Feasibility of cash crops for small holder farmers A case of Afar Province Sesame Farmers, Ethiopia



Research project submitted to Larenstein University of Applied Science in Partial Fulfillment of the Requirements for the Degree of Master of development, Specialization International Agriculture

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Glory to the Almighty God



DEDICATION

This thesis is dedicated to my organization, Support for Sustainable Development and the Afar community of Aura who allowed me to see the great challenges in rural life of Ethiopia



ABSTRACT

The purpose of this study was to assess the feasibility of cash crops in the existing production and marketing conditions in Aura and Uwa districts of Afar province of Ethiopia. For the feasibility study, one cash crop, sesame, was picked and its economic profitability to farmers was assessed in comparison with a major food crop produced in the area, Maize. The low adoption of cash crops by farmers was the rationale behind the study.

Both empirical and desk studies were employed to collect the necessary information. The field study deployed a case study and survey research strategies. The case study involved in-depth interviews and focus group discussion with sesame farmers, chain actors, chain supporters and influencers identified during the study while the survey involved randomly selected farmers to generate information on farmers' major crop selection criteria.

The results of the study revealed that sesame is highly profitable when compared to maize in the existing production and marketing chain which in general showed that cash crops can be feasible options for farmers who are highly engaged in food crop production. The study also showed that nonfarm gate marketing of sesame to traders and wholesalers is more profitable than the farm gate sell. The significant difference in the farm gate and nonfarm gate prices is the basis for the difference in the profits.

The study on the crop selection criteria of Afar farmers showed that "use for consumption" and "attractive profit from sale" were found to be the first two criteria for crop selection. In addition "use of crop residue for livestock feed" and "technical knowhow and labor requirement" were also mentioned as key criteria of farmers in crop selection.

However in general the food insecurity and poverty condition of farming households which necessitated the production of food crops was the explanation behind the less cash crop preference of farmers and the subsequent low and slow adoption of cash crops including sesame.

The principal conclusion was that cash crops, though, are more profitable than food crops, complete shift of farmers from food crop production to cash crops is unpractical in the current context due to the need of households to assure their food security first. However, producing both food and cash crops in a way that suit the farmers cropping calendar is suggested as a an alternative to maximize benefits and spread their risks. Nevertheless, this requires addressing the existing production and marketing constraints so as to make the alternative attractive for farmers.

Key words: Feasibility, profitability, sesame, maize, cash crops, food crops, comparative analysis, value chain, value share



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LIST OF ACRONYMS

ANRS	Afar National Regional State
APRDB	Aura Pastoral Rural Development Bureau
CSA	Central Statistical Agency
EARO	Ethiopian Agricultural Research organization
EC	Ethiopian Calendar
EEPA	Ethiopian export promotion agency
GC	Gregorian (western) calendar
MOARD	Ministry of Agriculture and Rural development
NGO	Non Governmental Organization
PAN	Pesticide Action Network-Germany
PRDB	Pastoral and Rural Development Bureau
SNV	Netherlands Development Organization
SSD	Support for Sustainable Development
UPRDB	Uwa pastoral Rural Development Bureau



CHAPTER 1: BACKGROUND OF THE STUDY

1.1 Introduction

In many developing nations in Africa, strategies to improve incomes from agriculture have been emphasizing on promoting food production by intensifying the supply of inputs, such as subsidized credit and input delivery systems in most cases through state institutions. However this approach has failed as many of the state institutions becoming financially unsustainable. Following this, another strategy adopted by many developing countries to improve income of households is to intensify crop production by promoting high value cash crop production (*Pororo 2001*). This is in the assumption that where cash crops are produced they can be marketed, hence enable households to increase their rural incomes.

Two antagonistic views exist on the issue of the significance of cash crops to small farmers. However, though the issues of cash crops and food crops for small farmers have been extensively debated, transition from food crop production to cash crop production by small farmers have continued as a natural process in many countries and sectors around the world.

Farmers in general select crops to grow based on several criteria such as household food security, labor availability (both hired and household), experience and technical knowhow, availability of inputs, profitability and market potential, government policy and environmental factors such as climatic and soil conditions (*Pradeep and Robert 2006*). The scenarios on food and cash crops, above all other cases, are founded on two of the most important criteria mentioned above, food security and economic profit/ income/ of households.

In arid and semi arid pastoralist dominated areas of Ethiopia, crop production can be realized only through irrigation. The Agricultural Development Led Industrialization (ADLI) strategy of the Ethiopian government aims to enhance the agricultural productivity in potential farming areas as well as non potential dry land areas. One of the policies within this strategy is to stimulate and/or support the development of small-scale irrigation in arid and semi arid areas (*Mengistu 2008*). The support of the government ranges from implementing irrigation schemes to co financing irrigation development projects of development organizations and facilitating enabling policy environment (*IFAD 2005*). Following this enabling policy, irrigated agriculture has been expanding rapidly in both farming and pastoral areas of the country where there is access to irrigation water.

Farming agriculture is a new phenomenon in the extremely arid environment of Afar province of Ethiopia which has been realized following the development of irrigation schemes by government and NGO's. Aura and Uwa are two of the districts in the province where by crop production has been made possible using irrigation schemes built in 2004 by a local Nongovernmental organization called support for Sustainable Development (SSD). In the first few years of crop production periods, more than 90% of small scale farmers in the districts have been engaged in production of only food crops mainly maize and sorghum. Though the farmers market the surplus of the food crops, the income out of the sale was recorded to be very low because of the low market price of cereals in general and other market constraints.

However in recent years (2006 and onwards), the trend in Agricultural crop production in the areas has been gradually changing to incorporate cash crops as an important substitute for food crops to improve household income. Consequently, farmers, though in a very limited scale, started to cultivate crops like sesame, pepper and onion in the irrigated plots for commercial



purposes. However, the adoption rate of cash crops in general has been observed to be very low and slow. An informal survey done by SSD in 2007 in Aura district, on perspectives of farmers on cash cropping, revealed that farmers are hesitant to grow cash crops in general because of their doubts, above all, on profitability of the crops in the existing production and marketing conditions (*SSD 2007*).

This desire and the contradicting fear of the farmers to grow cash crops highlight the importance of this study. In analyzing the feasibility of cash crops, this study is focused only on one specific cash crop grown in the area, sesame. The study will look at the feasibility of sesame from the point of view of its economic profitability for producers in the existing production and marketing chain. However, since the existing production and marketing chain of sesame in the region has not been identified, the study will start by mapping the chain before making economic analysis of the crop.

The research does not attempt to answer the question of whether farmers in Afar region of Ethiopia should make the transition from food crops to cash crop production. Rather by looking at the issues which are important for cash crop production, it will provide ground on which basis farming households can make an informed decision on what crops to grow /food or cash/. To reach to this outcome, apart from the analysis of the profitability of sesame as a crop, the study will also make comparison of the economic returns of sesame and maize (highly grown food crop of the area).

The research output will not be limited to only providing information. It will try to come up with recommendations that might further improve the existing situation if cash cropping has to be an attractive business that accommodate many more farmers.

1.2 The Research Design

This section elaborates on the problem statement and justification, the objective of the study and the research questions raised to come to the results needed to meet the objective of the research. In the section, the key concepts used in the research are also explained according to the context of the research. Finally the outline of the document is presented for easy follow up.

1.2.1 Problem Statement and Justification

Cereals (Maize and sorghum) have been the two major food crops produced by farmers of Aura and Uwa districts mainly for own consumption. However, since production is possible in two to three seasons in one year, farmers usually market surplus production. Farmers sell the surplus produces to traders for low farm gate prices or exchange it with wheat and rice which are the staple foods in the region next to milk and milk products (*Lefteri 2009*).

However, as a general truth, when compared to high value cash crops, food crops have relatively low market value in terms of price. This is also true in Ethiopia. Afar farmers have been getting low income from marketing of their food crops as a result of the low market value of the crops and fierce competition with the neighboring major cereal growing areas.

In recent years however, since 2006, few farmers started to grow cash crops such as sesame mainly for commercial purposes. However, the adoption rate of cash crops in general and



sesame in particular has been low and slow in terms of number of farmers and area of land cropped.

As a general truth, economic benefit/profitability/ is one of the known most important rationales why farmers grow what they grow especially when cultivation is for commercial purposes (*Pradeep and Robert 2006*). The main research issue and the rationale behind the research is summarized in the following statement as; farmers in Aura and Uwa districts are not confident on the feasibility of cash crops including sesame in the existing production and marketing conditions.

This lack of confidence had significant influence on the adoption rate of the crops which was observed to be very low. This study limits its scope to the study of the economic feasibility of sesame which can later be used to partly generalize to all cash crops. The economic attractiveness of the sesame crop is determined by comparing the returns with the substitute food crop, maize. For this comparison, a value chain analysis done on maize sub sector of the area in 2008 by the same author is used with slight modifications. The identified maize chain with the necessary price and quantity overlays are attached as annex 1.

The findings of this study can provide useful insights that can be used to give recommendations for the enhancement of the existing production and marketing chain of cash crops.

Sesame is chosen among the cash crops grown in the areas because of the following main reasons: -

- Considering the relatively higher number of farmers engaged in its production and marketing compared to other cash crops, the author believed that sesame can best represent other cash crops
- The crop fits and is well adapted to the physical environment of the area and hence is environmentally feasible in terms of climate and physical growing conditions. Adaptation and yield trails conducted by SSD also showed similar positive outcomes (*SSD 2006*)
- The author believed that if feasible, sesame can be an important source of income to the farmers considering the market demand and value of the crop at national level for local consumption and export markets.

Of the two food crops produced in the area, maize and sorghum, Maize is chosen to be the food crop for the comparison because it is the main food crop produced in the area and there are no major differences between maize and sorghum either in production or marketing

However apart from this main study, the researcher found it interesting to investigate what factors explain the preference and slow adoption of cash crops in general. Hence the study included a small assessment on the criteria Afar farmers consider most to decide on what crop to grow.

1.2.2 The Research Objective

The general aim of this thesis is to determine the feasibility of cash crops by analyzing the economic profitability of sesame in the existing production and marketing chain in Aura and Uwa districts of Afar province of Ethiopia. In addition, the research is also aimed at exploring the major crop selection criteria of the farmers



The specific objectives are to:

- Map the existing sesame production and marketing chain and analyze how benefits are distributed among the chain actors.
- Study comparative economic advantage of sesame over cereals (maize) in terms of income from sale
- Examine the opportunities and challenges (risks and constraints) that exist in sesame production and marketing?
- Assess the major criteria Afar farmers consider most when choosing a food or cash crop to grow.

In relation to the objectives, the following major research questions were outlined

1.2.3 Research Questions

- 1. What is the economic feasibility of sesame for farmers in the existing production and marketing chain in Aura and Uwa districts of Afar province?
- 1.1 How is the existing sesame production and marketing chain organized?
- 1.2 What comparative economic advantage does sesame has over cereal (maize) for farmers in terms of profit from sale?
- 1.3 How are the benefits distributed among the chain actors?
- 1.4 What challenges and opportunities exist in sesame production and marketing for farmers?

2. What factors affect the adoption of cash crops in general and sesame crop by Afar farmers?

- 2.1. What are the criteria Afar farmers consider very important when choosing what crop to grow?
- 2.2. What are the pros and cons of cash crop farming for the farmers that might have impacted the adoption process of the crops?

1.3 The Definition of concepts

In order to get a better understanding of how the study is designed to address the research problem, the key concepts used in the research have to be clearly defined. The key concepts used are: economic feasibility, food and cash crops, value chain, marketing, comparative analysis and value share.

a. Economic Feasibility

Feasibility study is investigating into the potential benefits associated with undertaking a specific activity or project. The main purpose of feasibility study is to consider all factors associated with the activity/project, and determine if the investment of time and other resources will yield a desirable result. A feasibility study can be one or a combination of technical, economical, environmental or operational feasibility studies.



For the purpose of this research, feasibility study is limited to and is understood to have only economic sense/ economic feasibility/. It is all about answering the question of whether sesame as a cash crop makes economic sense to farmers in the current production and marketing chain. Economic feasibility in this research will be assessed as part of the chain by analyzing the net income/profit/ farmers get from marketing their sesame. The income/ margin/ is calculated as:

Net income/profit = GO-TC which is

Where GO is gross output (quantity* price) TC is total cost (production and marketing cost)

For this research, cost of production does not include fixed economic costs such as investment costs (irrigation scheme related costs). The technical and environmental feasibility of the crop is discussed in the literature review part and is summarized in the SWOT analysis table which compares sesame and maize farming.

b. Food and Cash crops

A cash crop refers to a non staple crop that is mainly produced for commercial purposes while a food crop is any crop/staple or not/ produced mainly for own consumption. The definition holds true for this research context. However both food and cash crops can be consumable as well as marketable. The cash crops in this research refer to sesame, onion and pepper while the food crops are sorghum and maize.

c. Value chain

According to USAID a value chain is a supply chain made up of a series of actors from input suppliers to producers and processors to exporters and buyers engaged in the full range of activities required to bring a product from its conception to its end use. A value chain is the sequence of activities involved in transforming raw materials to intermediate products, to manufacturing the final product (*USAID 2006*).

d. Marketing

Marketing in this context refers to the process of pricing and selling of an agricultural produce which involves the transfer of goods to different actors before it reaches to the end user.

e. Value share

It is the percentage of the final retail price that the actor earns. Value share is calculated as Added Value*100/final retail price

Where Added value is price received by actor-price paid by actor

f. Comparative Analysis

Item by item comparison of two or more comparable alternatives, processes, products, qualifications, sets of data, systems, etc. In the study, the comparative analysis between maize and sesame includes economic profit and other production and marketing aspects.



