | Relative/friend | Simsim business | Other commodity |
| | Rural assemblers | 2 | 1 | 1 | 1 | 0 | 1 |
| Rural wholesalers | 4 | 1 | 1 | 1 | 0 | 1 | 0 |
| Urban wholesalers | 5 | 7 | 7 | 6 | 1 | 5 | 2 |
| Urban exporters | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban retail shopkeepers | 3 | 1 | 1 | 1 | 0 | 1 | 0 |
| Urban open air retailers | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| NGO/ Agent | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 18 | 10 | 10 | 9 | 1 | 8 | 2 |

Source: Authors

4.6 Market information

Access to production and marketing information is important for the performance of sesame trade. Table 12 presents the responses on traders' access to information relating to farmers production costs, storage practices, grading and labelling, domestic market, export quality standards, phyto-sanitary issues and certification issues. Results show a low level of awareness on many of these topics.

Three in ten traders (29 %) were aware of farmers' production costs and good storage practices. However, only two in ten traders (21 %) were aware of grades and labelling for sesame. Nine in ten traders (93 %) had no access to market information for either domestic and export markets. There is therefore a need to have a structured dissemination of market intelligence on aspect such as sesame seed demand, supply and prices for both domestic and export markets. This would play an important role in proper functioning of the market, reduced inefficiencies, increased competition and lead to better returns to traders and farmers.

The results show that 89 % of traders had no access to information about export quality standards and 93 % had no access to information about phyto-sanitary/certification. Major export markets such as the European Union, the United States, and Japan place a high premium on quality and phyto-sanitary concerns. This therefore raises the importance of dissemination of information on standards requirements and certification requirements to both traders and farmers.

Table 12 Access to information by traders

| Information Type | Frequency | | Percent | |
|--|--------------------------|----------------------------|--------------------------|----------------------------|
| | No access to information | Have access to information | No access to information | Have access to information |
| Farmers production costs | 20 | 8 | 71% | 29% |
| Good storage practices | 20 | 8 | 71% | 29% |
| Grading and labeling | 22 | 6 | 79% | 21% |
| Domestic market | 26 | 2 | 93% | 7% |
| Export market | 26 | 2 | 93% | 7% |
| Export quality standards | 25 | 3 | 89% | 11% |
| Phyto-sanitary and other certification | 26 | 2 | 93% | 7% |

Source: Authors

Table 13 shows the information sources that were mentioned by the traders. National Agricultural Research Organization (NARO)/Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), followed by Olam international (an exporter) were the most common sources of information. NARO/MAAIF had the most diverse subject offering as compared to other information providers. The topic with most suppliers of information was sesame production and storage practices. Very few sources of information were available for other topics. It is important, therefore, to stimulate the supply of market intelligence on markets, prices and demand as well as other requirements and non- tariff barriers that have an impact on trade.

Table 13 Traders' Sources of Information

| Information source | Information on: | | | | | | | Total |
|------------------------------------|--------------------------|------------------------|-----------------------|-----------------|---------------|--------------------------|--|-------|
| | Farmers production costs | Good storage practices | Grading and labelling | Domestic market | Export market | Export quality standards | Phyto-sanitary and other certification | |
| Farmers | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Organic farming institutions /NGOs | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 4 |
| Mukwano(Processor) | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| NARO/MAAIF | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 8 |
| Nile breweries | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Olam(Exporter) | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| Produce Dealers | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| Total | 7 | 6 | 2 | 2 | 2 | 2 | 2 | 23 |

Source: Authors

4.7 Grain and batch characteristics considered in sesame marketing

Grain characteristics relate to individual grain considerations such as grain colour, shape and size while batch characteristics are aspects relating to a consignment, including homogeneity, cleanliness of the grains and the percentage of foreign matter. Table 14 shows the characteristics traders considered in buying and selling sesame grain. Colour ranges from white to light brown to grey-coloured grains depending on the variety planted. All traders preferred white coloured grains when buying sesame and about 10 % preferred

white-coloured grains when selling. Improperly dried grains have a brownish hue so white is an indicator of well-dried grains. A light brown colour indicated that grain was not fully or well dried.

