

**ECONOMIC ANALYSIS OF SESAME VALUE CHAIN IN MASASI DISTRICT,  
MTWARA REGION, TANZANIA**

**RYOBA EMMANUEL MAGABE**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
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**ABSTRACT**

Sesame is among one of important economic crop for smallholder farmers and other actors involved in value chain. However, smallholder farmers have not fully benefited due to fragmented market and unimproved production. This study was conducted to assess the profitability of sesame actors along the value chain in Masasi District. The specific objectives were to identify the structure and functioning of the value chain; to determine the gross margin received by different actors along Sesame value chain and to determine the factors and their effects on the profitability along the sesame value chain in Masasi District. A survey of 126 randomly selected sesame farmers and 20 sesame traders was undertaken in the study area. Both qualitative and quantitative methods of data analysis were employed. Gross margin analysis was employed to determine the gross margin received by actors along the value chain. The results show that the key actors of sesame value chain include input suppliers, farmers, traders, commission agents and exporters. The findings also show that, farmers had a gross margin of 323.64 TZS per kg, while traders had a gross margin of 581.57 TZS per kg which was relatively higher than that of farmers. The major determinant factors for profitability of smallholder sesame producers were estimated by ordinary least square regression. The finding shows that the farmers' gross margin was influenced by household education level, household age, market information and extension services. To increase farmer's gross margin, the study recommends improving availability and accessibility of the market information network, farmers training, intensification of land utilization and value addition activity of sesame.

**DECLARATION**

I, **RYOBA EMMANUEL MAGABE**, do hereby declare to the Senate of Sokoine University of Agriculture, that this dissertation is my original work done within the period of registration and has never been submitted nor being concurrently submitted for a degree award in any other institution.

\_\_\_\_\_  
Ryoba Emmanuel Magabe  
(MSc. Candidate)

\_\_\_\_\_  
Date

The above declaration is confirmed by;

\_\_\_\_\_  
Dr. Evelyne A. Lazaro  
(Supervisor)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Dr. Fulgence J. Mishili  
(Supervisor)

\_\_\_\_\_  
Date

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**LIST OF ABBREVIATIONS AND ACRONYMS**

ADB	African Development Bank
ANOVA	Analysis of Variance
AMCOs	Agricultural and Marketing Cooperatives Society
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
DAICO	District Agricultural, Irrigation and Cooperative Office
ESRF	Economic and Social Research Foundation
GDP	Gross Domestic Product
GM	Gross Margin
GMA	Gross Margin Analysis
ha	Hectare
MTs	Metric Tons
kg	Kilogram
NARI	Naliendele Agricultural Research Institute
NBS	National Bureau of Statistics
OLS	Ordinary Least Square
RAS	Regional Administrative Secretary
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Package for Social Sciences
TEOSA	Tanzania Edible Oil Seeds Association
TR	Total Revenue
TVC	Total Variable Cost
TZS	Tanzania Shillings
UNIDO	United Nations Industrial Development Organization

URT	United Republic of Tanzania
VIF	Variance Inflation Factor

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background Information

Agriculture is the mainstay for majority of the people in most of countries in Africa. For example, in Tanzania, nearly 80% of the country's population is engaged in agriculture and is the main economic activity of the rural community (URT, 2010). The sector is the main pillar of food security at the household and national levels and it contributes to about 28% of the GDP and 24% of foreign exchange (Msambichaka *et al.*, 2009). Agriculture sector takes a vital role in livelihoods, employment, income growth, food security, poverty alleviation and socio-economic development in the country and in developing countries (World Bank, 2008; Gollin, 2010; Pingali, 2010). In order to understanding the role of agriculture as the source of all development endeavours, the government of Tanzania has designed Agricultural sector Development Strategy (ASDS) and Agricultural Sector Development program (ASDP) which aim to encourage the production and marketing of high value agricultural products with a view of increasing competitiveness in domestic and international markets. The policy is being implemented through District Agricultural Development Projects (DADPs) (URT, 2001).

The marketing systems of agricultural commodities mostly are determined by the type of production system (large scale or small scale), location and the nature of the product. Accordingly, the crop and livestock sector has different systems. Among the crops, one can distinguish oil crops, cereal, fruits and vegetable marketing systems. Distinction can further go to different groups of crops marketing systems. Among oil crops, there is a distinct marketing system for cotton, ground nuts and sesame. Sesame, which is the focus



of this study, has unique marketing system because of the fact that its production is concentrated in selected areas of the country.

Tanzania Sesame exports increased from 25 000 MTs in 2006 to about 76 710 MTs in 2012 and it is the main export oriented oilseed crop in Mtwara and Lindi which account for 70% of the total sesame export in Tanzania (Mwakalinga *et al.*, 2012). Local demand for edible oils in Tanzania is still very high compared to its supply due to inadequate supply seeds in the domestic industry (TEOSA, 2012). In 2010 the domestic demand for edible oils was 350 000 MT against a supply of only 95 000 MT. The gap is filled with import of other edible oils such as palm oil, at a preferential tax regime (SNV, 2012). This shows that Tanzania imports a lot of edible oil from outside the country and processing of oilseeds locally is important to capture the assured local markets (Olowe *et al.*, 2005).

According to Mwalukasa *et al.* (2002), there is no evidence that Tanzania is importing raw sesame; perhaps sesame oil may be traded though not in large quantity. Import tariffs for sesame oil is subject to the East African Custom Union whereby sesame oil is classified as a pro-cessed food and is subject to 25% import duty charged at ad valorem (ESRF, 2010).

By observing what is going on in Tanzania agriculture, one can claim that there is huge potential for sesame and other oil crops to contribute to the growth of agriculture sector in Tanzania but the industry has been constrained by several factors. These factors are mainly related to policies, legislations as well as the institutional framework (Kihenzile and Mashindano, 2013). For example, production of sesame in Tanzania is between 333.45 kg/ha and 555.75 kg/ha (URT, 2011). Despite all the potential that is noted in

oilseed sector, there are some constraining factors for realizing its potential such as policies, legislations as well as the institutional framework (Kihenzile and Mashindano, 2013). Likewise the current price setting and taxation systems are arbitrary, counter market functionality and transport monopolies are discouraging open market competition (SNV, 2012). Moreover, the autonomy and legitimacy of Agricultural Marketing Cooperatives (AMCOs) are limited because they are audited and regulated by the District Cooperative Officers who also approve their annual plans (Kihenzile and Mashindano, 2013). As a result only less than 5 percent of farmers are members of AMCOs. All these factors have significant impact on sesame marketing system and productivity of smallholder farmers in Masasi District.

Therefore, factors affecting sesame production and marketing in the study area were addressed by carrying out value chain analysis. Among the available marketing study approaches, value chain approach is employed due to its combination nature of both functional and institutional approaches. That is, one way to understand production and market performance of product is through learning the value chain (Mayoux and Grama, 2007). This includes studying the phases of production from raw material, processing, distribution, marketing until the product reaches the consumer and dispose after use (Kaplinsky and Morris, 2001). Thus a value chain approach allows performance analysis to be done at the microeconomic level.

## **1.2 Problem Statement and Justification of the Study**

Agricultural marketing in Africa has often been considered as nonstarter or as an activity of exploitation of farmers, especially when differences between the farm gate price and the consumer price are significant (Killick, 1989). Nonetheless, agricultural marketing has been constrained by various factors such as inadequate access to markets, insufficient

market information, poor capacity of agricultural marketing institutions, non-existence of product standards, poor coordination and integration of marketing channels and policy uncertainties (UNCTAD, 2009).

Among other factors, farmers in Masasi are also affected by low farm gate price especially after the so called trader's boycott during 2007 sesame harvest, whereby the Regional Government authorities in Mtwara proposed a system to be applied to most of the crops including sesame (Bennett, 2008) without consulting them in order to enhance the efficiency of the entire marketing systems and assist the development of input markets (Madulu, 2011). Although the system was established in Mtwara region in order to stabilize price, still the livelihoods of smallholder farmers and marketing systems are not improving. The reasons are that most of smallholder farmers have not opted to sell their sesame through AMCOs (Kihenzile and Mashindano, 2013) as directed. This is due to high government interference because it is mandatory for all farmers to sell crops through the cooperatives, which somehow violate free market principles and thus creating monopolistic tendencies on the side of cooperatives (Onumah, 2010). However, besides the Regional Government intervention, still sesame marketing channels were not well identified. Therefore, it is important that the sesame supply potential with the major production constraints is documented in order to guide the District and Regional to design appropriate regional intervention measures that will enhance its marketability.

Moreover, it is claimed that most of the reviewed value chains on different crops in Tanzania have little or no link between production and efficiencies. For example the studies of Kihenzile and Mashindano (2013), SNV (2012), NARI (2007) and Olowe, *et al.* (2005) have only covered issues on new varieties, productivity, marketing practices, marketing functions and value chain from the farmer to consumer in terms of handling,

value addition, packaging and marketing cost for sesame. However, these studies lack detailed information on the existing structure and factors influencing profitability of the crop at the farm level. This study therefore, sought of analysing the structure of the sesame value chain and determining factors influencing sesame profitability at farm level in order to inform farmers on how they can get access to urban markets. This will help to strengthen and establish farmers' groups as well as having formal contractual arrangement with their buyers. This study will also be useful to policy makers on drawing evidence based policies, extension worker to be able to guide and educate farmers accordingly and farmers themselves to understand the best ways to approach sesame markets in order to increase their margins.

### **1.3 Objectives of the Study**

#### **1.3.1 Overall objective**

The overall objective of this study was assessment of profitability of sesame actors along the value chain in the Masasi district in order to improve the returns of producers and other actors in the value chain.

#### **1.3.2 Specific objectives**

In order for the overall objective to be achieved, the study intended to:

- i. Identify the structure and functioning of the value chain in the study area;
- ii. Determine the gross margin received by different actors along the sesame value chain in the study area; and
- iii. Determine the factors affecting the profitability of smallholder sesame producers along the value chain in the study area.