1.4 Research outline

This study is organized into six main chapters. Chapter one introduces the research topic, study area and the research design which briefly describe the research problem, research objective and two main research questions with their respective sub questions. The chapter concludes by clarifying key concepts used in the research. In Chapter two the research methodology is discussed in detail elaborating the study areas, sampling procedure, data collection methods and the tools & procedures used for data analysis. Chapter three, Literature review is divided into two main parts; background information and theoretical framework part. The background section is consisting of overview of sesame sub sector of Ethiopia and the scenarios on food and cash crops and the theoretical framework briefly discusses the theories and analytical tools used in the research.

Chapter four discusses the empirical findings of the research and the discussion of the analysis of the findings is presented in chapter five. The thesis report ends with chapter six which formulates the conclusion and recommendations out of the study.



CHAPTER TWO: LITERATURE REVIEW

The literature review section has four parts; the first part discusses sesame and its agronomy. Part two gives overview of sesame sector of Ethiopia. The different scenarios on food and cash crops for small farmers are discussed in part three of the section. Part four explain the theories, frameworks and tools used to analyze the research findings. These include the value chain analysis concept, Porter's five forces market analysis model and SWOT analysis tool.

2.1 Back Ground Information

2.1.1 The Sesame seed crop

Sesame, Sesamum indicum L., is an ancient oil crop known to be cultivated first in Asia or India (*USAID 2002*). There is also an argument saying that sesame has its origin in Africa and spread early through West Africa to India, China and Japan, which became secondary center of diversity (*Yohannes 2006*). The crop is grown for its seeds which have a higher oil content of 44-60%, and the primary use of the seed is as a source of oil for cooking, paste (tahini), cake and flour.



Figure 1 The sesame seed crop and seed

The plant is usually 60 to 120cm tall and the fruit is a dehiscent capsule held close to the stem. When ripe, the capsule shatters to release a number of small seeds. The seeds are protected by a fibrous 'hull' or skin, which may be whitish to brown or black depending on the variety.

The plant is deep rooting and well adapted to withstand dry conditions. It will grow on relatively poor soils in climates generally unsuitable for other crops. The optimum temperature for growth varies with cultivar in the range 27-35°C. It is well suited to smallholder farming with a relatively short harvest cycle of 90 –140 days allowing other crops to be grown in the field.

Maturity of the crop, depending on the cultivar, takes 105-140 days. 98% of the world sesame seed producers are developing countries due to its labor intensive nature of production and climatic conditions (*ARARI 2005 cited in Yohannes 2006*).



Production requirements

A. Climate

Sesame is very drought-tolerant crop due to an extensive root system and is intolerant of water logging. Moisture levels before planting and flowering have the greatest impact on yield. Generally, the crop is well adapted in areas below 1250 meters above sea level and performs well at a temperature above 25 °C. It is a dry land crop which requires a rainfall from 400-650 mms (depending on the cultivar water requirement of the crop may reach to 1000mm). Generally, the crop requirements for water can be expected to be about half of that for cotton or maize (*Mal Bennett, 1995*). The water requirement can be met from available soil moisture at sowing, rainfall during the growing season and irrigation.

B. Soil:

Sesame is well adapted to sandy loam, well-drained and fertile soils with a medium PH from 6-7. Sesame has a very low salt tolerance and cannot tolerate water logging conditions.

C. Land preparation and sowing

Good land preparation is essential for a good stand since the seed is small. The seed needs to be planted into good moisture with loose, dry cover. Sesame can be sown in row or broadcasting. The seeding rate depends on the soil type, cultivar and sowing system however on average 3-5 kg/ha in furrow sowing and 6-8kg/ha in broadcasting is needed (*PAN, 2007*)

D. Cultivation and weeding

Sesame is relatively labor intensive crop during cultivation and harvesting. Watering, thinning, weeding and harvesting are the major labor requiring activities. In areas where chemical pesticides are not used, manual weeding is required during two critical periods. Sesame is an excellent rotation crop of cotton, maize, sorghum, wheat and peanut. It is an excellent soil builder that improves soil texture, moisture retention and lessons soil erosion. These characteristics of sesame increase the yield of the following crop (*PAN, 2007*).

E. Irrigation requirement

In arid and semi arid areas where the crop is grown using irrigation the crop requires 406-460mm of water. The number and timing of irrigations will depend on soil type, location and seasonal conditions however on average 2-6 irrigations are required. Water requirement is critical only during seedling and flowering stages. Generally, the crop requirements for water can be expected to be about half of that for cotton or maize (*Bennett, 1995*). Sesame is one of the most drought tolerant crops in the world, but will give higher yields with irrigation.

F. Harvesting and storage

Sesame is ready for harvesting 90 to 150 days after planting. At maturity, leaves and stems tend to change from green to yellow to red in color. The leaves will begin to fall off the plants. The shattering and non shattering types require different harvesting techniques.

Shattering sesame varieties are usually swathed green and placed upright in small bundles. Threshing should be done carefully since high grain loss occurs at this stage in case of the shattering varieties. Sesame may be stored at room temperature for approximately 5 years without loss of viability (*Wisconsin 2009*)



2.1.2 The Sesame subsector of Ethiopia

Agriculture is the mainstay of the Ethiopian economy as it accounts for about 46% of the GDP, 85% of the export and 80% of the employment opportunities (*Makombe and Kelemework 2007*). The country is primarily an exporter of agricultural products and importer of consumer and capital goods. Main export commodities are coffee, oilseeds, pulses, spices, flowers and vegetables and skin and hides.

Next to coffee, oilseed as commodity is the second largest export earner for the country. The sector is one of the fastest growing sectors in the past ten years. Currently Ethiopia is one of the top six oilseed mainly sesame seed, Linseed and Niger seed producing countries with China, India Sudan, Myanmar and Nigeria. The fast growth of the sector was attributed to the following reasons (*Elias 2008*)

- Favorable agricultural policy of government that promotes the sector through provision of investment incentives
- High global oilseed demand
- Good quality of fatty acid profiles, health friendliness due to organic nature of Ethiopian oilseeds, specific aroma and high oil content
- Expansion of farm land under oilseed as the crop is considered as a high income cash crop Ethiopian small holding farmers

The oilseeds in Ethiopia comprise sesame seed, Niger seed, Ground nuts, Rape seed, Safflower, Lin seed, Castor seed, Pumpkin seed and Mustard seed.





Sesame is by far the leading crop in the country's oil seeds production and export where by significant percentage of the production comes from small holder farmers (*EEPA 2004*). In 2008 alone, sesame accounted for 81% of the oilseeds and 14 % of all the agricultural crops produced and was 12% of the export income of the country (*MOARD 2008*). According to Ethiopian Commodity Exchange program higher officials, Ethiopian coffee exports will fall by 30-



40 percent in 2009/2010, but the country hopes to become the world's biggest sesame seed exporter of the year. Accordingly the sesame export for 2009 is projected to be 225,000 tones, earning about \$250 million, which is likely to make Ethiopia the world's largest sesame exporter *(Anon 2009)*.

The major Sesame producing areas are located in the North and North West parts of the country specially concentrating in 18 semi-arid agro-ecological districts of the following national regional states: Tigray, Amhara and Benshangul Gumuze and Oromia. These states supply almost 95% of the total national production (*SNV 2009*). There is also large potential for the sector to grow as additional hectares of land are cropped under the crop every year. According to MOARD more than 15 % additional new farm land under sesame is expected in2009/10 due to numerous commercial and small holder farmers' involvement (*Elias 2008*).

About 3 Million farmers in Ethiopia are involved in Oilseeds cultivation. Since the crop is produced by a large number of small-scale, low-income producers, it has a large pro-poor impact potential. However, commercial farms with relatively large land holdings and relatively modern agricultural practices also exist for Sesame production especially in the North West major sesame producing areas. In Humera alone, over 400 large-scale investors are each cultivating an average 600 hectares of sesame. Small holder sesame farmers cultivate 1 to 12ha of land on average (*Anon 2007*).

Sesame is labor and time demanding crop from land preparation to threshing. In the major growing areas, the sesame cropping calendar usually starts in the time between November and March by land preparation. The sowing is done during June to mid-September and harvesting from October onwards. Two critical weeding periods exist in one production season during the first growing month. Since missing the critical weeding periods result in reduction of significant portion of the yield, growers use laborers or herbicides. Ethiopia produces and exports both biological and conventional grown sesame seed to the world. The large scale mechanized farms in Humera areas use herbicides during the critical weeding periods. On the other hand large numbers of small holder producers in the country produce organic sesame.

Humera, Gondar and Wellega are the three most known types of sesame produced in the country; the first being the main type exported while the later is tagged as organic. The organic nature of Ethiopian sesame is another preferred trait in the international market which can fetch higher price to the country.

Sesame is cultivated around the world in crop rotation and intercropping systems (*Mal Bennett*, 1995). In Ethiopia also, the crop is produced by a large number of small holder farmers through intercropping with maize, sorghum, haricot bean, soybean and other crops. Intercropping maize and sesame was found to maintain maize yields while producing an important cash crop to supplement smallholder income. The farmers' objective of the maize-sesame intercropping system is to grow the normal amount of maize while receiving the added bonus of sesame cash crop from the same fields. Mkamilo in his study showed that the high maize-sesame intercropping practices in Tanzania improve the productivity of maize while adding cash benefits to the family (*Mkamilo, 2004*). However according to the study, sesame has to be planted two weeks after maize so as to reduce intercrop competition for resource and also minimize risks such as water logging on the sesame crop.



In Ethiopia, depending on the variety yield per hectare at farmers level ranges from 0.3 to 1.2 tons (average being 5.5-7). However, some improved varieties developed by Ethiopian Agriculture Research Organization/AERO/ found to yield between 0.9-2 tons per hectare under irrigated condition. Research on sesame development in Ethiopia has been carried out under the national program on oil seeds in the lowland research station at Melka Worer in the Central Eastern parts of the rift valley in Afar province. According to MOARD, Afar province is one of the potential areas expected to cultivate oilseeds mainly sesame in large scale under irrigation (Elias 2008).

Close to 80% of the sesame produced in Ethiopia is for export while the remaining is used for direct consumption in bakeries and households (*Elias 2008*). Few edible oil producing agro industries also use sesame in small quantity. Ethiopian sesame export since 2000 has continued to grow remarkably in quantity and value being as principal cash crop.



Figure 3 volume of oilseed and sesame exported from 2003/04 to 2008/09 GC Source: *MOARD 2008*

Ethiopia, being Africa's largest sesame exporter, exports sesame to a number of countries around the world. The major Ethiopia's sesame seeds export partners/clients/ for the year 2007/08 were China, Israel, Turkey Greece Jordan and many more countries (*SNV 2009*). Fig 4 shows sesame export and % shares of importing countries. Sesame seed is mainly used in these countries for confectionery purpose, extracting cooking oils, making margarine, drugs, plaster, and soap preparation.





Figure 4 Sesame export and percent share of importing countries Source MOARD, 2008

Sesame crop has been traded individually by small and large scale farmers. However since recently, Ethiopia began trading the seed through a new electronic system at its commodity exchange program which will mean traders will buy and sell the seed on the trading floor in the same way as the country's largest export item, coffee.

The sesame market channel has a wide national dimension as the crop is an important export commodity. Small holder sesame farmers sell their sesame crop directly to local traders, or through local marketing cooperatives to large scale marketing enterprises. In the major producing areas, during the peak trading season of January to May, sesame is transported from Humera to Addis Ababa via Gondar and then exported to China and Japan through the port of Djibouti. The second route is through Sudan, which takes the crop to markets in the Middle East and Israel (*Anon 2007*). The national oilseed and edible oil chain as identified and mapped by Oxfam GB is presented below. The chain is mapped considering the main oilseed crops of the country, sesame and Niger seed.





Figure 5 National oilseed and edible oil marketing chain Source: Yohannes, 2006

The national and export price of oilseed crops mainly sesame have been increasing considerably especially in the last few years. However, the price in the international markets has been instable in the years 2007, 2008 and 2009 causing considerable fluctuations in the national markets. For example the price of a quintal of sesame in big towns in January 2007 was 1000 birr while it was about 2700 at similar time of the year in 2008 following the trend in the international market (*SNV 2009*). However, the price went down after May 2008 in the major destination countries China and India. Consequently, in 2008 sesame traders and exporters who hoarded their purchased crop to wait for high market price have gone bankrupt when prices of these crops dropped significantly at the world market.