Sesame II, an improved variety promoted by this project, is white in colour and therefore has high market demand. Nonetheless, traders did not report rejection based on grain colour. The majority of traders had no shape preference in either buying or selling. One third of the traders preferred large sized sesame grains while the remaining two thirds of the respondents showed no preference based on size.

Table 14 Sesame grain characteristics considered in buying and selling

| Grain Characteristics | Trader Category | | | | Total | |
|-------------------------------------|------------------------|--------------------|-----------|-----------------|-------|----|
| | Rural assembly | Regional Wholesale | Exporters | Urban Retailers | | |
| Buying Color | White | 10 | 11 | 3 | 4 | 28 |
| Grain shape considered when buying | No shape consideration | 7 | 11 | 3 | 2 | 23 |
| | Oval | 3 | 0 | 0 | 0 | 3 |
| | Elongated | 0 | 0 | 0 | 2 | 2 |
| Grain size considered when buying | No size consideration | 5 | 9 | 1 | 1 | 16 |
| | Large | 3 | 2 | 2 | 3 | 10 |
| | Medium | 1 | 0 | 0 | 0 | 1 |
| | Small | 1 | 0 | 0 | 0 | 1 |
| Selling Color | White | 8 | 10 | 3 | 4 | 25 |
| | Brown | 0 | 1 | 0 | 0 | 1 |
| | Light grey | 2 | 0 | 0 | 0 | 2 |
| Grain shape considered when selling | No shape consideration | 7 | 11 | 3 | 2 | 23 |
| | Oval | 3 | 0 | 0 | 0 | 3 |
| | Elongate | 0 | 0 | 0 | 2 | 2 |
| Grain size considered when selling | No size consideration | 5 | 9 | 1 | 1 | 16 |
| | Large | 3 | 2 | 2 | 3 | 10 |
| | Medium | 1 | 0 | 0 | 0 | 1 |
| | Small | 1 | 0 | 0 | 0 | 1 |

Source: Authors

Table 15 presents the batch characteristics that traders considered important in buying and selling sesame. To get the ranking of the preferred quality, the respondents were asked to rank those qualities that were mentioned as important. A rank of 1 was given to the most preferred, a rank of 2 to the second most preferred quality, and so on. A mean was calculated where those qualities with the lowest mean rank were most preferred. Clean grain, followed by homogeneity in the batch, were the two characteristics considered most important by traders. Two thirds of the traders did not consider presence of foreign matter a major problem. Batch cleanliness was a major concern across categories for a majority of traders. However, exporters and rural assemblers accorded cleanliness a higher importance

than regional wholesale traders. The problem of cleanliness of arises during the shelling and drying stages of sesame harvesting. Most farmers thresh and dry sesame on the bare ground so that sesame becomes mixed with soil. Simple technologies such as drying sesame on a tarpaulin or plastic sheet could eliminate this problem, and also reduce the risk of contamination with microorganisms found in the soil. There is therefore a need to sensitize farmers on the need for post-harvest processing to raise the phyto-sanitary standard of sesame.