#### **1.4 Hypotheses**

This study was guided by the following hypotheses:

- i. There is no well-functioning sesame market structure in Masasi District.
- ii. There is no significant difference in gross margin received by different actors along the value chain in Masasi District.
- iii. Socio-economic factors have no influence on profitability of smallholder sesame producers in Masasi District.

#### **1.5 Significance of the Study**

Interventions to improve output and expand markets of sesame and its products can extend chances to improve income of many rural poor households who depends on farming for their income. Nevertheless, uninformed interventions can cause imbalance of income distribution among key actors of the sesame value chain. The significance of this study is to provide information to policy makers and development partners for further informed interventions in the sesame industries in Tanzania and other parts of the world where such information is practiced.

#### **1.6 Organization of the Study**

This dissertation contains five chapters. Chapter one is the introduction, problem statement, objectives, hypotheses and the significance of the study; Chapter two presents literature review. Chapter three presents the approach and methodologies used in the study. Chapter four presents the findings and discussion. Chapter five presents the conclusion and recommendations.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 The Value Chain Concept

Value chain concepts have been defined differently by different scholars. Some scholars have used the term value chain and supply chain interchangeably. Fries, (2007) described value chain as the assessment of the actors and factors that influence the performance of an industry, relationship among the participants to identify the driving constraints to increase efficiency, productivity and competitiveness of an industry and on how these constraints can be overcome. Roedel *et al.* (2002) defined supply chain like industrial arrangements that allow buyers who are separated by time and space to progressively add and accumulate values as a product passes from one actor of a chain to another. UNIDO (2009) defines crop value chain analysis as a process of breaking a chain into its constituent parts in order to better understand its structures and functions along the chain.

The analysis consists of identifying chain actors at each stage and discerning their function and relationship, determining the chain governance or leadership, to facilitate chain formation and strengthening. Under the value chain analysis, identification of value adding activities is an important component since it tells the dynamic flow of economic, organizational and coercive activities involving actors from different sectors (Kaplinsky and Morris, 2001).

The flow of goods, information and finance through the various stages of the chain are evaluated in order to detect problems or identify opportunities to improve the contribution of specific actors (Kaplinsky and Morris, 2001).

## **2.2 Value Chain Researches in Tanzania**

### **2.2.1 Value chain approach**

A value chain approach focuses on the interaction of actors along each stage in supply chain. Understanding of the value chains originate from the filière approach (FIAS, 2007). This approach was developed by French researchers who studied vertical integration in agriculture. The French, who initiated studies in this arena prior to others, refer to “filières” which can be translated as “channels” (Bertrand *et al.*, 1984). It was soon applied to export commodity production of rubber, cocoa, coffee and cotton in France’s former African colonies (Bertrand *et al.*, 1984). Most research was done by agricultural scientists interested in increasing the efficiency of these value chains by improving the functioning of public marketing institutions and reducing transaction costs involved in dealing with farmers. According to filière-approach, the measurement of input-output relations, prices and value added at different stages of the production in the chain was relatively easy to do in fairly homogeneous commodities which were mainly regulated by State marketing boards (FIAS, 2007).

The value chain approach offers a rationale and a practical approach for using value chain analysis as an empirical tool in identifying constraints to industrial growth and competitiveness (FIAS, 2007). In increasing value, the value chain needs to meet consumer demand. However, to meet consumer demand is not enough; the actors in the value chain need to meet consumer demand better than actors outside of the value chain and therefore, the chain actors have to be competitive (Goletti, 2004). Moreover in order to keep competitiveness, the value chain needs to innovate continuously; otherwise their initial gains in competitiveness will be eroded over time. In addition in order for the chain to establish effective linkages, the chain needs to distribute benefits that provide incentives to the participants. However, if only one party in the value chain appropriates

all the benefit, the chain will not be sustainable in a market system (Goletti, 2004). Therefore for the case of sesame farmers they often registers dissatisfaction about receiving low prices compared to the other actors in the supply chains (traders, processors, transporters, AMCOs, etc.). The causes behind the low prices received by farmers along the crops value chain include the relatively small quantities traded by individual farmers, poor access to market information by farmers and the inability of farmer to intervene further up the value chain (Nkuba *et al.*, 2003). The degree of efficiency of transport systems is, therefore, a major determinant of market access, having a critical influence on farmer and consumer prices. Large gaps between farmer prices and consumer prices often signal an inefficient marketing system with a multitude of intermediaries who add little value (Goletti, 2005).

### **2.2.2 The use of value chain approach in Tanzania**

Value chain approach in analysing crop business has gained popularity among researchers and scientists in recent years. Several researchers have employed the approach to analyse different agricultural commodities and in assessing the profitability of smallholder agricultural farming and the factors affecting it. There is a rich history of researchers using gross margin analysis as a tool to determine efficiency and profitability of different crops, and regression analysis to determine factors affecting these systems (Van der Land and Uliwa, 2007). In addition Njau (2008) carried out similar work which assessed the performance of cassava value chain and determine the profitability to determine the most profitable value adding activity. A study by Osotimehin *et al.* (2006) examined the profitability as well as operational efficiency of milk processing enterprise in Nigeria using budgetary analysis. This resulted in the calculation of net farm income for processors hence omitting the profitability for dairy farmers. A study by Ngatingwa (2008) employed the value chain approach in generating information to inform policies



and describing strategies for adding value to the existing value chain for tomatoes in Mvomero District of Morogoro Region. Ngatingwa (2008) employed gross margin approach to determine the profitability of tomatoes. Otieno *et al.* (2009) undertook the economic evaluation of relative profitability in smallholder dairy farms in western Kenya whereby he used farmers' profit levels generated by gross margin analysis in comparing their relative efficiency in dairy farming using regression analysis. Therefore, these empirical literatures on profitability of smallholder farming forms the basis for carrying out an economic analysis of the sesame value chain in Masasi District. However, unlike the previous studies, this study took into account analysis of the market structure and the gross margin received by different actors along the sesame value chain.

### **2.3 Coordination of the Value Chain**

Coordination implies a set of two or more actors who perform tasks (example, collaborative value creation) in order to achieve goals. The coordination of value chain is the act of organising all stakeholders involved in the value chain in a better way. Coordination means managing the dependencies between activities and is therefore a core aspect of inter-organizational value creation (Riemer *et al.*, 2004). According to Goletti (2005), market linkages between actors in production in developing countries are extensive and complex (Goletti, 2005). Therefore, for a particular product to reach the consumers it has to pass through many different hands, packing, unpacking, grading, sorting, handling and transportation several times. On the way it is packed, unpacked, graded, sorted, handled and transported many times. This has significant consequences not only for the quality of the product when it reaches the consumer, but also for the efficient organization of the agricultural marketing system, which implies that organization of several actors is over the important factor in improving the efficiency of agricultural marketing system in sesame.

In addition, linkages cannot be effective without trust among stakeholders in the chain. A study by Mbiha (2008) on analysis of the dairy value chain in the Dar es Salaam found that almost all contracts reported by actors were verbal or written without lawyer assistance. This means that the linkage between actors was weak as there was no enforcement mechanism between them. Also, study by Kabuje (2008) on analysis of the value chain for hides and skins in Dodoma and Arusha regions found that vertical coordination and linkage between actors was weak as only 35% of butcher owners in Dodoma had informal contract with wholesalers.

Furthermore, contractual arrangements with firms can lead to value chain efficiency. The smallholder farmers are expected to enjoy more benefits from contract farming because they need inputs (cultivars and fertilizers) on credit (Tuan *et al.*, 2005). Also, having guaranteed market is a very crucial deal to farmers. For example, Nkuba (2007) found that during the high peak periods of banana supply, local markets were not able to absorb all bananas being sold by farmers and even the market outside the Kagera region could not absorb the banana surpluses either. This situation lowers bunch prices despite of large bunch sizes of new banana variety and reduces the adoption rate. Therefore, with effective linkages, coordination can range from informal agreements between farmers to coordinate purchases and sales, to groups that are formally constituted to facilitate collective action (like farmers' associations) and ultimately to groups that elect or hire managers (like farmers' cooperatives and investor owned companies).

Finally is horizontal coordination, this can reduce transaction costs and improve smallholders access to preferred markets, group arrangements introduce other costs and institutional problems that discourage smallholder participation and investment (Lyne and Collins, 2008; Cook and Iliopoulos, 2000). Horizontal coordination would be more

helpful to farmers if they could join their effort through associations and/or cooperatives because the informal and poorly organized supply networks is a big challenge/constraint to them due to little knowledge of modern agriculture; extension services are under-performing; farmers lack access to capital/loans and assets (for example, irrigation, storage) (Cook and Iliopoulos, 2000).

#### **2.4 Measures of Efficiency in Value Chain**

The question of how to measure efficiency has received considerable attention in economic literature. Following the work of Farrell (1957), efficiency can be defined as the ability to produce a given level of output at lowest cost. The concept of efficiency has three components: technical, allocative and economic. Technical efficiency is defined as the ability to achieve a higher level of output, given similar levels of inputs. Allocative efficiency deals with the extent to which farmers make efficient decisions by using inputs up to the level at which their marginal contribution to production value is equal to the factor cost. Technical and allocative efficiencies are components of economic efficiency. It is possible for a firm to exhibit either technical or allocative efficiency without having economic efficiency. Technical and allocative are therefore necessary conditions for economic efficiency (Abdulai and Huffman, 2000).

While technical efficiency may remain unaltered by transactions costs, this is certainly not the case for allocative efficiency, which needs to be measured relative to firm specific effective prices. One convenient approach for measuring efficiency under transactions costs uses the concept of profit efficiency (Sadoulet and de Janvry, 1995). The profit function, unlike the production approach, combines both technical and allocative concepts in a profit relationship, and any errors in production decisions are translated into lower revenue for the producer (Ali and Byerlee, 1994) and, hence, lower profit efficiency.

Profit efficiency is defined as the ability of firm to achieve the highest level of profit given the specific effective prices and specific levels of fixed factors of that firm. This study, therefore determined profit margins at various stages of the sesame value chain as a measure of efficiency in the sesame value chain.