Figure 6 price of a ton of sesame in USD per destination countries in 2000EC (2007/20008GC) Source: MOARD, 2008

This implies that, though the sesame chain is relatively well organized as it is the most exportable crop, there is still lack of the now and then changing market information. The current farmers' selling price of sesame in the major producing areas is between birr 800 /€44/and birr 900 /€50/ per quintal and the retail prices is 1400/ €77.8/ in major cities such as Addis Ababa. However the there exists slight to major differences in the price from place to place and seasonally in the national market and as well as the international market.

Quality of sesame seed is measured in terms of its color, cleanness, (purity), moisture content and free fatty acid content. There are three major types of sesame grown in the country; the Humera type, Gondar Metema type and Wollega type. Their names are derived from the areas in which they are produced. Ethiopia's sesame, especially the Humera and Metema types are highly competitive in the world market due to the color, purity, and good taste. The first two are preferred mainly for confectionery purposes and Wollega type is used for oil extraction due to its high oil contents (*Yohannes 2006*).

The Ethiopian whitish Humera type is known for its sweet taste in the world and is known as a brand name. It has very good demand in the world market for its quality and is also used as a reference for grading in the international markets (EEPA 2004).

2.1.3 Challenges and opportunities in the sesame subsector of Ethiopia

Challenges

The sesame subsector of Ethiopia has a number of constraints in production and marketing systems. The major challenges as identified and presented by SNV Ethiopia are

• The low productivity (yield per hectare) at farmers' level due to limited or no use of chemical inputs or mechanization



- The problem of high rainfall and water logging problem due to improper agronomic practices in irrigated farms.
- Instability of prices of the crop
- Lack of structured market places and periods
- Lack of regulated market facilities such as scale, stores, sacks and quality control equipment, absence of quality regulatory or market administration body.
- Problem of quality produce and absence of system of traceability.

Opportunities

- High Market Demand for the Ethiopian high value specialty Sesame seed in the global market especially in Asia, Europe and Middle East
- Presence of enormous potential to expand sesame seeds production in Ethiopia through cultivation of additional new land in the large arid and semi arid areas using irrigation
- Economic restructuring and attractive investment packages which enhances investment in the sector.
- Demand for Organic Products: Due to the low levels of inputs and the use of virgin lands, oilseed production by small holders in Ethiopia is almost near organic standards.
- High Quality of Sesame seed: Ethiopia has high quality Sesame seed varieties that are suitable for a wide range of applications. The Humera variety for example is appreciated worldwide for its aroma and sweet taste.

2.1.4 The Afar Province production

In Aura and Uwa districts where the study was conducted, there exists close to 1500 farming households. Crop production have started in the districts in 2004 by some 550-600 households who owned an area of 0.5-1ha each using the irrigation schemes built by SSD. Gradually the number of farmers has been doubled and some households expanded size of their farm lands up to 5ha. For most households two cropping seasons per year is normal however in some cases few tries to manage three seasons in a year.

The major food crops produced in the areas are maize and sorghum and the major cash crops being sesame, onion and pepper. In terms of area coverage sesame is indeed highly valuable of all cash crops, although it is not being produced on areas equivalent to the cereal crops.

Currently, Sesame accounts for 11% of the total crop production in districts and there are 254 households which produce sesame in the districts (*APRDB 2007 and UPRDB 2007*). The SSD and Aura district bureau records show that the total size of planted area to the crop in 2006 was not more than 4hectares and has been constantly increasing since then. Fig 6 shows the sesame production trend in Aura district. There was no data available for the production in Uwa district.





Figure 7 Sesame production trend in Aura district Source: SSD Agronomy department, Aura

Though the sesame production trend shows significant increase in the years, the author believes that current production is owned by few farmers considering the number of farmers and cultivable land available in the two districts.

As the Afar population is mainly pastoral communities, land ownership is communal. However, where crop farming is involved in areas like Aura, Uwa and many more districts, the land reform measure took by the regional government enabled individual land ownership for agriculture. However, where irrigation agriculture is possible, land distribution among the residents (local clan members) were done by the local administration and clan leaders. Land distribution originally was based on family size and social position of individuals. Gradually, farmers expanded their farm lands by occupying areas which can still be cultivated by irrigation in some cases illegally.

2.1.5 Farmers Crop Selection Criteria: The Food crop Vs Cash crop scenario

Though, different scholars define food and cash crops differently based on contexts, a cash crop refers to a non staple crop that is mainly produced for commercial purposes while a food crop is any crop/staple or not/ produced mainly for own consumption. The scenario on food and cash crop for small holder farmers has long been an issue in Agricultural development. This debate has been acrid in food insecure countries and communities. The arguments are based on the effects of the crops mainly on food security, income and power distribution and growth of households.

Regarding the advantages and disadvantages of cash crops for poor farming households, two schools of thoughts exist, 'food first /opponents/' and 'growth first'/ proponents/(*Stephen and Simon 2000*). The premise favoring cash crops have been that where cash crops are produced they can be marketed, hence enabling households to increase their rural incomes. According to this premise, the income from marketing the crops can then be used to purchase household



consumption goods rather than the household be constrained to produce all the various goods that are needed (*Timmer 1997; Govereh and Jayne 1999 as cited in Govereh and Jayne 1999*). They support their argument by saying that cash crops provide the highest returns to land and labor.

According to the growth first/ proponents/, cash crops allow farmers and countries to exploit comparative advantage and generate investible surplus. However, the proponents argue that this concept of comparative advantage works under the assumption of well functioning markets meaning that cash crops can be good for the incomes of poor families hence food security if production and marketing risks are spread and minimized. They further strengthen their ideas by saying that poor farming households in developing countries operate in unorganized production and marketing chains which makes them vulnerable to unfair competition, price variability and physical controls (*Stephen and Simon 2000*).

Furthermore according to the food first school of thought, national food self sufficiency should be priority of all nations and this could be achieved by producing more food crops than cash crops. They criticize that there are barriers such as having no access to capital, technical skills or market which prevent small farmers from participating fully in cash cropping since comparative advantage is a product of past investment or institutional relationships and is short lived.

The major social issue related to cash cropping is the shift on power distribution among member of households especially men and women. It is frequently assumed that an increase in cash cropping tends to increase male control over household resources. This different allocation of resources within the household might alter access to food for women and children. Even though women are food producers, once agricultural production becomes commercial, the role of women is marginalized because men take over and assume control over household income. The nutritional status in the household could worsen, as men tend to spend less on food (*Guinand 2007*).

Whatsoever is the case, farmers in most cases select crops to grow based on their own criteria considering the pros and cons of their choice. Among the criteria household food security, labor availability (both hired and household), experience and technical knowhow, availability of inputs, market potential and profitability, government policy and environmental factors such as climatic and soil conditions are the major ones (*Pradeep and Robert 2006*).

2.2 Theoretical framework

2.2.1 Value chain Analysis

The value chain model is first developed by Michael Porter which helps to better understand the activities through which a firm develops a competitive advantage.

Value chain analysis addresses the value chain in itself (involvement of actors both in activities as well as the governance of the chain), but also its political, social and economic environment (both at regional/ national level as well as at the level of the community and the household).

Value chain analysis comprises a whole series of different methods. The most essential methods in value chain analysis, however, are value chain mapping, quantifying the value chain



and economic analysis of value chains to identify the distribution of benefits in the chain (*GTZ 2007*). The meanings of the three most essential methods in value chain analysis described in GTZ value links manual are discussed below.

Value chain mapping: - refers to presenting the value chain system in a visual diagram. It systematically maps the actors participating in the production, distribution, processing, and marketing of a product. It is the first step in value chain analysis. The overview map should present the major links (segments) of the value chain. It should visualize

- The sequence of production and marketing functions performed
- The value chain operators taking these functions
- The vertical business links between the operators

These three elements represent the micro level of the chain, at which the value-added is actually generated and also called Value chain actors. These are those involved in producing, processing, trading or consuming a particular agricultural product such as producers, traders, retailers, consumers.

The meso and macro level supporters and influencers can also be part of the chain.



Figure 8 Generic elements of a basic linear value chain map Source: GTZ value links Module

Quantifying value chains: - is all about attaching numbers to the basic chain map. These numbers also called overlays include but not limited to numbers of actors, the volume of produce or the market shares of particular segments in the chain.

Economic analysis of value chain/identifying distribution of benefits: - is the assessment of chain performance in terms of economic efficiency. It includes the assessment of the value added along the chain, cost of production, and margins and profits. It helps to determine who benefits



from participation in the chain and which actors could benefit from increased support or organization.

Apart from the three methods discussed above, value chain analysis usually can help to see the role of upgrading within the chain and the role of governance in the chain. For this study, the value chain analysis includes only the first three points discussed above; which are mapping the chain, quantifying the chain and identifying the distribution of benefits of actors in the chain.

2.2.2 SWOT Analysis

SWOT is an abbreviation for Strength, Weakness, Opportunities and Threats.

The external influential factors are political, economic, societal and technological, PEST in short and are covered in the opportunities and threats part of the SWOT. On the other hand, the internal factors in strengths and weaknesses part of the SWOT refers to factors related to internal capabilities. When SWOT is used for subsector analysis, it consists of

- Production system and delivery of products in the value chain
- quality of business service provisions
- competitive advantages of the value chain members
- market access, infrastructure, management information and financial systems
- Policy environment.

The result of SWOT analysis helps to address the constraints while nurturing the strength of a subsector. Therefore it is a powerful analysis tool used in analyzing a situation in terms of capabilities (*Foong 2007*).

Similarly the opportunities and threats - the external trends that influence the subsector include such circumstances as changing business trends, increased competition, changing regulations, and so on. They can either help the subsector move forward (opportunities) or hold the subsector back (threats) -- but opportunities that are ignored can become threats, and threats that are dealt with appropriately can be turned into opportunities. The non controllable factors are generally dealt through advocacy and networking to bring about changes in the policy framework (*Foong 2007*).

In this research context, since focus is at production level, SWOT analysis deals with the internal strengths and weaknesses of producers and external opportunities and threats that forward or hold back the sesame production and marketing of producers.

2.2.3 Porter's Five Forces Model

Michael Porter devised a useful framework for evaluating the attractiveness of an industry or market. The competitive analysis leads to an insight in relationships and dynamics in the sector and allows individual businesses, public sector support organizations and other service providers to make strategic decisions regarding the best defendable and most economically attractive position.

In this research, the main aspects related to these five competitive forces and their internal dynamics are summarized for the sesame subsector in the study areas. Moreover, the model is used to identify where power lies in the chain and to analyze both the strength of the current



competitive position, and the strength of a position that can be looking to move into. Moreover, farmers' threats and opportunities under the effect of the environments that have collective impact on the rivalry and profit potential of the farmers will be assessed.

This framework, known as Porter's five forces, identifies five factors that influence the market profitability. These are:

- Buyer power
- Supplier power
- Barriers to entry
- Threat of substitute products
- Rivalry among firms in the industry



Figure 9 Diagram of Porter's five forces (Source: http://www.quickmba.com/strategy/porter.shtml)



CHAPTER THREE: THE RESEARCH METHODOLOGY

This section presents the research approach used in the study and the different data collection and analysis methods employed to generate answers to the research questions. It includes a description of the study area, followed by the sampling procedure used and methods of primary and secondary data collection. Finally it discusses the limitations of the study and concludes by discussing data analysis' tools.

Since the interest and scope of the author is to study economic feasibility of sesame for farmers, the main focus of the study is at producer level. However, for mapping and quantifying the sesame chain, the study also identified and analyzed all the chain actors and their value shares in the chain.

This research design is empirical, cross sectional and involves both qualitative and quantitative approach based on data collection from a case study, survey and desk study. The whole research work took a total of three months. The desk research was conducted in the month of June and early days of July while the field work for the study was carried out from 16th of July to 12th of August 2009. Data analysis and write up was done afterwards till 10th of September 2009.

3.1 Description of the study areas

The Afar Regional State, structured into 29 weredas (districts), is located in the Northeast of Ethiopia, sharing international borders with Eritrea and Djibouti. It is the fourth largest province in the country enveloping a total area of 100,860 square kilometers and a population of nearly 1.5 million people who are pastoralists relying mainly on livestock rearing as solitary livelihood means(*Davies and Bennett 2007*). Most of the land of the region lies at altitudes below 1,000 meters and is characterized by typical lowland climatic conditions, hot temperature and inadequate rainfall amounting not more than 500 mm per annum.

The livelihood of the Afar pastoralist population is primarily based on livestock (small ruminants, cattle and camels). With milk and milk products being the major staple foods, the animals represent not only a capital value, but contribute directly to household subsistence. The province is one of the poor and least developed regions even in Ethiopian standards (*SSD 2003*). The huge development gap of the region when compared to other provinces in the country and recurrent droughts occurrences forced government of Ethiopia to allocate special budgetary support and provide free food aid to the region every year. The undiversified economic means of the community with the fragile environment of the area, lack of development interventions in the past and a number of other reasons were the causes of the severe poverty in the region.

Afar is net importer of grain from other parts of the country. Apart from milk, wheat is the next staple food of the region sourced from food aid as well as purchased from market by households. Since recently however, maize is becoming major substitute crop for wheat.

The Farming agriculture is possible in the region only through the use of irrigation and the province is known to have untapped potential for irrigated crop production. Hence, a number of irrigation based private and state commercial farms exist in the province for crops like cotton,



sugarcane and tropical fruits. In recent years however, as part of development interventions by the regional government and supporting organizations, development of small scale irrigation schemes for the pastoral communities have started to flourish. The eight provinces of Ethiopia and the study areas in Afar province are indicated in the following figure.