Table 15 Sesame Batch Characteristics Considered in Buying and Selling

| Batch Characteristics | | | Trader Category | | | | Total |
|-----------------------|---|------------------|-----------------|--------------------|-----------|-----------------|-------|
| | | | Rural assembly | Regional Wholesale | Exporters | Urban Retailers | |
| Buying | Homogeneity buying | Not Considered | 2 | 7 | 1 | 2 | 12 |
| | | Uniform | 6 | 5 | 2 | 3 | 16 |
| | Cleaned grain buying | Not Considered | 0 | 5 | 0 | 3 | 8 |
| | | Yes | 8 | 7 | 3 | 2 | 20 |
| | Max allowed of foreign matter (%) when buying | No consideration | 7 | 9 | 1 | 3 | 20 |
| | | Below 10% | 1 | 3 | 2 | 2 | 8 |
| Selling | Homogeneity selling | NA | 2 | 7 | 1 | 2 | 12 |
| | | Uniform | 6 | 5 | 2 | 3 | 16 |
| | Cleaned grain selling | Not Considered | 0 | 5 | 0 | 3 | 8 |
| | | Total | 8 | 12 | 3 | 5 | 28 |
| | Max required of foreign matter (%) when selling | No consideration | 7 | 8 | 1 | 3 | 19 |
| | | Below 15% | 1 | 4 | 2 | 2 | 9 |

Source: Authors

Table 16 shows the frequency of occurrence and ranking of quality characteristics that traders considered in buying and selling sesame. The most frequently considered traits were grain color (86%), cleaned grains (71%) and percentage of foreign matter (54%). Grain color was ranked first, cleaned grains second and grain weight third. The results support the conclusions drawn from Table 14.

Table 16 Ranking of Sesame Quality Traits by Traders When Buying and Selling

| Quality Characteristic | Importance in buying or selling | | Mean rank for buying | | Mean rank when selling | |
|------------------------|---------------------------------|----------------------------------|----------------------|------|------------------------|------|
| | Frequency | Percent of households mentioning | N | Mean | N | Mean |
| Grain color | 24 | 86% | 21 | 1.00 | 23 | 1.13 |
| Cleaned grains | 20 | 71% | 16 | 2.06 | 18 | 2.06 |
| % of foreign matter | 15 | 54% | 9 | 2.78 | 9 | 2.78 |
| Grain weight | 11 | 39% | 5 | 2.40 | 6 | 2.33 |
| Grain size | 8 | 29% | 2 | 2.50 | 4 | 2.75 |
| Homogeneity | 7 | 25% | 6 | 2.83 | 5 | 2.80 |
| % of grains moisture | 6 | 21% | | | | |
| Packaging material | 4 | 14% | 1 | 2.00 | | |
| % of oil content/Yield | 2 | 7% | 3 | 3.00 | 3 | 2.00 |
| Grain shape | 1 | 4% | 1 | 2.00 | 1 | 2.00 |
| % of insect damage | 1 | 4% | | | | |
| % of chemical residues | 1 | 4% | | | | |

Source: Authors

Interviews with traders indicated sesame buyers were satisfied with the quality of sesame on offer. It is also encouraging that 80 % reported that the quality of sesame in the market was improving. Despite this, the study did not find specific code of conduct or guidelines governing sesame marketing, trade or standards, especially for sesame exported to China for oil extraction. Sesame exported as organically certified was governed by a voluntary code of conduct developed by NOGAMU (discussed on section 4.1 of this report).

Table 17 shows the time that traders store sesame before selling. Except for regional wholesalers, the majority of traders resell soon after buying. This is because grassroots traders do not have storage facilities. Moreover, sesame is a high value commodity. Traders may lack sufficient capital to accumulate sesame and therefore need a quick turnover in order to return to the market and buy again. The longest period of storage observed was one month.

Table 17 Traders' Storage Practices

| | | Trader Category | | | | Total | Duration of storage | | | |
|--------------|-----|-----------------|--------------------|-----------|-----------------|-------|---------------------|-------------------|---------|--|
| | | Rural assembly | Regional Wholesale | Exporters | Urban Retailers | | Percent | Less than a month | 1 month | |
| Store sesame | No | 6 | 5 | 2 | 3 | 16 | 57 | N/A | N/A | |
| | Yes | 2 | 7 | 1 | 2 | 12 | 43 | 6 | 6 | |
| Total | | 8 | 12 | 3 | 5 | 28 | 100 | | | |

Source: Authors

4.8 Trends in Sesame Seed Business

Table 18 presents a self-assessment of business trends by sesame traders. The majority of traders (71 %) felt that the business was on an upward trend. A few, especially the urban retailers, felt that their business was constant. This shows that there is confidence among the traders which is crucial to unlock the potential for sesame in Uganda.