## **2.5 Measures of Profitability**

Although a business can have other objectives apart from profit making for attaining economic viability and growth, any business must make a profit in the long run. Profit level from economic theory point of view indicates productive and allocative efficiencies of the business firms (Mutabazi, 2002). Profit margin is the difference of the final price the customer pays and the sum of all costs incurred with the production and delivery of the product/service. It is normally presented in percentage. Within the whole value system, there is only a certain value of profit margin available. It was used to indicate who amongst actors has more influence in the value chain, as it is assumed that, the more profits one gets the more influential one is in the chain. Its main advantage is that it includes all costs incurred by chain actors. However, this margin distributed across the suppliers, farmers, distributors, customers, and other elements of the value system depend on the structure of the value system (Porter, 2001). Each member of the system will use its market position and negotiating power to get a higher proportion of this margin. According to Pomeroy and Trinidad (1995), analysis of profit margin or net returns aims to verify the existence of above average profits. If markets were perfectly competitive, net returns would roughly equal a fair return to ones capital. However, oligopolistic market structure would tend to increase returns as price distortion as well as bias buying and selling practices.

## **2.6 Marketing Margin**

Reardon and Timmer (2005), defines marketing margin in absolute and relative terms. In absolute terms marketing margin can be defined as the difference between the price paid by the consumers and that obtained by the farmers based on absolute levels of prices. Tomek and Robinson (1981) defines marketing margin as the price difference between two market levels. They argue that, marketing margin can be affected by number of factors such as distance to be covered, adequacy of transport, effectiveness with which various separate activities are carried out and services are provided. Marketing margins expressed in percentage terms are dependent on the relative levels of prices. It is a common means of measuring market efficiency through evaluating price efficiency. High marketing margin may imply high marketing costs and/ or profits, if one or two or both are extremely high or low, it indicates that the market is not efficient in coordinating allocation of resources (Mdoe and Mnenwa, 2004). For an efficient market, marketing costs and profit ought not to be too low or too high, and so do marketing margins. According to Mendoza (1995), high marketing margin may sometimes result in little or no profit or even loss for the seller involved, depending on the marketing costs as well as the selling and buying prices. Marketing margin measures the share of final selling price that is captured by a particular agent in the marketing chain.

## **2.7 Factors Affecting Profitability**

Measurement of efficiency remains an important area of research both in developing and developed countries. According to Abdulah and Huffman (2000), efficiency goes a long way to determine the profitability of an enterprise and agricultural growth. Though, various studies have examined the issues of productivity and technical efficiency of farmers, only a few of them dwell on Sub-Saharan Africa and only one was in Tanzania by Msuya and Ashimogo (2006). Of the few studies that have analyzed efficiency in sub

Saharan Africa Agriculture include those of Okike (2000), Udoh (2000), and Tchale and Sauer (2007). Several studies on efficiency have been carried out in Nigeria like those of Udoh (2000); Amaza and Olayemi (2000) and Okike (2000). Udoh employed the Maximum Likelihood Estimation (MLE) of the stochastic production function to examine the land management and resource use efficiency in South-Eastern Nigeria.

An understanding relationship between profit and the social economic characteristics could provide the policy makers with information to design programs that can contribute to measures needed for improving efficiency along the sesame value chain. In all farming activities, human physical energy is required. The level of active involvement by individuals in their farms to a large extent determines their production output levels. The age of the farmer is also an important factor in agriculture because it may affect the level of efficiency at the farm level (Nganga *et al.*, 2010). Influencing profit efficiency also is the farmer education level. This is because efficiency in agriculture production, that is, in terms of quality and quantity, speed of new technology adoption and rationalizing of input, may boost the output hence increasing the volume of sales as well as gross margin. (Nganga *et al.*, 2010).

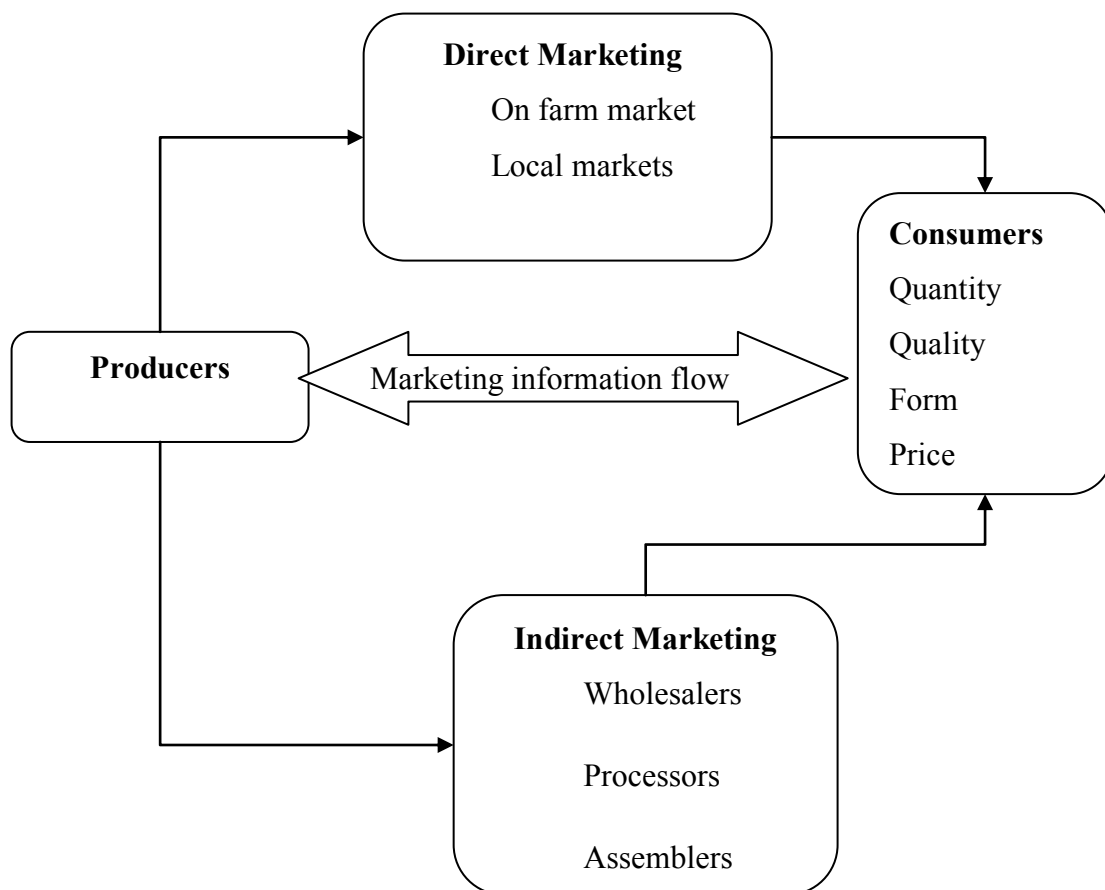
Education represents human capital and it is hypothesized to have a positive impact on efficiency, Nganga *et al.* (2010) in their study found that the level of education, age of farmer, experience measured in years and farm size have a significant effect on the profit inefficiency. The negative and significant coefficient of education variable indicates that higher education reduces profit inefficiency. A negative and significant coefficient of farm size and experience was also found and indicates that farmers who have more experience and farm size tend to exhibit higher levels of profit efficiency. However, completely in line with a priori expectation, a positive and statistically significant

relationship was found between age of the farmer and profit inefficiency (Lockheed *et al.*, 1980).

In this study factors hypothesized to influence profitability of sesame were the main occupation of the household head, membership in an organization, education level, means of accessing market information, extension visit, household size, land size, farming experience and selling price. Main occupation of the sesame producer is hypothesized to increase efficiency as would tend to make farmers concentrate and devote more attention and resources to the sesame sector, thereby gathering information, making decisions, and adopting technologies that increase efficiency.

## **2.8 Conceptual Framework**

The conceptual framework (Fig. 1) shows two options as alternatives to sesame farmers to market the sesame products. The first options are direct marketing where a producer sells his/her products directly to the ultimate user through on farm markets or local farmer markets. The second option is indirect marketing where producers deal with the intermediaries rather than the ultimate final user. In these assemblers, wholesalers, processors and retailers buy sesame from producer. Consumers often have specific requirements for product based on quality, form and quantity, including its availability. The main link among them is the information flow between these two pillars (Producers and consumers). Therefore presence of different marketing opportunities to producer help them to choose the best option, while the information obtained in the markets act as a guideline to the sesame producers.



**Figure 1: Conceptual framework**



## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Description of the Study Area**

The study was conducted in Masasi District, Mtwara Region. The district is known for high production of sesame and cashew (RAS, 2012). Masasi District is located in the Southern, Eastern part of Tanzania. The District is situated between latitudes 10° to 12° to the South of Equator and Longitudes 36° to 38° East of Greenwich with an elevation of 470 meters above sea level (URT, 2008). It has a total area of 3868.5 square km which is 23 % of the total area of Mtwara Region (Fig. 2).

According to 2012, Tanzania National Population Census, the total population of the District was 247 993 people, of whom 118 976 were males and 129 017 were females with an annual growth rate of 2.1% (URT, 2013). The major economic activities in the study area are agriculture and livestock keeping. The major crops grown are cashew nuts, paddy, sesame, groundnuts, maize, pigeon peas and horticultural crops. Livestock kept include cattle, goats, sheep, pigs and poultry. Over 90 per cent of people live in rural areas and their livelihood depends mainly on farming.