Figure 10 Map of Afar showing location of the study areas

Aura and Uwa are two of the 29 districts located 17kms apart to each other in the north west of the Afar National Regional State /ANRS/. They are located in western part of the region about 660 - 669Km from Addis Ababa. The areas are found in the same agro climatic zone and mean annual rainfall of the areas is estimated about 400mm, the temperature ranges from 29°C to 36°C and the altitude is 900-940m.a.s.l. Compared t o other districts in the province, Aura and Uwa are found in close proximity to the neighboring Amhara Province and are relatively cool and well watered niche. Large portion of the land in the districts is grazing land with uncontrolled nomadic movement. Acacia dominated vegetation cover of the area is relatively better compared to most of the ANRS. Aura and Uwa districts are home for nearly 22,900 and 43,500 people *respectively (CSA 2005).* The areas are characterized by hot climate and unreliable and small amount of rainfall.

The districts, like most other areas of the region have also suffered from severe recurrent droughts and animal diseases especially in the years 2001 and 2003 (*SSD 2003*). Consequently the livestock based economy of the areas has been sternly affected in subsequent years to a level that relief food continued to be the major income of families for food and non food needs of most households in the districts. The households supplement their livestock based diet with wheat and maize grains produced in the areas and purchased from markets. Major weekly markets held in each district and market centers in Afar and Amhara regions provide the grain demand of Afar consumers. Hence, Deraitu, Uwa and Chira markets in Afar province and Kobo, Hara and Woldia markets in the neighboring Amhara province serve as major market places for the food grain and other needs of the households in Aura and Uwa districts.

The research was conducted in Aura and Uwa districts of Afar province of Ethiopia. The farmers who use irrigation schemes built by SSD in the two areas are chosen considering the researcher's experience of working with the organization and the farmers. The farmers in Aura and Uwa districts are intentionally chosen among 6 districts (where SSD built irrigation schemes) for two main reasons. The irrigation schemes at the two areas are relatively the oldest ones built by SSD and hence the farmers have longer period of experience in farming



agriculture. The other and main reason is the fact that the areas are where small holder farmers showed interest in cash crop production mainly sesame cultivation in the past two-three years for commercial purposes. There is no any major difference between Aura and Uwa that is used to make any comparison between the areas in this research.

3.2 Sampling Procedure

Of the total of close to 1500 irrigation farming households in the districts, sesame farming households are not more than 15%. Initially it was intended to conduct an interview with randomly selected 8 sesame farmers however it was revised later to only six strategically chosen farmers in three clusters. The clusters are based on size of farm land owned by the farming households and these are farmers owning an area of <0.5ha, 0.5-1ha and 1<ha
s. The clusters are chosen based on size of farm lands to see if similarities and differences exist among the sesame farmers on production and marketing of sesame which includes decision making on what crop to grow, cropping patterns and land allocation to crops, market outlets, access to inputs and market information, bargaining powers and other aspects raised in the research issue and questionnaires.

Two farmers were strategically chosen and interviewed from each cluster of farmers for the case study. The researcher was assisted by the staffs of SSD and Pastoral and rural development bureaus in in the process of selecting farmers. The basis of selection was the number of cropping seasons the farmers grew the crop which is more than three seasons. Moreover, two persons were interviewed from each category of other chain actors which are rural assemblers, traders, wholesalers and retailers. For the focus group discussion, four experts were chosen from SSD and PRDBs, two from each.

For the survey data collection, 30 farmers were randomly selected in the two districts. Table 2 shows the number and category of respondents for the survey and case study.

Category of interviewee	Number of respondents	Research tool and strategy
Farmers with farm lands <0.5ha (farmer category 1)	2	Interview for case study
Farmers with farm lands 0.5ha-1ha (farmer category 2)	2	Interview for case study
Farmers with farm lands 1 <ha<5 (farmer="" 3)<="" category="" td=""><td>2</td><td>Interview for case study</td></ha<5>	2	Interview for case study
Rural assemblers	2	Interview for case study
Traders	2	Interview for case study
Wholesalers	2	Interview for case study
Retailers	2	Interview for case study
SSD experts	2	Focus group discussion for case study
ARDB experts	2	Focus group discussion for case study
Farmers (randomly chosen)	30	Interview for survey study

Table 1 Number and category of respondents



3.3 Data collection

Data used in this thesis are based on secondary and primary data sources.

3.3.1 Secondary Data

The secondary data sources such as document of SSD (project baseline, proposals and reports) scientific books, MSc thesis, studies of SNV Ethiopia and relevant published and un published reports were reviewed to generate secondary data on the sesame sector of Ethiopia.

Moreover, reliable internet sites were reviewed on the concepts/theories on the scenarios on food and cash crops, value chain analysis and other analysis tools used for the research. In addition, findings of the maize value chain analysis of the same place done by the author in the past has been reviewed and used so as to make an economic comparison with the sesame farming.

3.3.2 Primary Data

A case study and survey have been employed as main research strategies to collect primary data. Semi structured interview questionnaires prepared in English were translated to local languages /Amharic and Afar/. Interview was conducted with the help of translators since the researcher does not speak the local language very well. No recorders were used during the interview sessions. Pretesting of the questionnaire/checklist/ was carried out to identify gaps within the questionnaire for amendments before administering of the questionnaires. Based on the results of the pretesting, interview questions were revised.

CASE STUDY

A. Individual Interviews

Interviews were conducted with sesame farmers as presented earlier in table 1. The interviews were aimed at exploring the existing production and marketing chain of sesame in the study area, identifying the challenges in the production and marketing process and economic returns of sesame farming (see annex 1 for interview questionnaires).

The interviews were conducted at the farmers' fields, houses and SSD's field office. The individual interview took from 3 to 5 hours per interviewee depending on the situation. The major problem encountered during the fieldwork was the lack of even the most essential economic data on cost of production and price. The researcher cross checked the information provideded by the farmers with SSD and ARDB records to get reliable data.

Moreover, the researcher interviewed 2 village level assemblers, 2 traders, 2 wholesalers and 2 retailers. The interview for village level assemblers/traders were carried out in Aura, Uwa and chifra (30km from Uwa) towns respectively. The traders, wholesalers and retailers were located in Woldia and Hara towns which are found in the neighboring Amhara province (90-110km from Uwa district town). The interviews were aimed at mapping the sesame value chain, value share of actors in the chain and challenges in the marketing system.

B. Focus group discussion

The research unit was a group of field level experts from SSD and district agriculture department which are part of either chain supporters and/or influencers. The major issues of the discussion included the roles played by each organization as a supporter or influencer, the challenges in the existing sesame production and marketing and the future prospect of cash crops in the districts. The discussion was held at the field offices of SSD.



SURVEY

The research units for the survey are randomly selected 30 farmers in the two districts to understand the basis/criteria Afar farmers use to choose a specific crop to grow and what the farmers think about pros and cons of cash crop in general that have profound influence on the decision making of a farmer to adopt or reject a specific cash crop. However, though the sampling was random, it was deliberately made to incorporate farmers growing different crops such as sesame, cereals and vegetables. The survey answers the questions posed in the second research questions. Semi structured interview was deployed to conduct the interviews with farmers.

3.4 Data Analysis

The empirical data was reorganized and analyzed using the theoretical frameworks and tools proposed. Most findings were organized and presented in the tables, graphs and charts using excel spread sheet. The data analysis was done according to the clusters formed earlier.

Tools like chain mapping and Porters five forces were used to analyze the exiting chain and market feasibility. SWOT was used to analyze the internal strengths and weaknesses and external opportunities and threats of the Afar sesame sub sector.

3.5 Limitations

- Due to smaller sample size of the survey study, statistical tests have not been used instead descriptive statistics is used to quantitatively summarize and present the data of the results.
- Most farmers did not have records on actual costs of production. In such cases, the researcher tried to cross check with SSD records.
- The other and major problem was the conflict between two clans in Uwa district. Meeting the respondents was difficult because of the conflict resolution meetings held in the district town for three days. This has delayed the field data collection by five more da



CHAPTER FOUR: RESULTS

This chapter presents the findings of the different interviews and focus group discussion carried out with farmers, traders, wholesalers/exporters, retailers and institutions supporting sesame farmers at production level. The findings are related to the sub questions of the research. It presents the existing production and marketing system of sesame which includes production process and costs, the market outlets available and the income for the producers out of marketing. It also maps the existing sesame value chain and how the activities are organized and benefits are shared among the different actors in the chain.

Sesame farmers in Aura and Uwa districts own farm lands of 0.3 to 5 hectares and most produce two cropping seasons per year. Of the two production seasons possible in one year, interviewed farmers produce sesame in one production season either solely or by intercropping it with maize or sorghum. From the interview, it was found out that the farmers who own a relatively smaller farm land (0.3-1ha) cultivate sesame by intercropping it with maize or sorghum in relatively smaller portion of the land, in some cases in peripheral lands not used for main cereal crops. During intercropping the percentage of land allocated to the production of sesame is smaller than for the cereal crops. On the other hand farmers who own more than 1 hectare produce the crop once in a year in the entire area of their land (100% of the available land area). These farmers use shifting cultivation as major cropping pattern to grow crops which is alternating sesame with food crops, sorghum and maize. The following chart shows percentage of farm land allocated to sesame cultivation in a production season.



Figure 11 Land allocated to sesame cultivation by respondents

According to the interviewees, most farmers are interested to cultivate sesame in large extent in terms of size of farm land; however limited size of farm land was pointed out as the main constraint. On the other hand, all the farmer categories were less interested in growing sesame or any other cash crops in more than one production seasons per year, owing to the necessity of producing food crops to sustain life of their families.



In rain fed areas of Ethiopia, farmers follow a specific cropping calendar depending on availability of rainfall, market and other factors. Since irrigation water is available throughout the year, farmers in the study area have no problems of following a specific cropping calendar. All the interviewed farmers said that they grow maize or sesame or a combination of these crops alternating in the two cropping seasons. According to the interviewed farmers and agronomy experts, crop production in the areas has no specific pattern. The two cropping seasons are shown in the cropping calendar below.

Cropping calendar showing the two cropping seasons												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land Preparation												
Planting												
Weeding/cultivation			_									
Harvesting												
Source: SSD Agronomy department												

Table 2 Cropping calendar of farmers in Aura and Uwa districts

Source: SSD Agronomy department

Production cost per hectare per season was found to be more or less similar to all the three categories of farmers. A farmer requires close to birr 1500 to birr 1600 equivalent of €83.3 to €88.8 (exchange rate; birr 18 to 1 euro as of may 2009) to cultivate one hectare of land. Of the total cost, close to 500birr is cash cost for input supply, tractor rent and equipments while about 1000birr is estimate of family labor. The opportunity cost of family labor is calculated based on the local cost of labor which is 20birr/day. When marketing cost is included (transport to the nearest big towns) the total cost raises to an average of 1800birr. The detail of cost calculation is attached in annex 3 and 4. From the chart below, it can be seen that labor is the highest cost followed by tractor rent for land preparation. The labor activities are related to plantation, cultivation, weeding, harvesting and bagging.

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Production per hectare of sesame in Aura and Uwa was found to be 7qt/ha on average which is not definitely a bad yield when compared to the national range of 3 to12 qt/ha. However, interviewed farmers notified that major loss occurs during harvest and handling which significantly reduce the final quantity at hand.

4.1 Sesame Marketing

According to the respondents, farmers sell 90% of their produce in different outlets while keeping 10% for own consumption and as seed stock for the next production season. Sesame seed is used as an ingredient in sauce making for consumption. Marketing of sesame in the districts is done on individual basis. According to the respondents there are neither any collective marketing systems nor marketing arrangements between farmers and buyers. Farmers market their produce in two ways; either on farm gates or by taking the produce to market places where buyers are concentrated.

The national market price of sesame fluctuates following the changes in the international markets and this in turn affects the local selling price of farmers. This was found out to be true also during the interview with the farmers.

The current average selling price of sesame at farm gates is around 600 birr per quintal. The price gets lower to 550birr/qt during the peak harvest season and 650birr is the price at lean seasons. On the other hand, when farmers transport and sell their sesame to traders and wholesalers found in bigger towns, the price gets higher in the range of 700-900 birr/quintal depending on the season. Therefore, considerable difference exists between the farm gate and nonfarm gate prices.

4.1.1 Market Outlets

The district's sesame production is initially channeled through assemblers, traders and wholesalers. Almost all the assemblers buy the produce at farm gates. For the rest, farmers take their produce where the traders and wholesalers exist which are bigger towns in Afar and Neighboring Amhara province. There are major differences among the three categories of farmers on the use of the market outlets available and percentage of produce channeled through the outlets. Fig 13 shows the different market outlets used by each category of farmers and the percentage of produce channeled through the outlets.