Table 18 Trends in Sesame Business

| Trend of your sesame business growth | Trader Category | | | | Total | |
|--------------------------------------|-----------------|--------------------|-----------|-----------------|-------|--|
| | Rural assembly | Regional Wholesale | Exporters | Urban Retailers | | |
| Increased | 7 | 9 | 2 | 2 | 20 | |
| Decreased | 0 | 1 | 1 | 0 | 2 | |
| Constant | 1 | 2 | 0 | 3 | 6 | |
| Total | 8 | 12 | 3 | 5 | 28 | |

Source: Authors

4.9 Strengths and Weaknesses of Sesame Production and Trade

Figure 7 presents the results of the SWOT analysis carried out with the sesame traders. Strengths and opportunities are the internal and external factors that are advantageous to the business while weaknesses and threats are the internal and external factors that put the business at a disadvantage.

The strengths of sesame seed traders include availability of credit facilities at wholesale market level, and the high demand for sesame seed in both domestic and export markets. A low volume, high value commodity like sesame has advantages for a landlocked country such as Uganda because handling and shipping costs are reduced. Trade in sesame was reported to be profitable. Infrastructure in the regional centres was well developed thus lowering operating and transportation costs for sesame. Traders in regional markets observed that location in the produce section of the markets presented opportunities for information sharing, central accumulation of sesame and good supply of sesame.

Several weaknesses affecting the marketing and trade in sesame in Uganda were also identified. These included inability to honour supply contracts, and opportunistic behaviour 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. Poor infrastructure at the assembly level limited access to markets for farmers in the periphery and ultimately the total volume marketed. Exporters are few, limiting competition and leading to concentration of market power among a few large exporters.

| STRENGTHS | WEAKNESSES |
|---|---|
| <ul style="list-style-type: none"> • Sesame is a low volume, high value product • High demand both locally and internationally • Good profit margins • Access to banking and capital facilities • Location in the produce section of the market • Availability of credit at wholesale level traders • Good transport infrastructure the regional centre • Support from NGO's and industrial association • Uganda sesame is high yields of recoverable oil • Well-developed shipping lines to export markets • Competition at assembly level thus competitive pricing | <ul style="list-style-type: none"> • Fragmented supply wide area and small quantities per producer • Untrustworthy agents, failure to honour supply contracts among organic farmers • In adequate capital investment at lower assembly levels • Opportunistic behaviour e.g. adulteration with soil and sand • Poor transport infrastructure at the assembly level • Poor handling at farm level raising phyto-sanitary concerns • Failure to address quality concerns and phyto sanitary concerns • High handling costs such as loading and unloading • High concentration of market power to a few exporters |
| OPPORTUNITIES | THREATS |
| <ul style="list-style-type: none"> • Relative ease of expansion of sesame production in response to better prices • Rising global demand • Availability of premium markets such as Europe and niche organic markets, • Ready domestic and export market for sesame • Security and stability in the production regions and reduction of internal displacement • | <ul style="list-style-type: none"> • Limited aggregate amounts of sesame available for exports thus low economies of scale and in ability to attract many global players • High road transport cost to Mombasa as compared to shipping costs to China and other markets • Existence of two markets in far east and Europe, one has high demands on quality while China is very lax • Continued use of DDT in the control of malaria which may leave traces in samples affecting access to niche organic markets • Scarcity of improved planting material • Pests and plant diseases affects production |

Figure 7: SWOT Analysis Matrix for Sesame Trade

Traders also highlighted opportunities. These included the relative ease to raise production in response to better prices, because sesame is a semi-annual crop that can be cultivated twice in one year. Global demand for sesame seed and products is increasing. Security has also improved in the Northern and Western regions of Uganda where sesame is grown. Growing niche markets for organic sesame create opportunities for farmers to benefit from higher prices in these markets.