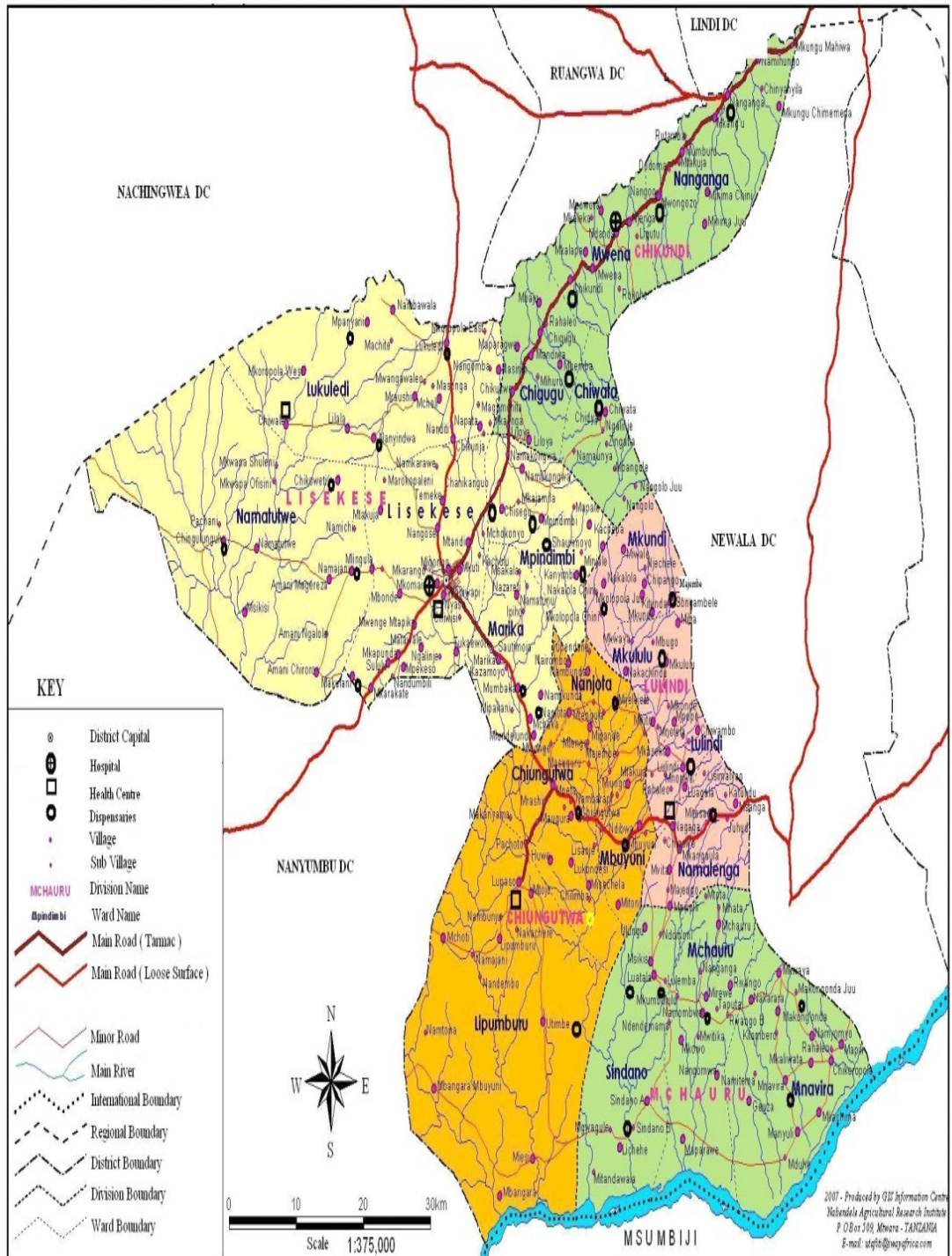


Figure 2: Map of Masasi District

Source: Masasi District Council (2013)

## **3.2 Research Design**

The research design for this study was a cross-sectional, where data were collected at a single point and time. The reason for choosing this design was simply because it is flexible, economical and easy to work on data and information extraction (Bailey, 1994). Also, the duration of the study was very short therefore, cross section design was deemed appropriate.

## **3.3 Sampling Frame and Procedure**

### **3.3.1 Selection of sample wards and villages**

The sampling frame consisted of smallholder sesame producers and traders. Firstly, a purposive sampling technique was used to draw a sample of two wards from the list of 22 wards in Masasi District based on the production potential of sesame in the District. Secondly, one village was randomly selected from each ward. The list of wards was obtained from the District Planning Office while the list of villages in each ward was obtained from Ward Government Offices. Kivukoni and Mpanyani villages were selected from Chiwale and Mpanyani wards respectively (Table 1).

### **3.3.2 Selection of producers' sample**

From a sampling frame of sesame producers provided by village officers, 126 sesame producers were randomly selected from the lists obtained from village executive officers. The sample consisted of 62 and 64 sesame producers from Kivukoni and Mpanyani villages respectively (Table 1). Numbers in brackets are sesame producers presented by village executive officers, where samples were randomly selected.

**Table 1: Distribution of sample farmers by selected wards and villages**

Wards	Village	Total
Chiwale	Kivukoni	62 (563)
Mpanyani	Mpanyani	64 (650)
Total		126 (1223)

Note: In the parenthesis is the sample frame for each respective group

The sample size was determined by the formula proposed by Gupta and Kapeor (2002),

$$n = \frac{N}{1 + Ne^2} = \frac{1223}{1 + 1223(0.05)^2} = 301 \dots\dots\dots(1)$$

Where; n = sample size,

N = population size (total number of households affected by a phenomenon being studied),

e = the level of precision, (0.05)

1 = a theoretical or statistical constant.

It was intended initially to conduct an interview with 301 respondents as from the formula above. Unfortunately because of the farm activity, limited time and funds I end up collecting information about 126 households. This sample size was statistically large enough for inferential analysis. In conformity with Gupta and Kapeor (2002) who reported that the minimum sample size should at least be 30 cases, regardless of the population size.

### 3.3.3 Selection of traders' sample

A total of 20 sesame traders were randomly selected from sampling frames provided by AMCOS chairman of selected village of Mpanyani and Kivukoni in the District. The

identification of sample traders was carried out at their selling/buying points in the village.

### **3.4 Data Collection**

A single household was taken as the basic survey unit to get the information for the analysis. A household was defined as a number of people (it may be only one person) living and eating together in the same dwelling who share the same budget. Given that the household is a production unit, a farm is defined as all the agricultural activities under the control of the household members. A structured questionnaire was designed to elicit answers from the households (see in Appendix I). Data on the size of land cultivated, quantity of output, quantity and cost of input, labour used for land preparation, planting, inputs applications, harvesting, extension services, household income, extension service and the problems faced during the marketing of the crop were collected. The survey was carried out in two phases. Phase one was done as pre-survey to the research site. This was achieved through interviewing with village leaders in the selected wards. Phase one of field work was followed by a second phase, household survey guided by the information generated from phase one of site visit. The main activities during the entire survey consisted of identifying, interviewing and meeting various stakeholders in the Masasi District.

#### **3.4.1 Primary data collection**

Primary data were collected from farmers using a structured questionnaire designed to collect general and specific data from the sampled farmers and traders. The questionnaire had a section on background information including household size, age, gender and education of the respondent, production cost, marketing prices and challenges faced by the respondent. Specifically, the section for farmers was designed to collect qualitative

and quantitative data on sesame production and management practices. On the other hand, the questionnaire for the traders was designed to collect information on sources of sesame and on the transaction cost thus buying and selling costs. Apart from structured questionnaire, discussions with key informant were used to supplement the questionnaire survey.

### **3.4.2 Secondary data collection**

Apart from data collected through the key informants' interviews and the household survey, the data were supplemented by gathering an enormous amount of secondary data through literature reviews. Information on agricultural production, land size and the population together with maps were collected from reviewing reports from the Masasi District Agricultural, Irrigation and Cooperative Office (DAICO office), Sokoine National Agricultural Library (SNAL), NBS and Ministry of Agriculture and Food security.

## **3.5 Data Analysis**

### **3.5.1 Analytical techniques**

To achieve each specific objective, both quantitative and qualitative methods of data analysis were carried out. The analysis included descriptive statistics (mean and standard deviations) to describe the general characteristics of the data. The quantitative analysis involved the use of Gross Margin (GM) and regression analyses. The gross margin was computed to measure profitability along the chain while the regression analysis was used to determine the factors which influence performance in term of profitability of sesame at farm level.

### 3.5.2 Value chain mapping

Identification of the value chain of sesame (from producers to the ultimate consumers) was done by identification of players in the chain. Under these, the key actors involved in the production and marketing were identified, including the channels used to pass the product until it reaches the ultimate final consumers. To facilitate the mapping of the value chain, an initial map was drawn using the data collected through key informants' discussion. The information obtained from key informants enabled to describe the value chain map and relative function of each actor. The map indicated that there were input suppliers, producers, traders and exporter. After getting detailed data collection, the map was adjusted.

### 3.5.3 Gross margin analysis

Gross margin was used in this study to establish the relative economic profitability of sesame actors at different (nodes) levels of the value chain. This was done to address the second specific objective of the study. The Gross Margin model is presented in equation 2:

$$GM/Kg = \sum \frac{TR - TVC}{Salesvolume(Kg)} \dots\dots\dots(2)$$

Where:

$GM$  = Gross Margin per kg in Tanzanian shillings (TZS/kg)

$TR$  = Total revenue from sesame (TZS)

$TVC$  = Total variable cost incurred in sesame (TZS)

This margin was used to compare the profit accrued by the actors in the chain. The gross margin of individual farm household per acreage was also calculated as follow;

$$GM/Hectare = \sum \frac{TR - TVC}{Farmsize(Hectare)} \dots\dots\dots(3)$$

Where:  $\frac{GM}{Hectare}$  = Annual Gross Margin (GM) per ha

TR = Total revenue from sesame (TZS)

TVC= Total variable cost incurred in sesame (TZS)

The margin was used as dependent variable in regression analysis to determine factors contributing to the level of farmer's gross margin in a given acre of sesame production.

### **3.5.4 Limitation of gross margin analysis**

In using gross margin it is simple to understand the logical interrelation of economic and technical parameters and forecast of the national structure of an enterprise which are the key strengths of gross margin as an economic analysis tool. Regardless of the advantages, gross margin has the inability to take into account for variations in fixed cost structure within or among enterprises. The economic farm surplus was used alongside gross margin analysis in order to take care of the inability of the gross margin technique to take into account for the variability of the fixed cost for different farms (Philip, 2001).