Figure 13 Percentage of sesame channeled through the different outlets

Large quantities of the sesame in the areas is produced by farmers in the first and third categories due to relatively large number of farmers involved in the first category and the relatively large volume of production in the third. Since the main outlets for these farmers are local assemblers and wholesalers, these two outlets handle the large percentage of the marketed sesame. The volume of marketed sesame in each outlet is shown in the following graph



Figure 14 Percentage of the total volume of sesame channeled through the outlets

All the respondents indicated that traders and wholesalers pay better price for their produce compared to local consumers and assemblers. However, farmers in the first category (with<0.5ha) said that even if the benefits are lower, they still prefer to sell to consumers and assemblers for two reasons. The reasons are described as follows by own words of one of the respondents, Ahmed Burea



"We prefer the rural consumers and assemblers because they are the ones who can buy our small quantity of produce at whatever time we want to sell. I personally also trust the consumers and assemblers more than the traders. Plus, our social attachment and relationship is strong beyond temporary benefits. We do not sell to traders and wholesalers since they do not come to our villages and it is costly to go to towns to sell our small produce".

On the contrary, Sheik Seid Ali, a farmer in the 3rd category having 5ha of land said that

"I take and sell my sesame to a wholesaler at Kombolcha town. There are a number of wholesalers there who have links to Addis Ababa market. They pay a very good price. Last season I took 40 quintals produced in my 5ha of land and I sold a quintal of sesame for 900birr which is a total of 36000 birr. I heard that sometimes the price even gets higher than this. My major cost was the transport cost but still I was satisfied with the profit I got".







Figure 15 Value Chain Map of Sesame, Afar

A. Chain Actors

Input Providers

The seed input used for sesame production is sourced from own seed stock stored from the previous production season and/or purchased from traders (Agri input shops). If seeds are purchased from traders, farmers travel to Woldia, Dessie and Kombolcha towns (110-250kms away). According to the respondents, the farmers save costs by delegating one person (a farmer) to buy the inputs and they cover the costs of his trip. During production season the farmers also get access to rented tractors for 250 birr per hectare for land preparation. The tractor is supplied to the Pastoral Rural Development Bureaus/PRDB/ of the districts by the regional government food security bureau. Apart from seeds, the farmers do not use any fertilizers and chemical pesticides.

Sesame Farmers

These are small holder farmers in Aura and Uwa districts who own individual farm lands ranging from 0.3 ha to 5ha. These farmers are members of the irrigation users association established in the areas by all irrigation crop producers in the areas. The association has a management committee which is responsible for fair water distribution among users and also for the facilitation of the smooth functioning of the irrigation schemes. Currently, the association is not strong and active in providing services neither on production nor on marketing activities of the farmers especially for cash crops. Therefore any production or marketing activities of farmers are individual basis.

Though the farmers for this research purpose are categorized in three categories/clusters based on the size of farm land they own, all the farmers are in the small holder category in the national standards. The three categories/clusters of farmers in study are

- Farmers with farm land size of <0.5ha
- Farmers with farm land size of 0.5-1ha
- Farmers with farm land size of 1-5ha

There are no major differences in the three clusters regarding access to inputs and other services and costs of production per hectare. However, in the research major differences were found on percentage of land allocated for the crop and quantity of sesame produce per season, cropping pattern and market outlets used as discussed in the sections above.

Rural Assemblers

These are people mainly from the Afar ethnic group and in most cases are residents of the study areas. Rural assemblers began to actively operate in the areas since the beginning of crop production in the districts which is 2004. They are the first link between producers and other buyers (traders and wholesalers). Assemblers in most cases buy produce of farmers in the first two categories, farmers with <1ha. They buy produces of any type, sesame as well as cereals, in small quantities at different times from farm gates. They then sell the assembled produces to traders, wholesalers and retailers in large and small quantities in the neighboring bigger towns. Their sources of money and market information are their clients (traders and wholesalers).

According to the two respondents, they are usually the ones who decide on the price and quality of the sesame they buy and they sale according to the national market. However, they also said that they had no major problems regarding the quality of sesame since the farmers normally produce the whitish type which is known for its high quality. However, they pointed out that as a result of improper harvesting and handling, cleanliness is sometimes a problem which affects



the farm gate price. However, this statement of the assemblers was criticized by the farmers. One farmer respondent explained the farmers view as

"There is no quality problem. Our lack of experience in harvesting and handling is a problem to us only because it causes huge loss in quantity. The quality issue is the excuse the assemblers and traders give to make the price lower. We, Afar people, are known to be pastoralists not farmers, therefore anything from us always has lower price. This is true even for the maize and sorghum. I think it is a problem of attitude".

Major marketing challenge mentioned by the assemblers is the high transaction cost caused by the high cost of transport from the districts to the trading areas.

Traders

The two interviewed traders have a minimum of five years experience in the business. From the interview it was found out that traders come to the two villages in the peak cereal harvest seasons to buy produce at relatively cheaper prices. According to the two traders interviewed, traders do not go to Aura and Uwa aiming to buy sesame alone. Rather they go to buy cereals like maize and sorghum during harvest seasons. Therefore, normally traders do not buy the sesame from farmers at farm gates. According to the respondents, this is because sesame production in the areas is in small quantities and most of the produce is handled by assemblers. One trader said that

"We prefer to buy the sesame from the assemblers since they provide in relatively larger quantities. The farmers sell their produce individually at different times so it is not economical for us to go to the villages. We buy sesame directly from farmers in those times we go to the areas to buy cereals but still that is a very small quantity if we are lucky to get any"

These traders collect sesame not only from Afar province but also from farmers in Amhara region. The quantity they buy and their stock depends on the capital they have. Traders sell the produce to large wholesalers and retailers.

Wholesalers/Exporters

These are large wholesale shops located in bigger towns of Woldia, Dessie and Kombolcha towns of the neighboring Amhara province. In some cases, the wholesalers are people with large warehouses who collect oil seed crops from different parts of the country and sell it to large exporters and oil processors in Addis Ababa. In some cases the wholesalers themselves are exporters or oil processors. In the sesame chain of Ethiopia, wholesalers/exporters/, based on the export market price, determine the price of sesame. Compared to other actors, wholesalers have timely price information.

The researcher in this case did not meet those wholesalers who are exporters or oil processors at the same time. The wholesalers interviewed sell the produce to retailers in the region and exporters in Addis Ababa. However, it is appropriate to mention here that the interviewed wholesalers doubted whether the produce they buy from Afar province is exported or sold in the domestic market. According to the wholesalers, sesame produced in the major producing areas such as Humera only has an organized market chain for export. The produces collected from other non major sesame producing parts of the country are collected and assembled before sell.



Since there is no system for tracking and tracing of marketed crop, it will be difficult to exactly put the destination of the sesame produced in Afar. Therefore, mapping of the sesame value chain of Afar was done in this research considering all the possible destinations.

Retailers

A number of actors are involved in the retail marketing of sesame. Open marketers and grain stores in neighboring towns provide sesame for local markets outside the Afar province. They buy the sesame from the wholesalers and traders and provide to different levels of consumers. Open marketers are the ones who sell agricultural produces in open markets (see annex 6) in quantities as small as 500grams and 1kg using local cups for measurement. Hence, the poor urban people are their major customers. The grain stores are also main markets of sesame for the town people. The grain stores apart from sesame provide teff, maize, sorghum, millet and other grain crops sourced from different places.

B. The Chain Supporters and Influencers /the Meso and Macro levels/

From the interview with farmers and focus group discussion with SSD and district PRDB experts, it was found out that the major supporters and influencers at production level are SSD, the districts PARD bureaus and the regional government. The roles and responsibilities of the organizations are summarized in the following table.

Institution	Support Rendered
a) Support for Sustainable Development /SSD/	 Built irrigation schemes and facilitate the smooth operation of the schemes Training of farmers on irrigation scheme management and proper use of the irrigation water Training of farmers on the production, harvesting and post harvest management of crops like sesame, cereals and vegetables Facilitate Institutional development (establishment and capacity building of water users association of farmers) Provide farm input such as improved high yielding varieties of seeds Provide agriculture extension services to farmers Consult farmers on crop production and marketing issues
 b) Farmers water users association 	 A legally registered body that represent farmers Distribute irrigation water among users Mediate conflicts among irrigation water users Facilitate infrastructure maintenance and management activities
c) Aura and Uwa districts PRDB	 Provide agriculture extension services, inputs and hand tools Facilitate the provision of tractor for land preparation
d) Afar National Regional State/ANRS/ government	 Influence the transformation of the clan based communal land use system of the Afar people in to individual based farming use system Provide tractors to farmers through districts PRDB Provide indirect support by facilitating the smooth operation of SSD's irrigation projects Handle legal issues regarding land and water use (legal registration of water users association in the region)

Table 3 Chain supporters and Influencers



4.1.2 Price Setting and Bargaining in the chain

In general, the price of any produce in Ethiopia is set in the major producing and/or marketing areas of the crop. Hence, the price of sesame produced in any part of the country is determined by the price of the crop set in the major producing Oromia and Tigray regions or marketing places like Addis Ababa. In the local context in the study areas, price is set by buyers (traders, assemblers and wholesalers). However in general, the selling price of sesame in Afar is lower than the selling price in the major producing areas. Selling price also differs according to the outlets used. The selling price of farmers based on outlets is presented in the following table.

Seller	Market outlet	Selling price birr/qt	Market situation
Farmers	Rural assemblers	600	Farm gates
	Traders	800	
	Wholesalers	900	
	local consumers	600	
Rural	Traders	800	
assemblers	Wholesalers	1000	
Traders	Wholesalers	1000	
	Retailers	1100	
wholesalers	Retailers	1200	
Wholesalers	Exporters	1200	Current export price
Retailers	Consumers	1300	
Export price		1410	

Table 4 Selling Price of sesame per outlet

The price presented in the table is the average price taken at each actor level. However, there were times when farmers sold a quintal of sesame for 1000-1200 birr locally and close to 2000 birr to wholesalers when the price for a ton of sesame was more than 2200 dollar at the end of 2007 and beginning of 2008.

4.1.3 Logistics and Market Information in the Chain

The two districts are found in the least developed and climatically harsh area of the country. The nearest bigger towns in the neighboring province are found 110kms away. Though rural gravel roads are available telephone and other communication systems are poorly developed. According to the finding of the research, the major transaction cost to rural assemblers and farmers is transport cost which is caused by bad road conditions (especially during rainy seasons), transport and information accessibility of the areas.

According to the respondents, they use the vehicles of independent merchants coming to the districts from neighboring Amhara province to trade "Khat" (a green leafy plant chewed as a drug in East Africa especially by the Muslim communities). This "Knat" transport vehicles enter the towns at least three to four times a week. Mostly the trucks in their return trips serve as public transports for the villagers. The assemblers use these trucks to transport produces collected from farmers.



In the research, the major information contacted among the actors is price information. Some farmers get information on the international and wholesale market prices in major cities in the country from a radio broadcast. Price information is also communicated to chain actors at different levels in the following flow. Other important information is on quality and quantity of produce.



Most of the interviewed farmers said that they get information (reliable or not) in one way or another and are aware of prices. However, according to the farmers in the first two categories, in most cases the information has no big influence on the price they ask for their produce. One respondent in the second category of farmers said that

We are not ignorant of the price of a quintal of sesame in other areas. We also sell our sesame for a good price when we take and sell it in market places. But if it is farm gate, the price is lower and we still prefer that because if you have only a small quantity to sell, it is not wise to go to town since you will spend all your profit in the road for transport and loading unloading.

4.1.4 Challenges in Sesame Production and Marketing of farmers

The following are the major production and marketing challenges of farmers identified during the interview with farmers and chain supporters.

A. Production Constraints

The chronic problem pointed out by farmers was scarcity of land for cultivation. This was raised during the interview with farmers and focus group discussion as a major problem which has no solution, at least, in the near future as the already cultivable land under the irrigation schemes is beyond the maximum carrying capacities of the schemes, despite the availability of large arable but uncultivated land in the areas.

Lack of agro inputs such as seed and chemicals at the right time and in close proximity to the areas is also another problem identified during the study. Some farmers also raised the lack of credit services in the region as a problem for their financial constraints.

An interesting result found in the study is regarding the opinion of farmers on labor requirement of sesame. According to literature findings and studies in sesame producing areas, Sesame production is labor intensive by nature and seeks huge labor for land preparation to threshing. This was also found to be true in this study as the major production cost was shown to be labor. However according to the farmers, the labor cost for other crops is much higher than the cost required for sesame and hence sesame is relatively less labor intensive than most food and cash crops such as maize, sorghum, tomato and others. According to the farmers, this is because the major labor cost in relation to crop cultivation in the areas is shielding the crop against livestock (goats, cows, camel) and wildlife (birds, primates, wild rhino etc) attack. As per the farmers, wild life attack in crops like sorghum, maize, fruits and vegetables is one of the



major production constraints in the area which force farmers to spend too much labor and time on the farm. In this regard, sesame is less labor intensive crop as it is inedible by domestic and wild animals except camel.

All the interviewed farmers said that the quality and access of extension services rendered by SSD and the districts PRDB are poor and unorganized. According to respondents, this has affected farmers' technical capacities on cultivation and harvesting of the crop and hence the yield loss during harvest and afterwards is resulted to be high.