The threats to sesame included the danger of decreasing soil fertility through continuous planting. However, this can be averted by educating farmers in crop rotation and other methods of maintaining productivity. The non-availability of improved sesame varieties was also seen as a threat, since recycled seed lowers yields. Non-tariff barriers and expensive certification processes were seen as a threat because they posed barriers to entry into lucrative European markets. Europe and China, the two major export markets, make

different demands on quality. Without clear price differentiation based on quality, it is difficult to introduce quality standards, which limits access to more lucrative markets. It was also observed that there is a high transport cost to port of Mombasa (\$ US 1200 per 20 tonnes) as compared to shipping to China (\$ US 300). Railways transport would be a cheaper alternative but it was said to be unreliable.

5 Exports

The value of the world market for sesame grain in 2006 was \$ US 1 billion (ITC, 2008). The world market has grown in both value and volume. Between 2002 and 2006 the recorded growth rate in the world market was 22%. Table 19 presents export statistics from Uganda Bureau of Statistics for the years 2005-2009. During this five-year period exports of sesame grew by 63 % in volume, from 7,412 t in 2005 to 12,107 t in 2009, and by 180 % in value, from 4.7 million \$ US in 2005 to 13.4 million \$Us in 2009. Sesame seed also increased its share in the value of total exports, rising to 1 % in 2009. Sesame is a high value, low-volume crop that makes it easy to handle and transport to distant markets. The average value per tonne rose from \$ US 645 to a high of \$ US 1,104 per tonne in 2009.

Table 19 Ugandan sesame exports, 2005-2009

| Item | Year | | | | |
|--|--------|--------|--------|----------|----------|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Quantity (ton) | 7412 | 7568 | 5945 | 14154 | 12107 |
| Value (000 \$ US) | 4779 | 4547 | 5477 | 15884 | 13369 |
| Exports by percentage value of total exports | 0.6 | 0.5 | 0.4 | 0.9 | 0.9 |
| Average Value per (\$ US/ton) | 644.77 | 600.82 | 921.28 | 1,122.23 | 1,104.24 |

Source: UBOS (2010)

Figure 8 shows trends in the mean export prices for selected countries producing sesame seed. The world price for sesame seed shows a steadily rising trend in the last decade, rising from \$ US 650 per tonne in 2001 to \$ US 1300 per tonne in 2009. The year 2008 has the highest recorded price of \$ US 1500 per tonne; this was the year of global financial crisis where there was a rise in general commodity prices. Prices in China remain high and attractive for an exporting country like Uganda. Nigeria as compared to Uganda has experienced phenomenal rise in prices mainly driven by the relative abundance of sesame and attracting exporters who require large volumes. This presents an opportunity for Uganda since higher volumes available for export will offer economies of scale for foreign buyers.