### **3.5.5 One way ANOVA**

One way ANOVA was used to compare the gross margin obtained in equation (2) above by actors at each node of the value chain. This was used to test hypothesis that there is no significant different actors in the chain.

### **3.5.6 Regression analysis**

The empirical literature on agricultural economics reflects the investigation into the relationship between factors used in production and profitability by means of multiple regression methods (Olubiyo *et al.*, 2009). Studies conducted by Nchinda and Mendi (2008) and Chagunda *et al.* (2006) have demonstrated the effects of various factors on



profitability of smallholder dairy enterprise by use of multiple regression models. In this study, the linear regression analysis was used to test the extent to which gross margins are statistically dependent on the explanatory variables influencing performance in sesame production. This was done in addressing a specific objective number three in order to test which variables and at what extent they contribute to farmers' gross margin in sesame production. The empirical model was employed to analyze the factors influencing farmer gross margin in sesame production. The model was specified as follows:

$$Y_t = \beta_0 + \beta X'_t + \varepsilon_t \dots \dots \dots (4)$$

Whereby;  $Y_t$  = The annual gross margin per hectare of sesame,

$X'_t$  = Vector of explanatory variable representing factors influencing changes in  
Sesame profitability along the value chain and

$\beta_0$  = An intercept

$\beta$  = Coefficient of explanatory variable

$\varepsilon_t$  = Stochastic error term.

On the basis of the variables the empirical regression model was specified as follows:

$$Y_t = \beta_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \beta_1 Age + \beta_2 HHS + \beta_3 EstVist + \beta_4 Farmexp + \varepsilon_t \dots \dots \dots (5)$$

Whereby  $Y_t$  = Annual gross margin per hectare,

$D_1$  = Household gender (dummy, 1= male; 0= otherwise),

$D_2$  = Household education (dummy, 1=no formal education; 0= otherwise),

$D_3$  = Market information (dummy, 1=access to information; 0= otherwise),

$Age$  = Household age in years used in production (treated as dummy: 1 = age group  
between 18 and 55years; 0=otherwise)

$HHS$  = Household size,

*EstVisit* = Extension visit (number of times the farmer visited per season by extension office)

*Farmexp* = Farming experience (measured in years)

$\beta_i$  = The coefficient's estimate of independent variable,

$\alpha_i$  = The coefficient of dummy variables.

$\varepsilon_i$  = Stochastic error term.

### 3.5.7 Description of the variables used in the model

All the variables above i.e. household gender, household education, access to market information, household age, household size and extension visit are assumed to a positive influence in agricultural production. Age is a demographic variable and is measured in years in the analysis age was grouped in categorically the treated as dummy. The expected influence of age is assumed positive since it is a proxy measure of farming experience of the household. Active aged group households are believed to be wise and gain skills easily in agriculture and marketing (Abebe, 2009). Gender focuses on the relationship between men and women in terms of their roles, accessibility to and control over scarce resources. A study conducted by Oladeebo, (2012) shows that gender has a positively influence in agricultural production.

Hence in this study it was expected that gender has positive influence on yield of sesame. Household education also is a major input for agricultural production. Studies conducted by Gizachew (2005) and Rehima (2006) showed that education was positively related to household market participation and marketed volume. It is expected that if a farmer acquired good training on production husbandry, the crop yield would increase. Agricultural extension services assist farmers to distinguish and examine their production

constraints and become mindful of opportunities for improvement by changing their outlook towards their difficulties. In addition, extension visits help to reinforce the message and enhance the accuracy of implementation of the technology packages (Oladeebo, 2005). The area under cultivation is the major input for agricultural production in rural households. The total size of farm land cultivated by a farmer is among the variables that could influence crop yield. If a farmer cultivates more land, the probability of crop yield for sesame would increase. The total cultivated land should have a positive relationship with income of a household (Kamara *et al.*, 2005). Access to market information was measured as a dummy variable taking a value of 1 if the farmer had access to market information and 0 otherwise. It has been speculated to affect positively sesame marketable supply of farm households. Because, producers that have access to market information are likely to supply more sesame to the market. Takele (2010) he noted that better market information significantly raises the probability of market participation for potential selling households.

### **3.6 Limitations of the Study**

Much of primary information was gathered through interview. An error resulted from respondents in one way or another was a limiting factor. Interview relied on the respondents to remember information, thus it was difficult to get the precise data on production and cost incurred due to poor record keeping. These pitfalls affected precision in some of the information gathered. To minimize errors, the researcher had to be more careful so as to get accurate and reliable information through review of various accounts and documents, interviewing the key informants and triangulation of data made by households. The study was limited to quantifiable data on processors and consumers because there were no processors found in the study area because all sesame was exported out of the District.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Overview**

This chapter presents and discusses the main findings of the study. It is organized into five sections. The first section presents the socio-economic characteristics of respondents who participated in the study. In this section demographic factor such as age, gender, education and household size are discussed. The second section depicts the institution framework of sesame in the study area. The third section presents the mapping of sesame sector in the chain. The fourth section presents the profitability analysis of sesame in the chain and the fifth section looks into the factors affecting profitability of smallholder's sesame producers in the study area along the chain.

#### **4.2 Socio-economic Characteristics of the Respondents**

The characteristics of given respondents have important on social and economic implication in accessibility, participation and decision of marketing produce within households. The composition of a household usually influences the decision on marketing. This section describes the characteristics of sampled households based on age, gender, education level of respondents and household size in relation to sesame marketing within farmer's head of household and traders.

##### **4.2.1 Distribution of the sampled farmers by age**

Age of the household head is an important aspect in agriculture, because it determines the experience one has in a certain type of farming. In addition, to a certain extent, age indicates the position of the household in the life cycle. Jari (2009) states that household

head's experience influences household members' farming activities since they usually get guidance from the head. The study findings shows that about 46% had age between 41 and 55 years, 33% had age between 25 and 40 years, 18% had age above 55 years old and 3 per cent of household head had age below 25 years. The maximum age was 72 years and the minimum age was 20 years while the mean age was 44.27 with standard deviation of 10.89. The age of the household head determines whether the household benefits from the experience of an older person, or have to base its decisions on the risk-taking attitude of a young farmer. Table 2 shows that, the largest age group was the 41-55 years which accounted for 46%. This affirms that young people are massively involved in farming. These findings are in line with the findings of Ayele (2011) and Mkojera (2008) which indicate that active participants in farming activities ranged between 40 and 50 years.

**Table 2: Distribution of the sampled farmers by age**

<b>Age group</b>	<b>Frequency</b>	<b>Percent</b>
Below 25 years of age	4	3
Between 25 - 40 years of age	42	33
Between 41 - 55 years of age	58	46
Above 55 years of age	22	18
Total	126	100
Mean age	44.27	
Minimum age	20	
Maximum age	72	
Standard deviation	10.898	

#### 4.2.2 Distribution of the sampled farmers by gender

The findings as presented in Table 3 show that out of the 126 sampled respondents, about 64% were male headed while 36% were female headed. High involvement of men could be due to the importance of the sesame sector in the economy of the household in this area, the findings are in line with the findings of Ellis *et al.* (2008) that as in the other parts of Tanzania, men in most cases are the owners of resources and decision makers in the family. The participation of both sexes in the production shows its importance both as an economic activity and for food security.

**Table 3: Distribution of sampled farmers by gender**

<b>Gender</b>	<b>Frequency</b>	<b>Percent</b>
Male	81	64
Female	45	36
<b>Total</b>	<b>126</b>	<b>100</b>

#### 4.2.3 Distribution of the sampled farmers by education level

Human resource plays a substantial role in economic development. Literacy and education enable farmers to increase crop productivity through better management of other resources. It plays an important role in the adoption of innovations/new technologies. Further, education is believed to improve the readiness of the household to accept new idea, innovations and better use of market information, which in turn reduces marketing costs and make it profitable to participate in the market channel entry decision and increase volume of sale (Somano, 2008). The study findings show that about 77% of the household heads had completed standard seven, 14% had not attended any formal education and 9 per cent had completed secondary education (Table 4).

**Table 4: Distribution of sampled farmers by education level**

<b>Education level</b>	<b>Frequency</b>	<b>Percent</b>
Completed standard seven	97	77
Completed secondary education	11	9
No formal education	18	14
Total	126	100

#### **4.2.4 Distribution of the sampled farmers by family size**

Household size may affect the availability of family labour involved in farming activities. The results in Table 5 show that about 65% of household head had a family size of 4-6 members, 33% of the household heads had a family size of 1-3 members and 2% had a family size of above 6 members. The minimum household size was one and maximum household size was 8. This suggests that participation was associated with large household size probably due to higher labour requirements for performing some farming activities.

**Table 5: Distribution of sampled farmers by family size**

<b>Family size number</b>	<b>Frequency</b>	<b>Percent</b>
1-3	41	33
4-6	82	65
Above 6	3	2
Total	126	100
Minimum 1.0		
Maximum 8.0		

#### 4.2.5 Distribution of the sampled traders by age

The analysis in Table 6, shows the distribution of the sampled sesame traders by age. The mean age of sampled traders was 42 years with a minimum and maximum age of 34 and 48 years respectively. This is an indication of having traders who are young and energetic to performing sesame production.

**Table 6: Distribution of trader by age**

Age category	Frequency	Percent
18-33	2	18
31-45	15	72
41-57	3	10
Mean age	42	
Minimum	34	
Maximum	48	
Std. deviation	8.28	

#### 4.2.6 Distribution of the sampled traders by gender

The results in Table 7 shows that, 80 per cent of the sampled traders were males. The male dominance in sesame business was due to the fact that the business involve being away from home for some days due to travelling along distance as well as walking on foot to collect sesame from farmers.

**Table 7: Distribution of sampled traders by gender**

Gender	Frequency	Percent
Male	16	80
Female	4	20
Total	20	100



#### 4.2.7 Distribution of the sampled traders by education

Table 8 shows that 70 per cent of the sampled traders had attained primary education. Only 30 per cent of them had never gone to formal education. This suggests traders having limited knowledge and skills in performing sesame business.