In addition some farmers complained about the irrigation scheme system as it is highly susceptible to flood damage in rainy seasons that cause considerable problems in the consistent supply of the irrigation water at all seasons. Moreover, farmers also mentioned that the current water management system of the management committee of the water users association is inefficient in terms of fair water distribution among users and facilitation of infrastructure maintenance works.

B. Marketing Constraints

The main constraint in the marketing of sesame is the unfair farm gate prices (when compared to the nonfarm gate price and market price of other areas. The causes for the low price are multifaceted. Some of them as mentioned by the farmers are

- The unreliable market information provided to the farmers by local assemblers and traders.
- Lack of and/or high cost of transport to market places forces farmers to sell at farm gates for low prices
- High price fluctuations
- Lack of structured market places and periods make profit variable and unpredictable

4.2 Afar farmers Crop Selection Criteria

The second part of the study was assessing the major criteria Afar farmers consider most when deciding what crops to grow for what purpose. As discussed in the document, choosing a cash or food crop to grow is a major decision a farming household make. Though basic generalizations can be given for all small holder farmers, the criteria might also differ according to local contexts.

Thirty randomly selected farmers were interviewed for the study to explore the criteria in Afar context. 86 % of the respondents were farmers having a maximum of 1ha (in the first two categories) and respondents' family size ranges from a minimum of 5 to maximum of 28. For ease of presenting the results and analysis, the respondents are categorized and presented in the following table.

Table 5 Respondents of the survey study

Respon	dents by ex	Respondents by size of farm land Respondents			spondents by family size		
Male	Female	<0.5ha	0.5-1ha	1 <ha<5< td=""><td><7</td><td>7-14</td><td>15-28</td></ha<5<>	<7	7-14	15-28
23	7	17	9	4	11	12	7



Due to limitation of time given for the whole research, number of research sample (farmers) for the survey study was too small. Though the author believes that sample size of 30 still represents the farmer population, it was difficult to use statistical tests. Therefore the descriptive statistics is used to quantitatively summarize and present the data of the results.

The principal four criteria chosen by all respondents were

- 1) Crop use for consumption/food security/
- 2) Attractive profit
- 3) Use of Crop residue for livestock feed
- 4) Technical knowhow and labor requirement

Of the four criteria chosen, one which is use of crop residue for livestock feed was not given as a choice and was discovered during the interview. Though the first four criteria chosen were similar by all the respondents, there were differences on prioritizing the choices. The findings for the different categories of farmers are presented in the following table.

Primary Criteria Chosen	Respo	ondents v sex	Respoi	ndents by farm land	Respondents by family size			
	Male	Female	<0.5ha	0.5-1ha	1 <ha<5< th=""><th><7</th><th>7-14P</th><th>15- 28</th></ha<5<>	<7	7-14P	15- 28
Crop use for consumption	10	7	13	4		3	5	9
Use of crop residue	4		4			3	1	
Income from sell	8			4	4	5	3	
Technical knowhow and labor requirement	1		1				1	
Total	23	7	17	9	4	11	10	9

Table 6 Farmers crop selection criteria and priorities

Based on the priorities given, crop use for food consumption (food security) and income from sale was ranked first and second as chosen by 56% (17 farmers) and 26% (8 farmers) of the respondents respectively. While 13% of farmers indicated that use of crop residue for livestock feed is also one of the major criteria for crop selection. According to the farmers, the above findings explain the rationale behind their choice of crops.





Figure 16 Crop selection criteria and priorities

Out of the 30 farmers interviewed, 46 % of the farmers had never produced any cash crops while the remaining 55% have tried to produce at least one type of cash crop in one or more cropping seasons. Among the cash crops produced by these farmers, sesame, pepper and onion are major ones.

In the study it was found out that most of the farmers who never cultivate a cash crop are those farmers who have relatively smaller land size (<1ha) and bigger family size (more than 15). According to respondents who never cultivate a cash crop, the major reason for not doing so was the household priority to guarantee its food security first. Moreover, all the interviewed women farmers put food security of their family as the most important reason behind their choice of growing a food crop than a cash crop. One woman respondent emphasized her stand as

"I never cultivated a cash crop before because I have to feed my family first and the portion of land I have is not enough even to grow a food crop. Growing a cash crop involves major risk. Imagine what will happen if I cannot sell my produce. But if it is a food crop, we have always something to eat and if there is surplus I can still sell it though not for a good price as compared to cash crops. Besides, I get feed for my livestock from the stalk of maize and sorghum which is very helpful especially during the dry seasons".

According to interviewed farmers, the major benefit of cash crops is their higher economic returns from sale. However, farmers notified that cash cropping, in the presence of production and market constraints, is a risky investment for food in secured household. Hence, most emphasized on the importance of sticking to food crop production and apportion less land to cash crops than the larger farming households until their food security is guaranteed

"When we grow maize or sorghum in our field, my children and I stay in the farm looking after the crops and eating roasted or boiled kernels. My children are always around and happy when these crops are on the field. So food crops have profound importance than cash crops. My husband consults me when he decides to sell a cash crop but mostly he



doesn't give me money from the sale neither he spends the money on the household needs."

According to respondents, farm decision making is usually done by the household head, in most cases by the man in consultation with his wife and other members of the family. Though all the interviewed men farmers said that they consult their wives before making decision on financial aspects, almost all indicated that they are the ultimate decision makers on the marketing of cash crops and the ultimate use of the money. However, if the owner of the land is a woman, it is she who decides on the farm. In the study, the interviewed women were widow household heads.



CHAPTER FIVE- ANALYSIS AND DISCUSSION

This chapter analyses the results of the study which were described in the previous section. The analyses are based on the findings mentioned in section four, in relations to information and framework discussed in literature review. Some of interrelated results are condensed and discussed holistically.

5.1 Feasibility of Sesame Farming

5.1.1 Economic Profitability

The profitability of Afar Province sesame producers was calculated by taking the average Gross income and average costs of production and marketing. For the farm gate marketing channeled through the local consumers, assemblers and traders, no marketing costs were included except for bagging. The marketing cost for the wholesale market channel includes estimates of transport and loading & unloading costs. The net profit was calculated as Gross output (quantity*price) – Total cost (production and marketing costs). Cost of production of farmers is indicated in annex 3. The calculation was done per hectare and per quintal considering the current selling prices per outlets. Considering the post harvest losses the average yield was taken to be 7quintal per hectare and no difference was considered on average yield per hectare among the different farmer categories.

Seller	Market channels (Actors)	Cost/ha	Cost per quintal	Selling price birr/qt	Gross output/ha	Profit per hectare	Profit per quintal	Remark
Farmers yield	Rural assemblers	1525	218	600	4200	2675	382	Farm gate
per hectare =7.0qtl	Traders	1525	218	800	5600	4075	582	Farm gate
	Wholesalers	1800	257	900	6300	4500	643	Include marketing cost
	local consumers	1525	218	600	4200	2675	382	Farm gate

 Table 7 Profitability of sesame for producers

The profit calculation presented in table 7 above shows clearly that sesame production was profitable for farmers in all the outlets used in the study period. However, there were significant differences in the profits obtained based on the outlets used. Producers earned a net profit of Birr 382 /€21/ to birr 643 /€36/ per quintal (birr 2675 to birr 4500 per hectare) based on the market outlets. The profit was lower for the farmers who sell directly to consumers and through local assemblers which is 382 birr/quintal while the highest profit was gained through the wholesale market channel which is 643 birr/quintal. From the result, it can be seen that farmers in the third category (with farm land size of 1<ha<5) who sell their entire sesame to wholesalers get nearly twice as much the profit of farmers who largely use the local assembler and



consumer outlets (farmers with <0.5ha). The farmers in the second category (with farm land 0.5-1ha) get far better profit than the first category of farmers but lesser than the farmers who sell to wholesalers which is birr 582 per quintal.

Therefore it can be concluded that sesame as a cash crop is feasible in terms of economic profitability to the farmers. However, there is significant difference in the benefits obtained depending on the market outlets. Sesame sold at farm gate, though profitable, is significantly cheaper than the nonfarm gate markets. Since majority of the farmers sell at farm gates, they lose considerable part of the income. The severe logistics problem which is costly to most farmers who produce small quantities at a time is barrier to take produce to market. This justifies farmers' choice of farm gate marketing channels.

As mentioned by interviewed traders and wholesalers, lack of marketing arrangements such as contract farming and collective marketing increase risk and cost of marketing to buyers and sellers. This urges for the development of marketing arrangements so as to enhance the benefits to farmers and all other actors. By collectively marketing their produce, farmers improve their economies of scale, lower their transaction costs, wider their choice of market channels, improve quality and access services like credit and extension.

5.1.2 Value share of actors

Some of the different market possible channels identified during mapping of the chain are

- 1. Producer-consumer
- 2. Producer- local assembler- retailer-consumer
- 3. Producer-local assembler-trader-retailer-consumer
- 4. Producer-local assembler-wholesaler-exporter-global consumers/importers/
- 5. Producer-local assembler-trader-wholesaler-retailer-consumer
- 6. Producer-local assemblers-wholesalers-oil processors-oil retailers-consumers
- 7. Producer-trader-retailer-consumer
- 8. Producer-trader-wholesaler/exporter-global consumers/importers/
- 9. Producer-trader-wholesalers-oil processors-oil retailers-consumers
- 10. Producer-traders-wholesaler- retailers-consumers
- 11. Producer-wholesaler/exporter-global consumers/importers/
- 12. Producer-wholesaler- oil processor -oil retailers consumers
- 13. Producer-trader-wholesaler-oil processor-retailer-consumer

For the value share analysis of chain actors, among the identified channels, two channels are selected to show the market share of actors in the national and export markets. These are the channel 'producer-local assemblers-traders-wholesaler-retailer-consumer' and the channel 'producer-local assemblers-traders-wholesaler/exporters' since they show all the actors involved in the sesame channel in both scenarios (national and global markets). The oil processor was not included since the oil processing sector is out of the mandate of this study. The value share of actors is calculated to find out the share from final retail price obtained by producers and other actors which indirectly shows the position of farmers in the chain in relation to other actors. The value share of actors in the national and export chains is shown in table 8 and figure 17 below



The producer share in both the national and export market chains are higher than the other actors. In the national market, the producer share from the retail price is calculated as 46% where as it is 43% in the export market which is much greater than all other actors. This implies that there is no major value addition on the produce down in the chain. However, in the export chain, apart from the major producer share of 43 %, the wholesaler/exporter gets a large share of the final export price which is 29%.

Actors	Selling price/qt	Added Value	Value share (added value/retail value*100)
NATIONAL MARKET	T CHAIN		
Producer	600	600	46.20%
Local assembler	800	200	15.40%
trader	1000	200	15.4%
Wholesaler	1200	250	15%
Retailer	1300	100	8%
Sum		1300	100%
EXPORT MARKET	CHAIN		
Producer	600	600	43%
Local assembler	800	200	14%
trader	1000	200	14%
Wholesale/exporter	1409	409	29%
Importer/Global			
sum		1409	100%

Table 8 Value share of actors in the National and Export Sesame chains



Figure 17 Value share of Actors in the National and Export Sesame chain

VAN HALL LARENSTEIN Though market share of producers in the chain is higher, the study found out that there is still a possibility to enhance the existing share of producers especially during times when the demand and value of sesame at national and international markets shoots as high as 2000\$/ton (24,000birr).

5.2 Comparative Analysis of Sesame and Maize Farming

As stated in the previous sections, sesame as a cash crop is profitable for small holder farmers. The competitive analysis between sesame and a cereal crop /maize/ is carried out based mainly on comparison of economic benefits of the crops to the farmers. The Gross output and net profit for sesame are based only on grain yield of the crop since sesame crop residue is mostly unused. On the other hand the calculation for maize included the opportunity cost of the maize straw since it is usable and marketable. Comparison of the economic benefits is done for the lowest and highest values which are the costs and net profits for the farm gate and nonfarm gate marketing.

The values for maize are derived from the Value chain analysis of the crop carried out in November 2008 with small amendments on the values (values are adjusted based on current costs and selling prices). The cost of production and selling price of maize are attached in annex 4.

	Farm G	Farm Gate (Minimum)			n gate (M	Profit	
	Sesame	Ma	ize	Sesame	Maize	Grain	difference
	Grain	Grain	Straw	Grain	Grain	Straw	
Total cost per hectare	1525	2375	2375	1800	2564	2564	
Total cost per quintal	218	68	34	257	73	37	
Income(Gross output)/ha	4200	4900	2450	6300	5600	2800	
Income (Gross output)/qt (selling price)	600	140	35	900	160	40	
Net profit per hectare	2675	2525	75	4500	3036	236	
Net profit per quintal	382	72	1.1	643	87	3.4	
Profit total per quintal	382	73.1		643	90.4		309-553
Profit total per hectare	2675	2600		4500	3272		75-1228

Table 9 Economic Comparison of Sesame and Maize



Table 9 shows that cost of production of maize is higher than sesame as a result of the high labor requirement to safe guard the maize crop from animal attack. This is a unique scenario for the study area (Afar province) since the reverse is known for the labor requirement of the crops in other areas in Ethiopia and abroad.