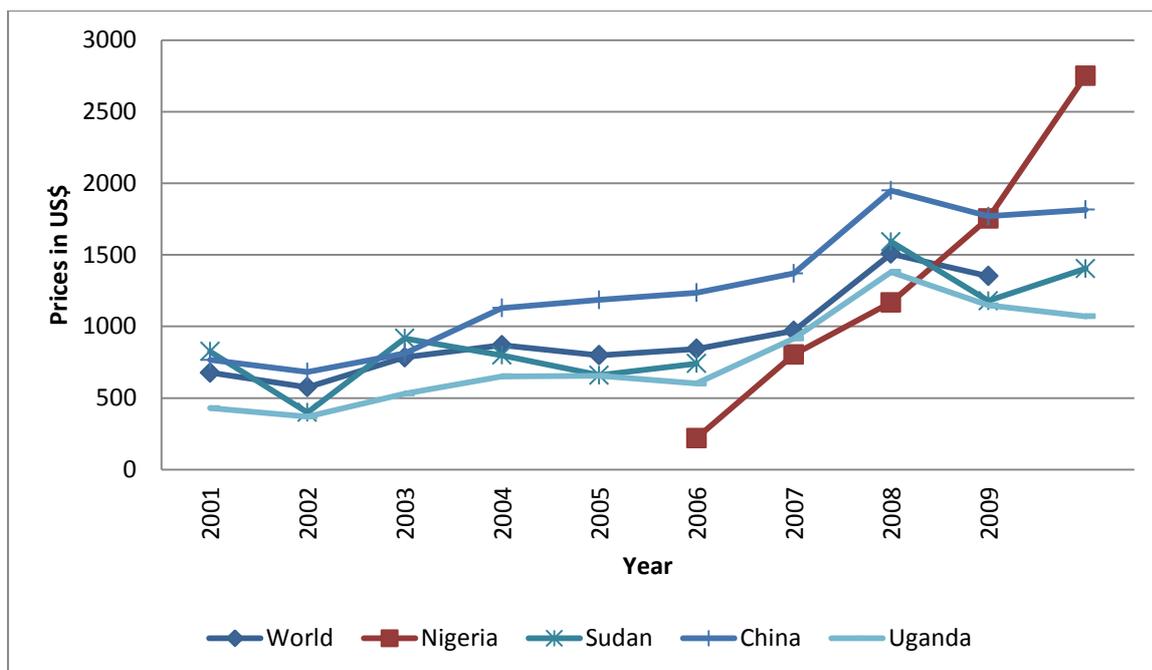


Figure 8: Trends in export prices, 2001-2009 (\$ US per tonne)

Source: ITC (2012)

5.1 Sesame Export Destinations

Figures 8 (a) and (b) show the pairing of export destination and prices in the destination markets. The Figure shows that there are three major market groupings:

1. European markets (Austria, Denmark, Germany and Switzerland);
2. The Middle-East (Turkey, Egypt and United Arab Emirates); and
3. The Far-East (Singapore, Japan and China).

European markets pay the highest value per metric tonne for Ugandan sesame. However, these countries account for only a small share of the total volume of sesame exported. The highest volume of Ugandan sesame is exported to United Arab Emirates and China which pay the third lowest and the second lowest prices per tonne, respectively. Hence, there is potential to realise higher value per tonne by changing export destination from the Far-East to higher value European markets.