**Table 8: Distribution of sampled traders by education**

Description	Frequency	Percentage
No formal education	6	30
Primary	14	70
Total	20	100

### 4.3 Sesame Production

#### 4.3.1 Scale of sesame production

Sesame production in the study area is dominated by smallholder farmers with the farm size ranging from a minimum of 0.10 ha to a maximum of 5.26 ha with an average of 1.61 Ha per household and standard deviation of 0.95 (Table 9).

**Table 9: Scale of sesame production**

Statistical measure	Farmer category
Mean	1.61
Minimum	0.10
Maximum	5.26
Standard deviation	0.95

#### 4.3.2 Amount of sesame produced, sold and consumed at home

Sesame is grown mainly for the market and is the second cash crop in the study area after cashew nut. Very recently, the sesame international markets have become so attractive

that many actors are involved in sesame marketing. Table 10 shows sesame production in the study area, the average sesame yield was 304.32 kg/ha. This production per hectare is low compared to that of other sesame producing area in the country. The average national production is between 333.45 kg/ha and 555.75 kg/ha (URT, 2011). The study clearly indicated that on the average 98 % of sesame produced had been sold to the market while the remaining was for home consumption for food and saved seeds for the next production circle. When statistically tested, the difference between the quantities of sesame seed sold and quantities of sesame seed consumed was not significant at the 5 % level. This implies that the producers in the study area grew sesame mainly for commercial purpose, and little for family consumption.

**Table 10: Sesame produced, sold and consumed in kilograms per hectare**

Variable	Min	Max	Mean	Std. dev	%
Sesame production (kg)	33	1788	490.35	292.9	
Sesame sold in (kg)	28	1767	482.28	290.4	98
Sesame consumed (kg)	0.0	84	8.07	9.4	2
Sesame production (kg/ ha)	202.54	463.54	304.32	42.28	
Sesame hectare (ha)	0.10	5.26	1.61	0.945	

#### **4.4 Mapping of the Sesame Sub-sector Market Chain**

A sub-sector encompasses all the actors that buy and sell from each other in order to supply a particular set of products or services to the final consumers. It may include farmers, processors, input suppliers, exporters, retailers and can be defined by a particular primary or finished product or service and the market for example spices for regional markets and chillies for local markets (Mnenwa, 2009). According to Vermeulen *et al.*

(2008), the mapping is not limited to actors, but also goes further to policies, legal and institutional framework that influence the functioning of the value chain and the inclusion or exclusion of small scale producers. In this regards input suppliers, producers, traders, commission agents and exporters were identified as the sesame market participants in the study area even though some of the agents carried out one or more of the market functions.

#### **4.4.1 Sesame sub sectors and their role**

##### **4.4.1.1 Producers**

Producers are the first link in the marketing chain. Sesame producers in Masasi harvest sesame and supply the same to the second agent. In Masasi, there are two types of producers, small and large scale farmers. The ultimate decisions on what to grow, how much to grow and when to grow are made by them. Basically, the main distinction between small scale and commercial farmers is the size of land holding and capital. Most farmers in the study area are small scale farmers who own a maximum land of 5.26 hectares. Farmers in the study area produce about two types of sesame varieties which are Lindi 2002 and Naliendele 92 and in most cases sell their sesame to traders or to the agents of farmer organizations. The roles of farmers in sesame production include land preparation, cultivation, planting, weeding and harvesting. Whereby tractors, hand hoes and machete were the tools used in production (Fig. 3).

##### **4.4.1.2 Traders**

Traders are the first connection between producers and other actors in the study area (Figure 3). Traders in the study area purchased 26.2% of the farmers' marketed sesame in 2012/13. They mainly used to buy small lots of sesame directly from farmers and sell to agents of farmer's organizations. The very unique nature observed in this category of

traders was that farmers sold about 17.5% of total volume of sesame to agents of farmer's organization but they could also sell the collected lots of sesame direct to the exporter such as OLAM Tanzania Limited, Export Trading Company Limited and Afroasian Company Limited.

#### **4.4.1.3 Commission agents**

These categories of the channel members are thus common in sesame marketing in the Masasi District. They usually arrive to the cooperative unions and purchase the sesame. They work on behalf of wholesalers and exporters in the study area. The short season of producer's supply of sesame to the market leads to the involvement of so many agents in sesame marketing. Like brokers they do have other activities to perform and received predetermined commission. The study finding shows that they purchase about 56.3% of total sesame from the producers and 17.5% from traders (Fig. 3).

#### **4.4.1.4 Exporters**

Sesame exporters are the last marketing chain link in the domestic trade. They are comparatively well equipped with the necessary capital, facilities and knowledge (Fig. 3). They are usually reported to have good access to timely market information. They buy sesame from producers, agents and others and supply it to the world export market. The exporters who usually purchase the sesame are the three companies that reside in Dar es Salaam. These companies are OLAM Tanzania Limited, Export Trading Company Limited and Afroasian Company Limited. The study showed that in production year 2012/13 they purchased about 73.8% and 26.2% of sesame from traders and commission agents (Fig. 3).

#### **4.4.2 Analysis of sesame marketing channel options in the study area**

The marketing options identified in the study area are diagrammatically presented in Fig. 3, involving the main key actors (farmers, traders, commission agents and consumers. Excluding backward linkages which link marketing nodes starting with farmers towards the input suppliers, the structure of linkages identified in the study area is forwards linkages as it links from the farm gate production to the ultimate consumers (exporter). In the study area 98% of sesame produced is exported out of the district. According to Mbiha (2008), marketing channel option is the sequence through which the whole of sesame passes from farmers to consumers. The analysis of marketing channel is intended to provide a systematic knowledge of the flow of the goods and services from their origin (produce) to the final destination (consumer).

##### **a) Option 1: Producer → Local trader → Exporters**

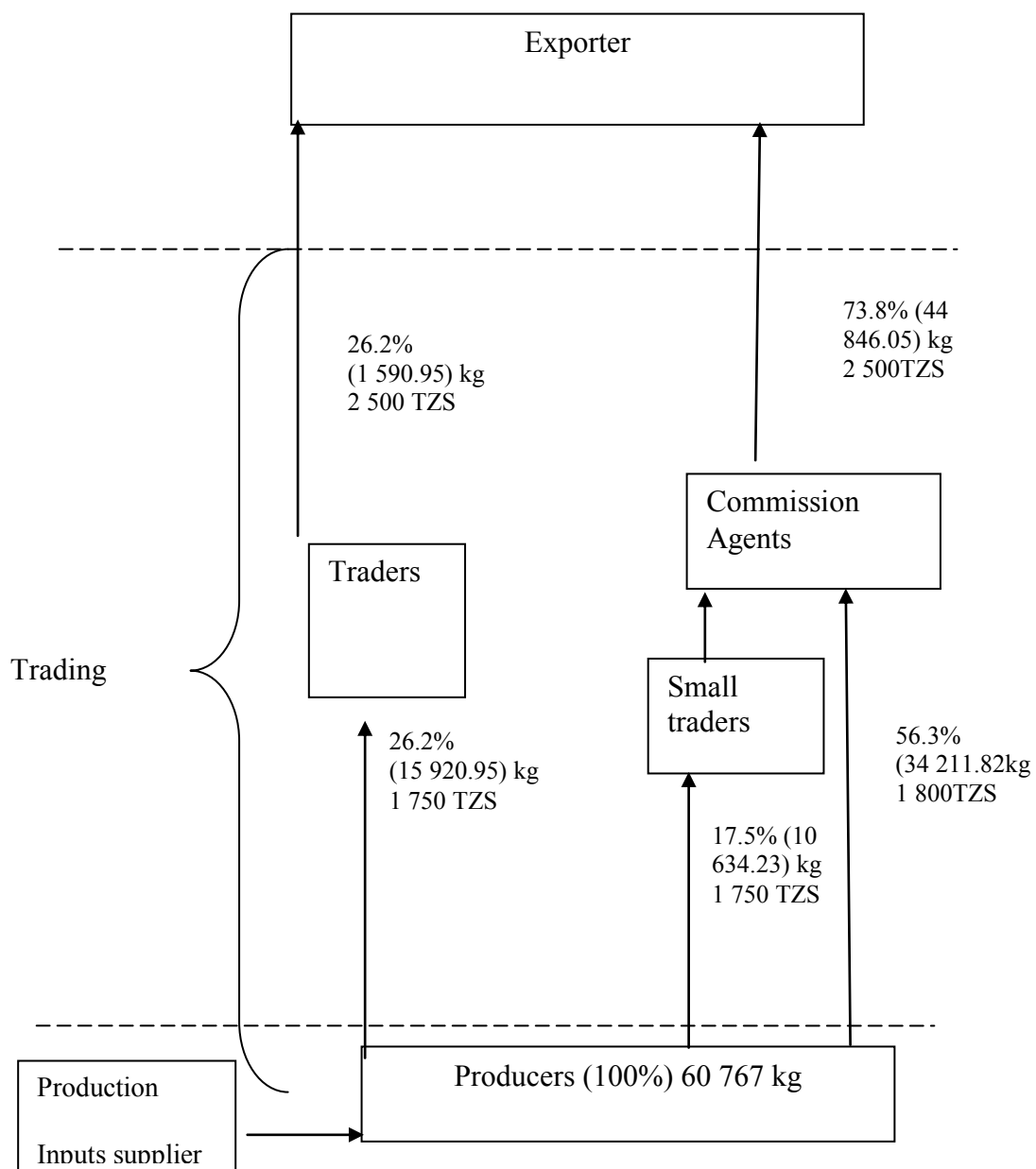
This option was found to be shortest of all sesame channel identified during the survey to farmers, and the most common alternative marketing channel in the study area because there is no complication during payment to farmers. In this channel, 26.2% of the farmers sold their sesame to the traders who then traded to the exporters. The sesame was sold at an average price of 1 750 TZS per kg (Fig. 3).