Profit per hectare is higher for sesame compared with maize in a range of birr 75-1228 (\leq 4.2 - \leq 68.2) per hectare. The profit per quintal is even much higher when considered for a quintal and in the nonfarm gate marketing which is through the wholesale or trader channels. Therefore in one way or another, sesame is more profitable than maize as a crop. When production is for market, even smaller volume of sesame is much more attractive than maize since its minimum profit/quintal of birr 382 is much higher than birr 73 of the maize. Therefore sesame is more attractive than maize when cultivation is for commercial purposes.

In the SWOT analysis of the sesame and maize subsectors below, a comparison is made between the sectors with regards to the internal strengths and weaknesses and the external opportunities and threats. However, there are features similar to both sectors



	5.3 Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis									
of Sesame and Maize sub sectors of Aura and Uwa districts, Afar										
SUBSECTOR	STRENGTHS	WEAKNESSES								
SESAME	 Economic Profit from sesame is relatively higher than maize Low cost of production as a result of low cost of labor Production of the popular best quality Humera type which has high demand in national and global markets Drought resistant crop and Low irrigation requirement when compared to maize (2-6 irrigations/season) 	 Farmers lack improved knowledge and training in production techniques and post harvest handling. Small number of farmers involved in cultivation of sesame Small production volume because of smaller size of land under cropping of sesame Poor market information and access High seasonal price fluctuation depending on national and global markets Inputs are not available on time and in close proximity to the areas Poor farmers face financial problems for investment Poor storage facilities Poor organization of Farmers for production and marketing of sesame A crop for men (cash benefits are not equally shared between men and women) Insufficient marketing knowledge and awareness. 								
MAIZE	 Highly demanded Staple food crop of the area Relatively larger production volume Involvement of large number of farmers High yield per hectare compared to sesame (profit can be attractive when economies of scale is achieved) Higher benefits for women and children Use of crop straw for livestock feed 	 Relatively lesser economic profit from marketing maize (low market value) Higher cost of production due to high labor demand in Afar context Higher irrigation water requirement; 4-12 times(For good production a medium maturity grain crop requires between 500 and 800 mm of water depending on climate) High seasonal price fluctuation during peak and lean seasons Loss of market value when food aid is available in the areas Poor organization of Farmers for production and marketing sesame 								



	OPPORTUNITIES	THREATS
SESAME	 Suitable climate and soil conditions for sesame Presence of irrigation infrastructure system assures two harvests a year High demand in domestic and export market Good reputation of the country in quality sesame export Potential to employ large number of farmers Federal and regional governments favoring farming agriculture and cash cropping High yields are possible through adding production inputs and technology Strong support from local government and NGO's in infrastructure development Possibility of new market developments 	 Poor road, transport and communication infrastructures Intense competition from neighboring provinces Political instability and conflicts among ethnics Farmers, particularly small farmers do not want to take risks against food security and stick to grow traditional food crops. Extended dry periods minimize River flow level and irrigation infrastructure capacity Competition with other suppliers and alternative crops Irrigation infrastructure susceptible to flood damage Lack of additional unused and cultivable land for economies of scale Lack of access to credit services Poor extension service
MAIZE	 Suitable climate and soil conditions for maize production High demand in domestic market as a staple crop for large population of the country Potential to employ large number of farmers Federal and regional governments favoring farming agriculture High yields are possible through adding production inputs and technology Strong support from local government and NGO's 	 Poor road, transport and communication infrastructures Intense competition from neighboring provinces Political instability and conflicts among ethnics Extended dry periods minimize River flow level and irrigation capacity Flooding above pick river flow level damages irrigation infrastructure Market competition with other suppliers and alternative crops Irrigation infrastructure susceptible to flood damage Lack of additional unused and cultivable land for economies of scale Lack of access to credit services Poor extension service



5.4 Porter's Five Forces Analysis

The Competitive Forces analysis is made by the five fundamental competitive forces of Porter's model. Since the intention of this study is to see the feasibility of sesame for the producers, the framework is used to analyze the subsector at production level.

Threat of entry:-

These are barriers or threats determining the ease or difficulty for new entrants to start competing in the industry, to join the sesame sector. As shown in the diagram of the framework, the threat of entry of competitors can depend on: Economies of scale, Capital or investment requirements, access to distribution channels, access to technology, brand loyalty of the customers, likelihood of retaliation from existing industry players and Government policies and regulations e.g. subsidies for new entrants. For this study, the following three factors are analyzed.

Capital Requirements: -

The initial capital investments to start production (land, planting material, irrigation infrastructure) are considerable in the sesame subsector. However, the capital for infrastructure development is not a major restricting factor as it is already built and available.

However, land is a major restricting factor. Since getting additional land is impractical in the current condition, farmers have to invest on the land they used for other purposes (production of other crops). This necessitates the attractiveness of the sesame farming in terms of returns to land when compared to competing food crops. The higher economic profitability of sesame when compared to major food crops such as maize can encourage the shift from maize to sesame cropping in the existing farm lands. Therefore in the current condition, capital requirement is not a barrier for new entrants.

Access to technology: -

Currently, the technology and technical assistance is provided to farmers freely from SSD and district PRDB. However, the existing extension service system is highly limited and inefficient. This contributes to the significant loss of produce during harvest and post harvest management of the crop. Therefore access and management of technical skills comprises a major and inevitable barrier for new entrants.

Economies of scale: -

The large scale production has a positive impact on the unit price as well as the profitability of the sector. However in the existing situation, economies of scale cannot be a barrier since many of the existing producers are competitive operating in very small scales.

In general the sesame sector has low barriers for new competitors which encourage new entries.

Threat of substitutes:-

The threat of substitution in the sesame sector of Afar is very real. The food crop production constitutes the main source of food and income of the respondents, in contrast to the sesame industry. It can be concluded that the food crop production activity is apparently a necessity as



well as attractive and lucrative for most respondents. Though the sesame industry is more profitable and earns larger revenue in terms of income from sale, it is in a disadvantaged position considering the priority of most farmers for food crops as a result of multiple benefits farmers get in terms of food, fodder and income. Therefore, the food crop farming can easily replace the sesame industry implying a high threat of substitution.

The other threat of substitution comes from the buyers' side. Sesame is produced in large amounts in the neighboring province of Amhara. Buyers especially traders and wholesalers can easily switch from one supplier to another which increases the risk of substitution.

Bargaining Power of Buyers:-

In the chain the buyers, namely the consumers, assemblers, traders and wholesalers, have high bargaining power than the farmers. The level of pressure applied to the farmers depends on: the concentration of buyers, buyer bargaining leverage, buyer information, low costs of switching from supplier/substitute availability/ and price sensitivity of customers.

Concentration of buyers: -

The sesame industry of the study area is characterized by a few assemblers and trades vs. many sellers at farm gate level. The result is a few powerful buyers dominating the scene at farm gates. The nonfarm gate marketing is another scenario. At this level also the case is many farmers Vs few wholesalers and traders but the difference here is the farmers are not only the ones included in this study, rather they are sesame farmers in Amhara province also. In general, the buyers are in the majority of cases able to force farmers to agree with the prices offered.

Buyer information and demand for high volume. -

Buyers namely wholesalers, traders, and assemblers are in a better position of getting information on price and other market information when compared to producers. This put farmers in a disadvantaged position. Moreover small farmers are restricted from selling their produce to buyers who offer better prices (traders and wholesalers) because of the demand of buyers for larger volume. Moreover, the high fluctuations in price of sesame at national and international markets create suitable ground for buyers to manipulate prices.

Low costs of switching from supplier. -

There are large numbers of sesame suppliers in Afar and neighboring regions of Amhara who use similar trader and wholesaler channels. The larger number of suppliers, compared to the few buyers in the chain, and the low costs of switching are making it very easy for the buyers to switch from one supplier to another. This is placing the buyers in the favorable position of forcing farmers to agree with the low farm gate and market prices offered.

Therefore in general, buyers have high bargaining power than producers

Bargaining power of suppliers:-

Under suppliers having bargaining power in the chain are those supplying farm inputs, farm machineries and extension services. These are both public and private institutions. The pressure suppliers are able to place on the farmer depends on: concentration of suppliers,



importance of volume to supplier, presence of substitute inputs, role of quality and service and switching costs of firms in the industry

Concentration of suppliers: -

The input suppliers (mainly seed) in the sesame industry are located in a region outside Afar province which in this case is few suppliers to many producers in both Afar and Amhara provinces. Therefore the sesame sector of Afar is characterized by a few suppliers vs. many buyers. As the services and supplies they deliver cannot easily be substituted, suppliers have a certain monopoly position in the chain. The agricultural extension service and machinery providers are local PRDB and SSD which are few with extensive power to influence farmers and are in position with no substitutes for the time being. Therefore in general suppliers have high bargaining power than farmers.

Intensity of Rivalry among existing firms

The intensity of rivalry among existing firms in the sesame sector depends on exit barriers, concentration of competitors, product differentiation, switching costs and brand identity.

The rivalry among farmers in Afar is reduced since there are clear market channels used by the category of the farmers and there exists unsaturated market for sesame. There is no either product differentiation between competitors or brand identity. Moreover, the sesame production has not been considered very important enough to deploy aggressive marketing strategies by producers. There is no exit barrier for the farmers to shift into other sectors which shows low rivalry. Low rivalry among the players is demonstrated in low production levels, poor cultivation, handling and marketing strategies.

However, on the other hand the sector in Afar faces fierce competition from producers in other regions especially in the neighboring Amhara province.

The outcome of the five forces analysis is summarized in figure 18 below.





Figure 18 Porters five forces Analysis at production level

From the Porter forces analysis it can be concluded that the low barrier for entry and low rivalry among existing farmers are attractive incentives for new entrants. However, the high bargaining power of buyers and suppliers and high threat of substitute put farmers in a less competitive position. The analysis shows that it is easy to enter and leave out the sector which shows the low attractiveness of the sector to farmers.



CHAPTER SIX- CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

For this study, Sesame farmers were categorized in to three depending on the size of their farm lands (<0.5ha, 5-1ha and 1<ha<5). There were differences in production and marketing of sesame among the different categories of farmers. The relatively small farmers (in the first two categories) produce sesame once in a year by intercropping it with food crops and the major marketing mode for these farmers is farm gate selling. On the other hand the relatively larger farmers in the third category produce sesame independently in shifting cultivation with other crops and marketing is nonfarm gate. There is a significant difference on the price of a quintal of sesame (as high as 300birr) between the farm gate and market sell. Compared to all the other actors involved in the chain (assemblers, traders, wholesalers and exporters), the farmers have relatively low bargaining power.

However in general, sesame is more profitable than maize in both farm gate and market selling. The minimum farm gate profit of a quintal of sesame is more than maize by 309 birr (Euro 17.2). However, even though the farm gate profit is still high, it is significantly lower than the nonfarm gate profit. Nevertheless, most farmers still use the farm gate marketing system as a result of low production volume, poor road, transport communication and market infrastructures. The dissatisfaction of the farmers with the farm gate price is one explanation why the production is still at low level and not more farmers are joining the sector. The study showed that, even though income from cash crops is attractive, food insecurity condition of the community is the major rationale behind the farmers' preference of maize production than sesame.

However, even when it comes to increasing the production and marketing of sesame and other cash crops, the following are major constraints identified which put farmers in less competitive position when compared to other actors in the chain. Addressing these constraints is mandatory if farmers have to benefit from marketing their produce.

- Lack of knowledge and capacity of farmers in production and marketing
- Lack of input in close proximity and poor quality and access of agriculture extension services
- Lack of credit services to finance agricultural production and marketing activities
- Market inaccessibility compounded by poor market facilities, lack of reliable market information, under-developed infrastructure, and limited purchasing power of farmers

The research showed that cash crops, though not all, are feasible in the existing production and marketing chain for small holder farmers especially in economic returns as indicated by the profit calculation of sesame. They can be attractive options to increase incomes and spread risks among the various crops. However, the success of cash crops is contingent upon reliable markets and predictable returns.

This paper has also attempted to show Afar farmers crop selection criteria and the different scenarios on the pros and cons of food and cash cropping in the local context. It is not clear cut



case to suggest whether farmers would like and have to produce food or cash crops in the current context since there are more complex issues involved, the major one being the poverty and food insecurity of households that bounded the agriculture sector

Apart from the difficulty to meet food security through cash crop production, the other issue associated with cash crops discussed is the power distribution among men and women members of the households. In rural communities like Afar, women are often marginalized when it comes to cash crops, men may benefit more than women. Plus the money handled by men may not necessarily be spent on food which affects vulnerable members of the family, women and children.

Hence, though cash crop production generates higher incomes than food crops, as indicated by the profits for sesame and maize, small farmers who have yet to achieve household food grain security are unlikely to adopt cash crops to a significant extent, unless the crops prove to be secure options in the long run.

To sum up, the economic profit of sesame and maize indicated that cash crops can be feasible options for small holder farmers. However, in spite of the higher benefits in terms of cash, food crops will continue to play a very important role in the livelihoods of the population in the Aura and Uwa districts of Afar province. Farmers whose food grain needs are already secured from non-farm income or have surpluses, can opt for cash crops purely as income generating schemes. Farming households who still struggle to secure their food requirements can benefit from food and cash crops rather than putting all the emphasis on either food or cash crop. Hence, the most practical scenario, in this case, is the production of both food and cash crops since the constraints discussed would not make a complete switch possible. The case of many farmers in developing countries revealed that production for home consumption is maintained when farmers make the switch from food crops to cash crop production

Since it is difficult to conclude that all cash crops are feasible in the existing condition, further study is needed to identify which cash crops are feasible for the farmers in the study area. Relationship between sources of income and cash crop production and impact of transformation from food to cash crops are interesting issues, which can be further investigated.