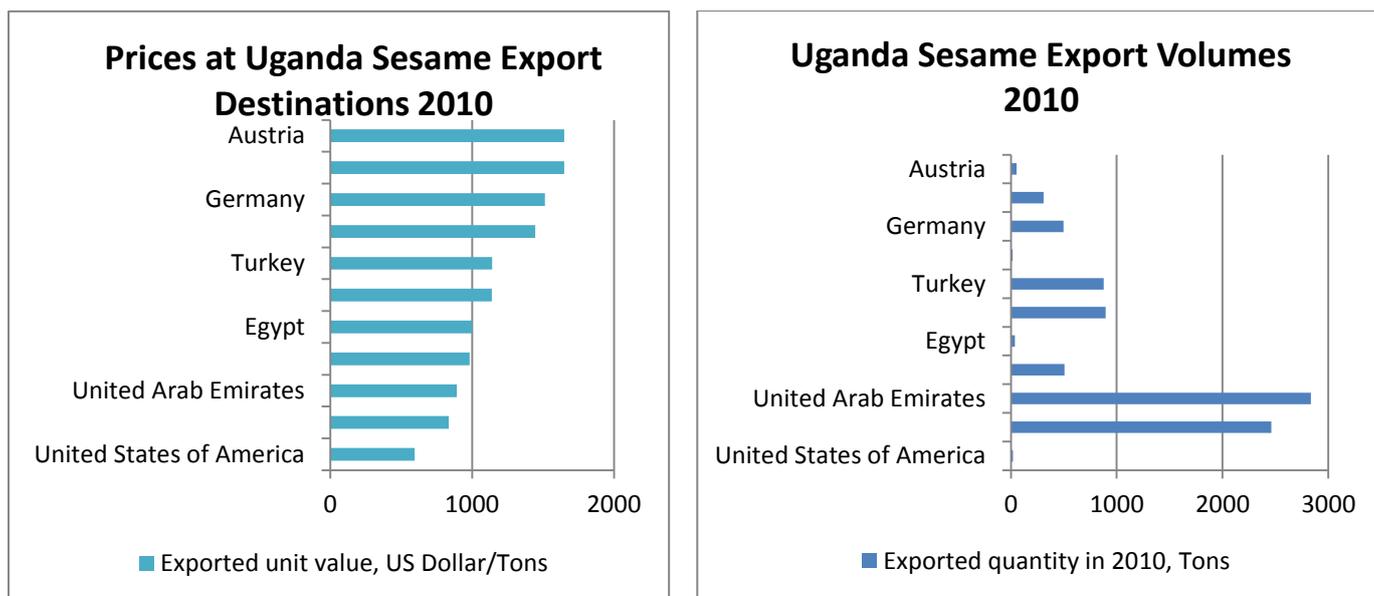


Figure 9: Sesame export prices and volumes for major destinations

Source: ITC (2012)

Opportunities for Uganda lie in the relative ease with which sesame seed can be produced, meaning that it is possible to increase supply in a lucrative market over a small period of time. The main challenge for such re-orientation is to overcome non-trade barriers to European markets, through certification of compliance to a variety of codes of conduct, such as Global Good Agricultural Practices (GLOBALGAP). This requires increasing traceability of farm to fork and addressing phyto-sanitary concerns in post-harvest handling of sesame seed. However, markets in the Far-East and China do not discriminate based on quality and have little if any requirements for entry. Consequently, farmer and traders have no incentive to invest in practices that will increase eligibility of sesame for access to higher value markets.

5.2 Niche Markets: Organic Sesame

Demand for organic commodities continues to rise. Growth is driven by strong and increasing consumer awareness of health and environmental issues as well as aggressive marketing by retail groups.

Shares Uganda is one company involved in the export of organically certified sesame to European and other premium markets. Shares works with sesame farmers in the main production regions of Lango and West Nile. The company’s field staff works with farmers’ groups to register and train farmers in good agricultural practices and organic growing of sesame. At harvest farmers groups collect sesame seed and collectively deliver it to Shares. Great effort is made to identify the produce from each farmer to ensure traceability.

Shares Uganda has a central processing plant in Kampala where it has invested heavily in cleaning and fumigation equipment to exterminate vermin, insects, larvae and eggs. The production process is certified by Ecocert (an independent organization that conducts inspections and certifications) and Bio-Suisse certification. Certification of the entire

production process is costly and may be a barrier to entry to other players. The study did not find any difference in the price of conventional sesame and the price offered to farmers by Shares Uganda.

6 Conclusions and Policy Implications

The four specific objectives of this study were to describe the structure and functioning of the value chain, measure the economic returns to participants along the value chain, identify market constraints and opportunities, and identify opportunities for market expansion.

The value chain for sesame in Uganda is characterized by numerous small producers, sellers, and buyers. Sesame is produced by smallholders each growing a total 0.37 ha across two growing seasons. Average production is 222 kg per household. About 77 % of total production enters the market. Similarly, the majority of traders are small-scale. Marketing involves numerous traders as sesame moves from grassroots assembly to regional markets and then to the capital city where processing and export activities take place. Rural assembly is typically a seasonal business with an average turnover of \$ US 25,000. Only urban wholesalers have the capital and storage facilities to generate a large turnover, averaging \$ US 1.4 million.