##### **b) Option 2: Producers → Local trader → Commission agents → Exporter**

Under this channel, the producers sold sesame to traders who then sold to commission agent who finally sell to the ultimate final end users exporter at a retail price. Producers sell 17% of the produced sesame to local traders at the price of 1 750 TZS per kg, The local trader sold the produce at the price of 1 800 TZS per kg to the commission agent and the commission agent sold to the exporter at the price of 2 500 TZS per kg to the exporter (Fig. 3).

**c) Option 3: Producers → Commission agent → Exporter**

This is the third identified option for selling sesame in the study area. As Figure 3 indicates producers sell sesame to commission agents and thereafter to the final user the exporter. The average selling price was 1 800 TZS per kg of sesame (Fig. 3).



**Figure 3: Value chain map of sesame in Masasi District**

#### 4.5 Profitability Analysis along the Sesame Value chain

According to marketing channels identified in the study area, the profitability analysis was determined in option three of the chain where farmers sold their products to a commission agent and the commission agent sells the produce to the exporter.

##### 4.5.1 Farmers

The overall objective of the value chain analysis was to determine the distribution of the profits between the value chain actors and hence to recommend development practitioners to develop value chains according to profits attained among value chain actors. Table 11 indicates that the gross margin per hectare of sesame at farm level was TZS 96 891.21 which is equivalent to 323.46 TZS per kg. The lowest gross margins earned by farmers found to be caused by relatively small quantity of output produced and poor access to market information especially on demand and prices in other market areas thus selling their produce at lower price.

**Table 11: Gross margin of farmers' sesame value chain in 2012/13 season**

Description of items	Total amount
Average acreage (in ha)	1.61
Average annual yield (Kg)	482
Average selling price(TZS)	1 800
Total revenue (TZS)	867 600
Variable costs (TZS)	
Seeds cost	32 178.57
Insecticides/herbicides cost	92 261.90
Land cultivation and cleaning cost	245 392.86
Planting cost	95 442.46
Weeding cost	112 769.84
Harvesting cost	133 559.52
Total variable cost (TZS)	711 605.16
Gross margin	155 994.84
Gross margin per ha (TZS/ha)	96 891.21
Gross margin per kg	323.64
Gross margin ratio in %	17.98

#### 4.5.2 Traders

Table 12 shows the results of gross margin analysis for traders in sesame value chain in Masasi district. The gross margin analysis was done based on revenue acquired by the traders and the cost involved. At the trader level the average gross margin was found to be 581.57 TZS per kg which is almost one point eight times that of farmer. This means that traders enjoy economies of scale compared to individual farmer.

**Table 12: Traders gross margin for sesame value chain in Masasi District 2012/13**

Description of Item	Total Amount
Average quantity purchased (Kg)	2 242.31
Average purchasing price (TZS)	1 800
Average selling price (TZS)	2 500
Total revenue (TZS)	5 605 763
Cost in TZS	
Purchasing cost	4 036 149
Transport	179 384
Levies	6 726.92
Offloading	449.6
Brokering	3 000
Communication	16 000
Salaries	60 000
Total variable cost (TZS)	4 301 710
Gross margin (TZS)	1 304 053
Gross margin per kg	581.57
Gross margin ratio %	23.26

From Table 11 and Table 12 show that traders had relatively higher gross margins than the farmers. Trader's gross margin was found to be 581.57 TZS per kg, while the farmer's gross margin was found to be 323.57 TZS per kg. This could be explained by the fact that the traders are always profit maximizers, which in turn gives higher gross margin than the



farmers. These findings support the arguments of Mashindano and Kihenzile (2013) that in Tanzania traders and exporters has higher gross margin than farmers in the value chain.

#### 4.5.3 Comparison of gross margin along the sesame value chain

After conducting t-test on the gross margin between farmers and traders, the findings indicate that there was significant mean difference in gross margins received between farmers and traders ( $p < 0.01$ ). This indicates that the traders received higher gross margin than farmers.

**Table 13: ANOVA Post Hoc tests, pair-wise comparisons between actors' gross margin**

Actor	Mean profit difference	Sig.
Farmer's profit Vs trader's profit	24 652*	.000
Trader's profit Vs Commission agent profit	832	.828

F-value = 14.7, \* = the mean difference in profit is significant at 0 .01 significance level

#### 4.6 Factors Contributing to Level of Producer's Profitability

The factors affecting sesame profitability were analysed using regression analysis as described in sub-section 3.5.7 of chapter three. The dependent variable was gross margin per hectare and the independent variables were household gender, education, market information, age of household, household size, extension visits and farming experience. The results of linear regression analysis at farm level indicated that 66.6% of the variation in sesame gross margin obtained at farm level was due to the independent variables included in the regression model. That is to say the specified predictors explained 66.6% of the variation in gross margin. All variables had an appropriate signs except for age of household which had negative relation with gross margin (Table 14). Also there was no multicollinearity between predictors as VIF of each predictor was less than 5.

Analysis from Table 14 shows that, household education was statistically significant at  $p < 0.05$  and positively related to profitability of the sesame as it was hypothesized. This implies that better education of the producers has advantages as it enlightens them on how best to strategize and adapt better production and marketing conditions of sesame business. This agrees with the findings by Wakili (2012) on his study he found similar results that, better educated farmers are expected to be more receptive to improved marketing techniques and therefore should have a higher level of marketing competencies than farmers with less education. This suggests the importance of education in increasing the ability of households to utilize market information and thereby utilizing market opportunities.

The findings as presented in Table 14 also shows that, means of accessing market information was also statistically significant at  $p < 0.01$  and positively related to sesame gross margin. The estimated coefficient of age was negatively and significantly different from zero at ( $p < 0.05$ ). The negative coefficient for age indicated that, the active group between 18 and 55 years of sesame farmers were more likely to participating in sesame production than older farmers with age group above 55 years. This was probably due to lack of viable collateral needed by financial institution such as house and land. Most of them use the family or hired land for cultivation of sesame, and therefore use crop inventories as collateral. Also the results showed that as the age of respondent's increases, the probability of participating in sesame business decreases. These results support the findings by Randela (2005) that younger farmers are expected to be progressive, more receptive to new ideas and to better understand the benefits of agricultural commercialization than older farmers. The estimated coefficient of extension services determining by the number of visits by extension officers to farmers is positively associated with the quantity of sesame produced and was statically significant at ( $p < 0.05$ ).

Access to extension services is a conduit for the diffusion of new technologies to the farmer by providing training; hence, it is expected to affect production. Also studies by Rahman (2003) confirmed this.

**Table 14: Regression model results of determinants of sesame profitability**

Predictor	Coefficient	Expected sign	VIF	Sig.
(Constant)	-26 046.08			.000*
Household gender (dummy)	48 234.56	+ve	1.18	0.826
Education (dummy)	26 421.06	+ve	1.36	0.042**
Market information (dummy)	16 052.88	+ve	1.42	0.010*
Age of respondent(dummy)	-42 626.42	+ve	1.06	0.042**
Household size	4 236.26	+ve	1.68	0.784
Extension visits	13 742.18	+ve	1.12	0.034**
Farming experience	12 486.83	+ve	1.28	0.678

R<sup>2</sup>=69.8%, Adjusted R<sup>2</sup> =66.6%, F=14.68\*, DW=2.36, \*=significance at (p<0.01), \*\*=significance at (p≤0.05)

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusions

##### 5.1.1 Structure of sesame value chain

The analysis of structure of sesame value chain has shown that sesame has been traded in large quantities, traded along three value chain strands. The key actors identified in the study area engaging in sesame value chain include producers, local traders, commission agents and exporter, with three marketing options for sesame which includes both direct and indirect marketing. The direct marketing involves producers selling sesame to the ultimate final user while the indirect marketing involves selling sesame through brokers/intermediaries.

##### 5.1.2 Prices and margins obtained by actors along sesame value chain

The findings of the study indicated that prices and margins obtained by the actors in the chain varied significantly with one another, traders obtain gross margin of about 581 TZS per kg which is significantly higher margins than producers which is 323.64 TZS per kg. It can be concluded that trading sesame business is an effective way of generating profits for traders than producers.

##### 5.1.3 Factors affecting profitability at farm level

The study revealed that 98% of the sesame production was supplied to the market. The major determinant factors for profitability were estimated by linear OLS regression. Thus; four variables out of the expected eight found significant and affect the household marketable supply of sesame. Variables that affect the household supply of sesame

include: education, access to market information, age and extension visits by extension officers. All the variables that were hypothesized to affect the marketable supply of sesame found to affect the supply as expected. Based on historical reasons, other factors which were expected to affect the household level supply of sesame positively found non-significant.

## **5.2 Recommendations**

The study shows that the value chain of sesame was dominated by smallholder farmers. The access of both inputs and outputs markets were confined to the villages and nearby towns. Other chain players like processors and consumers were inactive in the chain. The chain should be developed to cater the prospective sesame and its products through value addition. The best way this value chain can be developed is through making it demand driven chain. Farmers should be key players of the chain when their products follow a clear market, the revenue can be used to improve both backwards and forward links.

### **5.2.1 Improving sesame production**

Sesame is an important source of household income and it increases the income of the people in the District. Agricultural extension is believed to boost production and productivity. Although, the study result indicates that extension services contribute to the marketable sesame, more effort is needed by extension officer to give more training to farmers. To improve the situation, the study recommends the improvement of extension services with marketing knowledge on price. Also it is important to provide modern inputs at the right time and the required amount at reasonable price.

### **5.2.2 Improving the availability and accessibility of market information**

Market information was one of the factors affecting profitability of sesame at farm level. Linear regression model analysis results indicate that the profitability of sesame at farm

level was significantly and positively affected by access of market information. Farmers lack information on price from outside their localities thus demand for information need to be created. In order to improve the situation, there is a need to establish a market information network involving market search, prices and transaction costs. The farmer can also be supported by getting current price information from urban market by agricultural marketing and extension officers.

### **5.2.3 Value addition activity**

In spite of the large benefits of sesame as an oilseed, much attention has not been given to the production of value added products, such as sesame oil and meal thereby enhancing its economic value. More emphasis should be given by development stakeholders on aspects of value addition to increase the farmers' income.