6.2 Recommendations

Though complete shift from food crop production to cash crops is unpractical in the current context due to food insecurity problem of households, cultivating both food and cash crops is the best scenario to maximize household benefits and spread risks. However, to make the cash crop sector in general and the sesame subsector in particular attractive to farmers, mechanisms should be in place to address the identified production and marketing constraints. The author recommends the implementation of the following interventions so as to improve the existing situation.

1. Empowering the existing Farmers organization (Water users Association)

A potential exists for strengthening the present farmers water users association in both districts and to establish new producer's organization to develop the entire subsector, particularly to integrate the three categories of farmers as well as to improve farmers access to backward (seed, fertilizer, pesticide and other inputs) and forward (trading, wholesaling, export) markets to improve their profitability. The association can play a number of critical activities and can work as the central hub for the improvement of the subsector.

- Develop harmony, coordination and collaboration particularly for knowledge, information and experience sharing among the farmers
- Link farmers with inputs, technology, etc., as well as related service providers
- Link farmers with agriculture research institutions and extension service providers
- Organize capacity building programs based on the needs of the farmers
- Undertake/organize advocacy relating to issues affecting the productivity, profitability and growth as well issues related to access and availability of quality inputs, physical market, transportation, utilities, etc
- Take over and manage the irrigation scheme and in a sustainable manner

Empowering farmers and the association involves building the individual and institutional capacity of the farmers on necessary technical skills, leadership, planning and management, entrepreneurial skills, information and market researches. The local government district pastoral and rural development bureaus and SSD should focus more on the capacity building activities in their programs. The current approach of the organizations which is oriented more on physical irrigation infrastructure development should equally incorporate the software component of the development which is building capacity of beneficiaries.

2. Link farmers to markets and develop marketing arrangements

Currently, producers use different market outlets at different times of the year as a strategy to maximize profits. Special marketing arrangements are especially beneficial for small producers, who have difficulties selling small volumes in the conventional market system. Contract farming and collective marketing strategies are helpful in such cases. Linking farmers to markets and institutional buyers brings higher profit to farmers and minimize farm gate exploitation. For this objective to be achieved, farmers need to be organized and plan similar growing and marketing season of their crops. The already established farmers association is the best candidate to play the role of searching markets where farmers can sell their produce collectively. Building the



capacity of the association and farmers is mandatory for this recommendation to be practical which again demands the efforts of supporting institutions like SSD and district PRDBs.

3. Facilitate the establishment of informal credit facility

Since the formal banking system has not been organized and reinforced by financial policy reforms to deliver credit services to the subsistence oriented small holder farmers in the country, facilitating the establishment of informal credit service delivery system is the best alternative to address the financial problems of farmers. Credit and saving services are almost nonexistent in Afar province which urges the intervention of the local government and other stakeholders.

4. The Quality and coverage of the existing Extension Services should be Improved

Currently there is no private-sector involvement in agriculture extension service and input delivery in the area. The private sector involvement in agricultural input supply system and extension activities is vital for reliable, sustainable, competitive, and cost-effective economic development. This needs a policy reform towards which all stakeholders of the agriculture sector of the country should work on.

For the time being, improving the existing extension service delivery system is the only option. Many extension technicians of SSD and district pastoral and rural development bureaus, lack the expertise to provide adequate advice on certain technical matters. Both organizations should make efforts to raise the overall level of technical knowledge of extension officers.

The service provision should also be well organized and focus more on the knowledge and techniques farmers lack such as cultivation and post harvest management of cash crops.

5. Market Infrastructure Development

It is primarily the development of roads, telecommunication and market infrastructures to link producers with market centers. This involves improving infrastructural conditions such as roads, transport and telecommunication services which in the current condition are mandate of local government and private transport service providers.

Access to market and product information will allow producers to sell goods at a correct market value, understand the chain in which products are sold and therefore sell more directly; monitor trends, assess demand and plan accordingly, and diversifying products and applying best practice techniques where appropriate. In the study area producers/farmers access to market is generally limited. Therefore, to make farmers more profitable in any value chain, market infrastructure needs to be developed. Nevertheless, well organized farmers who have developed networks and partnership with chain actors and other stakeholders can endure and be competitive in difficult market infrastructure conditions

Therefore I believe that of the interventions recommended above, the most important is building the individual and institutional capacities of farmers as it is vital for sustainability of changes/interventions.



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Annex 1. The interview questionnaires

Semi structured interview for Case study

I. Interview Questions for Sesame farmers'

- 1. Name of Respondent ... Date...... Location......
- 2. Family and farm size (ha) of respondents?
- 3. How many cropping seasons do farmers have in a year?
- 4. How many seasons do farmers grow sesame in a year and why?
- 5. What cropping pattern do farmers use to grow sesame? (Intercropping, shifting cropping and with what crops) and why?
- 6. What percentage of their land do farmers use to grow sesame and the basis to decide that?
- 7. What do farmers think about cultivating sesame in large extent and why?
- 8. How does sesame production fit in the cropping pattern and calendar of the farmers?
- 9. What are the production costs for sesame (inputs, labor, equipments, others) quantified?
- 10. Of the produced amount how much is consumed and marketed?
- 11. What are the market outlets available?
- 12. Which market outlet do farmers prefer and why?
- 13. How much do farmers sell sesame quantified and based on outlets? What do they feel about the price (fair, low, high)?
- 14. Are there any special marketing arrangements between the market intermediaries and the farmers such as contract farming?
- 15. Are there collective marketing systems deployed by the farmers for sesame marketing? If yes, what is the advantage and disadvantage of collective marketing?
- 16. How and when do farmers get paid for their produce?
- 17. How do farmers get market information?
- 18. How do farmers get farm inputs?
- 19. How is the logistics organized?
- 20. How do farmers bargain for price and who decides on the quality and price in the chain?
- 21. What are supporting organizations and in what way do they support the farmers?
- 22. What challenges do farmers face in the production and marketing of sesame?

II. Interview questions for Traders/village level assemblers

- 1. Name of Respondent Location.....
- 2. How long have you been in this business?
- 3. Do you buy sesame from Aura and Alelesubula? Why?
- 4. How do you see the quality and quantity of sesame from Aura and Uwa?
- 5. At what price do you buy and who determines the price?
- 6. How do you feel about the price and how do you maintain the price?
- 7. Where do you sell the sesame and how do you determine the choice of the channel?
- 8. How much do you sell the produce?



III. Interview questions for wholesaler and retailers

- 1. Name of Respondent Location.....
- 2. How long have you been in this business?
- 3. Whom do you buy from? And how do you choose? Do you have know how where it is produced?
- 4. At what price do you buy from traders and who determines the price?
- 5. How do you feel about the price and how do you maintain the price?
- 6. Where do you sale the produce and how do you determine the choice of the channel?
- 7. How much do you sell the produce?

IV. Checklist for focus group discussion (SSD and district agronomy experts)

- 1. Name and office of participants Location.....
- 2. What are the main crops produced by farmers and what cropping system do they use?
- 3. In what way do you help farmers to make decision on type of crops to grow?
- 4. What are the overall supports provided to farmers
- 5. What are the pros and cons of producing cash crops/sesame/ for the farm households in the current production and marketing system?
- 6. What challenges do farmers face in the production and marketing of their crops?

Semi structured interview questionnaires for Survey

V. Interview questions for farmers

- 1 Name of Respondent Date...... Location...... Sex of respondent
- 2 What is your farm size? (ha)
 - a. <0.5 b. 0.6-1 c. >1ha
- 3 What is your family size?
 - a. 1-6 b. 7-15 c. 16-20 d. >21
- 4 What crop(s) do you mainly produce?
 - a. Maize b. sorghum c. sesame d. vegetables (specify) e. others (specify)
- 5 Have you ever produced a cash crop? If yes what crops and if no, why not?
- 6 Based on what criteria do you choose a specific crop to grow?
 - a. Food security b. profit/income from sale/ c. technical knowhow d. input availability e. others? Please specify
- 7 For what major criteria mentioned below did you choose or not choose to grow cash crops in general?
 - a. Food security b. profit/income from sale/ c. technical knowhow d. input availability e. others? Please specify (can choose more than one)
- 8 Who in the family has decision making power on production and use of cash crops a. Husband/men/ b. wives/women/ c. both d. others specify
- 9 How is access and decision making power of household members influenced by growing a food or cash crop?





Annex 2. Maize chain map of Afar province



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Annex 3. Production cost of sesame per one hectare of land									
	Labor (n	on cas	h cost	Equipme	nt (cash	cost)	Material (cash cost)		
Activity	Person days	Rate	Amount	quantity	Rate	Amount	quantity	Rate	Amount
Land Preparation									
Tractor rent				1	250	250			
Input									
Seed								25birr /Kg	84
Equipment				3	25	75			
Transport bags								5 per bag	66
Labor cost			800						
Planting			40						
Weeding	25	20	500						
Cultivating	13	20	260						
Harvesting			250						
Cut and Bundle	6	20	120						
Threshing	4	20	80						
Bagging									
Transport	2	20	50						
Sub total			1050			325			150
Total cost		1,525							
N.B – All costs re	lated to la	bor are	e family lab	oor					

Source: - VCA spotlighting my chain 2008, Own document



Annex 4. Production cost of Maize per one hectare of land									
	Labor (non cash cost) Equip				t (cash c	:ost)	Material (cash cost)		
Activity	Person days	Rate	Amount	quantity	Rate	Amount	quantity	Rate	Amount
Land Preparation									
Tractor rent				1	250	250			
Input									
Seed							23	6.5	150
Equipment				1	25	25			
Transport bags								5 per bag	150
Labor cost			1580						
Planting	3	20	60						
Weeding	30	20	600						
crop safeguarding	46	20	920						
Harvesting			220						
Harvest and bundle	4	20	80						
Threshing	4	20	80						
Bagging	3	20	60						
Transport									
Sub total			1800			275			300
Total					2375				
N.B All costs relate	d to labor a	re fami	ly labor						
Selling price of maize	e grain per q	uintal			14	0birr			
Selling price of maize straw per quintal 35 birr minimum and 40 birr m) birr ma	kimum			


Annex 5. List of Residents

	Name of Respondents (Farmers, case study)	Size of Farm Land
1	Sheik Seid Ahmed (Aura)	5ha
2	Hundeshek Abdu (Uwa)	3.5ha
3	Ahmed Burea (Aura)	1ha
4	Mohammed Ahmedu (Uwa)	0.8ha
5	Ali Kawye (Aura)	0.3 ha
6	Abo Humed (Uwa	0.3 ha

	Name of Respondents (chain actors, Case Study)	Function	
1	Ali Derba Bukusa	Local Assembler	
2	Ismael Seko	Local Assembler	
3	Gezahegne Wolde	Trader	
4	zemzem hussein	Trader	
5	Molla Kasaye	Wholesaler	
6	Fantaneh Abegaz	Wholesaler	
7	Munaye Tesfaw	Retailer	
8	Masresha Negash	Retailer	

	Name of Respondents (Focus Group Discussion)	Position	
1	Namrud Getachew	SSD Agronomy expert	
2	Derbe Getachew	SSD Aura –Uwa Project coordinator	
3	Mehari Belay	APRDB Agronomy expert	
4	Jemal Mohammed	UPRDB Agronomy expert	



	Name of Farmer respondents (Survey)	sex	Farm size	Family size
1	Melde Ali	М	0.3	6
2	Aytle Abdu	М	1	16
3	Umer Ali Abagar	М	0.3	6
4	Dawud Kelifa	М	2	14
5	Abdulaziz Mohammed	М	0.4	21
6	Fatuma Abdulkadir	F	0.3	6
7	Ado Walele	F	0.3	5
8	Seid Behne	М	0.3	12
9	Medina Ali	F	0.3	11
10	Hunde Abdu	F	0.3	9
11	Mama Abdo	F	0.3	15
12	Berento Mohammed	М	0.3	17
13	Bulahaba Konoyta	М	0.3	7
14	Ali Deto	М	0.6	12
15	Zahara Seko	F	0.4	5
16	Bidaro Konoyta	М	0.7	11
17	Kelifa Mohammed	М	5	22
18	Ali Bukusa	М	0.6	13
19	Ahmed Mohammed Asbera	М	1	6
20	Hassen Behne	М	3.5	19
21	Dawed Ebnale	М	0.3	5
22	Ali Wede Ello	М	0.4	10
23	Eysa Ismael	F	0.4	18
24	Umer Mussa	М	1	5
25	Bore Dufa	М	1	9
26	Hussa Berento	М	1	5
27	Keda Seko	М	0.3	16
28	Hassen Awel	М	0.4	6
29	Esmael Yayo	М	5	28
30	Hamid Ibrahim	М	1	5



Annex 6. Open Market in Woldia town