A map of the sesame value chain was developed showing the volume handled by the various actors along the chain as the commodity moves from farm gate to the consumers and export markets. Of the total sesame production, 50 % passes through rural assemblers, and 6 % is handled by rural wholesale buyers who buy and transport sesame to regional centres where it is bought by regional wholesale traders. Regional wholesalers sell sesame to export and domestic processors. About 42 % of the crop is exported, 10 % is consumed in urban centres, and the remaining 25 % is sold for consumption in rural areas.

Numerous traders from the grassroots to the regional level make the market for sesame reasonably competitive. On average, the farmer gets 70 % of the ex-local assembly level price and 60 % of the ex-regional level price. This shows that there is potential for a 10 % increase in the price received by the farmer where they sell collectively at regional level. Smallholders do not have strong bargaining power and collective marketing would allow them to bargain for better prices or sell directly at regional level where the returns are higher.

The market for sesame suffers from several constraints. At the farm level, the area planted to sesame is limited by lack of equipment for land preparation, non-availability of improved seed, and high labor requirements, particularly for weeding and harvesting. At the market level, the main constraints facing rural assemblers include the high transaction costs of buying from many small sellers, the need to operate several purchasing centres to acquire the desired volume of sesame, and their low working capital which limits the quantity they can purchase. Only one-third of sesame traders were able to obtain bank credit for their business. The majority of traders lack access to relevant information about grades and labeling, phyto-sanitary standards, export quality standards, and about domestic and export markets. Consequently, traders' buying decisions are determined primarily by colour and whether grain has been cleaned, rather than by other quality standards such as homogeneity, percentage of foreign matter, grain moisture, or damage from pests and diseases. This reduces the quality of the sesame that reaches urban and export markets.

Opportunities clearly exist to improve sesame marketing by improving quality through better post-harvest practices that reduce contamination, and providing market intelligence to traders on markets, prices, and quality requirements. At present, however, farmers and

traders have little incentive to improve quality since most sesame in Uganda is produced for the domestic market or exported markets that have minimal quality standards. Consequently, efforts to improve quality will depend on buyers' willingness to pay for quality.

Uganda's sesame exports go either to Europe, the Middle East or the Far East. Europe pays the highest prices for Ugandan sesame, but account for only a small share of the total volume of sesame exported. The highest volume of Ugandan sesame is exported to the United Arab Emirates and China which pay the third lowest and the second lowest prices per tonne. Standards for the Middle East and the Far East are less stringent than for Europe. Uganda would earn more from sesame if it could increase the share of exports to Europe. However, this would require improving quality to reach the required standards. Even if quality is improved, there is no guarantee that the higher selling price will benefit producers. One firm was found to export organically certified sesame and receiving premium prices. However, at the farm level there was no difference in the prices paid for conventional and organic sesame.

Improved sesame production combined with a better functioning marketing system can contribute to reducing poverty in Uganda. There are several policy instruments open to the government that may positively influence sesame production and marketing

1. Farmers do not have access to information on improved production practices, market intelligence, value addition, better post-harvest handling and demands on quality and standards in different markets. Such information may be included in state extension programs for dissemination to all stakeholders in the sesame seed value chain.
2. Sesame production is characterised by small production units which requires an elaborate product assembly process. Collective action whereby farmers form groups or cooperatives will enable them to increase the bargaining power. They would also be in a position to take to produce to regional markets centres and earn higher returns as compared to selling at assembly level.
3. Prices in European markets are higher than in the Middle and Far East. Redirecting exports towards more lucrative markets will increase the value of sesame exports and benefit the economy as a whole. However, this will involve a significant effort to raise the standards and certification issues to overcome non-tariff barriers of entry to these lucrative markets.
4. Since Sesame contributes only 1 % of Uganda's foreign exchange earnings, sesame is classified as a non-core export. However, the strong growth in exports for sesame shows its potential to contribute in the future. Moreover, unlike other export crops like coffee, sesame is grown in marginal areas in the Northern region. Promoting sesame will improve the distribution of income and equity within Uganda. This suggests the need to raise the profile of sesame seed in the agricultural policy agenda and discourse.

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