### **5.3 Area for Further Research**

The study had managed to look on important areas which need improvement in sesame production in Tanzania. The same research is recommended to be carried out in other sesame producing region in the country, as the results obtained from Masasi may not necessarily be similar to the situation in other regions due to difference in geographical area, cultural and economic differences.

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## APPENDICES

### Appendix 1: Household questionnaire for sesame producers in Masasi District

Household questionnaire

Date.		Village.	
Ward.		HH survey No.	
		Name Interviewer.	

#### A. General description of the household

ID	First Name	Relation to HH	Gender	Age (yrs.)	Education
		head 01. head 02. spouse 03. child 04. other : specify	01. M 02. F		Attainment level
1					
2					
3					
4					
5					
6					
7					
8					

<b>ID</b>	<b>Main activity</b>	<b>Main Economic activity</b>	<b>Additional economic activities</b>	<b>Labour position</b>	<b>Place of employment (geographical)</b>	<b>Income in cash (per month)</b>
	01. Income generating 02. school 03. unemployed 04. retired 05. disabled 06. other: specify	Specify	Specify	01. Self-employed 02. Employer 03. Permanent 04. Long term contract (one year and above) 05. Short term contract (less than one year) 06. casual wage labour 07. Family workers without pay	specify	specify
1						
2						
3						
4						
5						
6						
7						
8						

<b>Compared with 10 years ago (only for economically active members):</b>							
<b>ID</b>	<b>Main activity</b>		<b>Main economic activity</b>		<b>Income</b>		
	<b>same</b>	<b>changed – specify (why?)</b>	<b>Same</b>	<b>changed</b>	<b>deteriorated</b>	<b>same</b>	<b>Improved</b>
1							

2							
3							
4							
5							
6							
7							
8							



Are you using agricultural inputs? 1=Yes 2=No.

What main inputs do you use in sesame production? (Fill the table below)

S/N	Input name	Quantity/acre (specify units)	Cost/value(Tsh/acre)
1	Seeds		
2	Fertilizer		
3	Herbicides		
4	Insecticides		
5	Others (Specify)		

Have you ever faced any shortages or other difficulties in obtaining inputs? 1=Yes 2=No.

In addition to inputs what are other main costs involved in sesame production? (Fill table below)

S/N	Cost item	Cost/Value (Tsh/acre)
1	Land cleaning	
2	Land cultivation (tillage)	
3	Planting	
4	Weeding	
5	Harvesting	
6	Others (Specify)	





Do you receive any service that support sesame trading in your area? 1=Yes 2=No

If yes, fill in the table below appropriately:

Service provider	Type of support	Conditions attached, if any

If no what kind of support service does you prefer as far as your business is concerned?

.....  
 .....

Do you get market information? 1=Yes 2=No

If the answer in question above is 'yes', indicate the source and type of market information for each type of product.

Type of product	Type of market information	Source

If no what kind of market information does you prefer as far as your business is concerned?

.....  
 .....

Is the market information that you get sufficient to influence your decision? 1=Yes 2=No

How many times do extension officers attend you per production season?

.....





Use of remittances (specify)			Sent money and goods			
Living expenses	Investment 01. Housing 02. Agriculture 03. Business 04. Other (specify)	Community development	amount specify	How often 01. occasionally 02. Once a year 03. Every month	How sent	
					Informal channel	Formal channel

### 3) Physical assets

#### Housing

Dwelling Type	Ownership status	Construction material (specify)			facilities/ utilities
		Floor	walls	roofing	
01. Normal House	1. Own property				??
02. Rural House	2. Rented				
03. One room or more in unit	3. Other				
04. Free Standing room					
05. Others					

#### Services:

Does the HH has access to (please specify):			
electricity	Potable water		sanitation
	connection	source	
01. Generator	01. Tap inside home	01. Public	01. no toilet
02. Solar	02. Tap inside the	Network	02. common facility
03. Electricity (grid connection)	building	02. Pump	03. own house
04. Other (specify)	03. No connection with the utility	03. Well	04. Other (specify)
		04. Other	

**Other:**

production			Communication			transportation		
item	No. owned	Access (specify)	item	No. owned	Access (specify)	item	No. owned	Access (specify)
(Ox-) Plough			Mobile phone			Motorcycle		
Tractor			Radio			Car		
Cart			television			bicycle		
Hammer mill								

**Expenditure**

Consumer expenditure per month	Amount	Productive expenditures per month	Amount
Food		Hired labour	
Rent		Hired equipment	
Transport		Seed	
Medical		Fertilizer	
Schooling		Transport	
Utilities (water, energy..)		Water (irrigation)	
Other (specify)		Other (specify)	
<b>Total</b>			

**HH head:** Who in your household decides on the use of these earning?

What main challenges do you encounter in sesame marketing? (Rank the most 3 challenges by order of importance)

<b>Constraint</b>	<b>Rank</b>	<b>Constraint</b>	<b>Rank</b>
Roads		Telephone and communication	
Electricity		Warehouses	
Water		Market	
Taxes		Road blocks	

***THANK YOU FOR YOUR COOPERATION***

**Appendix 2: Checklist of issues for discussion with traders of sesame from Masasi District**

1. Background information	<ul style="list-style-type: none"> <li>a. Location</li> <li>b. Years in operation</li> <li>c. Type of commodities traded</li> <li>d. Other activities apart from sesame trading activity</li> </ul>
2. Volumes and sources of sesame	<ul style="list-style-type: none"> <li>a. Volumes of sesame purchased per month</li> <li>b. Volumes of sesame required per month</li> <li>c. Areas from where sesame is purchased</li> <li>d. Relative importance (in terms of volumes, quality, and regularity of supply) of different supplying areas.</li> <li>e. Sources of suppliers' e.g. individual farmers, farmer group/association, rural vendors/collectors, or processors.</li> </ul>
3. Prices, buyers and transactions	<ul style="list-style-type: none"> <li>a. Current purchasing prices for sesame (specifically the form in which you are purchasing)</li> <li>b. Current selling prices for sesame (specifically the form in which you are selling)</li> <li>c. Buyers of sesame (e.g. traders, retailers, consumers)</li> <li>d. Product requirement of different buyers (volumes, quality and regularity of supply)</li> <li>e. Places of purchase (e.g. farm gate, at the market, or at your own store)</li> <li>f. places of sale</li> <li>g. Negotiation process with suppliers and buyers (who determine the prices)</li> <li>h. Relationship with buyers or suppliers (credit, transport, technical support)</li> </ul>
4. Support services	<ul style="list-style-type: none"> <li>a. Transport (means of transport used, ownership, availability, cost if rented)</li> <li>b. Market information (type, sources, reliability, and problems)</li> <li>c. Credit (sources and their relative importance, cost, frequency and problems)</li> <li>d. Other support services</li> </ul>
5. Marketing costs	<ul style="list-style-type: none"> <li>a. Main marketing costs (labour, transport, interest on loan, handling, packaging, storage, taxes, rent, communications, product losses e.t.c )</li> </ul>
6. Policies and	<ul style="list-style-type: none"> <li>a. Key policies and regulations affecting his/her sesame trading business (registration,</li> </ul>



regulations	taxation, credit, subsidies to producers, certification e.t.c) b. Recommended changes in policy and regulations
7. Constraints and opportunities	a. Key constraints to the development of the sesame trading business b. Possible solutions to these constraints. c. Key sesame trading business opportunities.

**THANK YOU FOR YOUR COOPERATION**

**Appendix 3: Checklist of issues for discussion with staff of government and development partner for sesame value chain analysis in Masasi District**

1. Background	<ul style="list-style-type: none"> <li>a. Date of interview</li> <li>b. Name of the institution</li> <li>c. Location</li> <li>d. Name of the respondent</li> <li>e. Position of the respondent</li> <li>f. Role/functions of the institution related to sesame production, marketing or processing.</li> </ul>
2. Data for the past five years	<ul style="list-style-type: none"> <li>a. Number of households involved in production of sesame at the district</li> <li>b. Areas under sesame cultivation at district level</li> <li>c. Types of sesame varieties planted within the district</li> <li>d. Production volumes</li> </ul>
3. Strategies, policies, regulation and programmes for the sesame sub sector	<ul style="list-style-type: none"> <li>a. On paper; objectives, responsibilities, implementing agencies, activities, e.t.c</li> <li>b. Level of achievement in enforcement (policies and regulations) and implementation of the programmes</li> <li>c. Impacts on the production, marketing and processing</li> </ul>
4. Constraints	<ul style="list-style-type: none"> <li>a. Key constraints to development of the sesame sub sector (production, marketing, and processing in the district</li> </ul>
5. Opportunities	<ul style="list-style-type: none"> <li>b. Key opportunities regarding the sub sector (production, marketing and processing)</li> </ul>

**THANK YOU FOR YOUR COOPERATION**

**Appendix 4: Checklist for discussion issues with leaders of SACCOs/AMCOS for  
sesame value chain analysis in Masasi District**

**1. Introduction**

Date of Interview	
Name of Saccos/AMCOS	
Location	
Name of the Respondent	
Position of the Respondent	

**2. Interview questions**

1. Who are your members?
2. How many members do you have?(Male/Female/Total)
3. What are the membership conditions?
4. Are you registered?
5. What is your area of coverage?
6. What is your financial position? Was there any target in previous year?
7. Did you succeed to meet your target?
8. What is the source of your funds?
9. What are the types of services you provide to your customers?
10. For each service you provide:
  - a) Who are your major customers? (Male/Female/Total).
  - b) What are the procedures for getting the service?
  - c) What are the conditions for getting the service?

11. Do you receive applications for loans from farmers, traders and small businesses?  
How often in a year?
12. What are the interest rates, collateral and repayment procedures for the loans provided to farmers, traders and small businesses?
13. How do you determine interest rates?

### **3. Conclusions**

14. What is your general opinion, view or comment on accessibility of financial services to farmers, traders and small businesses?
15. What do you think can be done to improve the link between farmers, traders and small businesses to the financial institutions?

**THANKS FOR YOUR COOPERATION**