ANALYSIS OF SESAME VALUE CHAIN: THE CASE OF GIMBI WOREDA IN OROMIA NATIONAL REGIONAL STATE, ETHIOPIA

M.Sc. THESIS FIKIRU TEMESGEN GELETA

November 2015

Jimma University

ANALYSIS OF SESAME VALUE CHAIN: THE CASE OF GIMBI WOREDA IN OROMIA NATIONAL REGIONAL STATE, ETHIOPIA

Thesis Submitted to Department of Agricultural Economics and Extension,

School of Graduate study

JIMMA UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE IN AGRICULTURE

(AGRIBUSINESS AND VALUE CHAIN MANAGAMENT)

FIKIRU TEMESGEN GELETA

November 2015

Jimma University

APPROVAL SHEET
SCHOOL OF GRADUATE STUDIES
JIMMA UNIVERSITY

As Thesis Research advisors, we hereby certify that we have read and evaluated this thesis prepared, under our guidance, by Fikiru Temesgen entitled "Analysis of Sesame Value chain: The Case of Gimbi Districts in Oromia National Regional State, Ethiopia.". We recommend that it be submitted as fulfilling the thesis requirement.

Dr. Bezabih Emana	_____	_____
Major Advisor	Signature	Date
Fikadu Mitiku (PhD. Scholar)	_____	_____
Co-Advisor	Signature	Date

As member of the Board of Examiners of the M.Sc. Thesis Open Defense Examination, We certify that we have read, evaluated the Thesis prepared by Fikiru Temesgen and examined the candidate. We recommended that the Thesis be accepted as fulfilling the Thesis requirement for the Degree of Master of Science in Agriculture (Agribusiness and Value chain Management).

_____	_____	_____
Chairperson	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

DEDICATION

I dedicate this thesis manuscript to my families for their continuous contribution throughout my life.

STATEMENT OF AUTHOR

First, I declare that this thesis is my own work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for M.Sc. degree at Jimma University and is deposited at the University Library to be available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

Brief quotations from this thesis are allowable without special permission provided that accurate acknowledgement of the source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or part may be granted by the head Department of Agricultural Economics and Extensions or the Dean of the School of Graduate Studies when in his/her judgment the proposed use of the material is in the interest of scholarship. In all other instances, however, permission must be obtained from the author.

Name: Fikiru Temesgen Signature: _____

Place: Jimma University, Jimma.

Date of Submission: _____

BIOGRAPHICAL SKETCH

The author was born on 4th of April, 1990 in Dongora Keta kebele, Western Wollega Zone, Oromia Region. He attended his elementary and junior education at Dongora Kini and Dongoro Dissi found in Dongoro towns, respectively and Secondary School in Boji Diremaji in Bila town. After successfully passing ESLCE, he joined Haramaya University in 2008 and graduated with B.Sc. degree in Agricultural Economics (AGEC) in 10 July 2010. After graduation, he served in Yubdo Woreda Office of Trade and Market Development for three years. He joined Jimma University in October 2014 to pursue his M.Sc. degree in Agribusiness and Value Chain Management program.

ACKNOWLEDGEMENTS

At the top of all, I would like to extend my extraordinary thanks to the **Almighty God** for everything of his kindness. Next, I would like to thank my major advisor Dr. Bezabih Emana, in providing me the required materials, offering constructive comments, guiding and encouraging me in all moments since the research proposal preparation. Without exaggeration, the finalization of this thesis report would have been hardly possible without his guidance and heart full support.

I also extend my deepest thanks to the co-advisor, Mr Fikadu Mitiku, for his constructive comments throughout the study period. I am also pleased to thank Mr. Degafe Abdisa and Aleminash Asfaw, for their valuable assistance during the field wok as both facilitator's and enumerators. Special acknowledgements are also due to the kind staff of Gimbi Woreda Trade and Market development Office; for their kind provision of necessary data, information and worthy helping during my fieldwork, especially for Mr. Ayenew Abaynew. All farmers informants in Gimbi Woreda really, deserve special acknowledgement for their cooperation and willingness to answer the interview questions and share a rewarding experience. I take this opportunity to extend my especial thanks to Mr Hundasa Likasa, head of the Yubdo Woreda administration Office, Western Wollega Zone, for his various ways contribution to completion of my study.

Finally, yet importantly, I am grateful to my families, especially my father Temesgen Geleta and my mother Aregash Bulcha, for their endless supports and encouragements. I also thank my best friend Efa Gobena and Tura Kasso, for their special contribution to the completion of this paper, hence they deserves special thanks.

ABBREVIATIONS AND ACRONYMS

ADLI	Agricultural Development Led Industrialization
BoARD	Bureau of Agriculture and Rural Development
CSA	Central Statistical Agency
DA	Development Agent
ECX	Ethiopian Commodity Exchange
ECEA	Ethiopian Commodity Exchange Authority
FAO	Food and Agriculture Organization of the UN
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic Product
GMM	Gross Market Margin
GTP	Growth and Transformation Plan
GWOoARD	Gimbi Woreda Office of Agriculture and Rural Development
IIA	Independence of Irrelevant Alternative
NBE	National Bank of Ethiopia
NGO	Non Governmental Organization
NMM	Net Marketing Margin
OCSSCO	Oromia Credit and Saving Share Company
OLS	Ordinary Least Square
OoARD	Office of Agriculture and Rural Development
OoTMD	Office of Trade and Market Development
OoTI	Office of Trade and Industry
PSNP	Productive Safety Net Program
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
RMA	Rapid Market Appraisal
SCP	Structure- Conduct and Performance
TOT	Turn over Tax
VIF	Variance Inflating Factor

CONTENT **PAGE**

LIST OF TABLES

Table **Page**

LIST OF FIGURES AND MAPS

Figure **Page**

LIST OF TABLES IN THE APPENDIX

Appendix table **Page**

ANALYSIS OF SESAME VALUE CHAIN: THE CASE OF GIMBI WOREDA IN OROMIA NATIONAL REGIONAL STATE, ETHIOPIA

ABSTRACT

This study aimed at analyzing value chain of sesame in Gimbi woreda of Oromia National Regional State with specific objectives of identifying sesame value chain and examining the performance of actors in the chain; analyzing the determinants of sesame supply to the market; and identifying marketing channels and factors affecting market outlet choice decisions of farm households. The data were collected from primary and secondary sources. The primary data were collected from randomly selected 127 farmers and 17 traders. Descriptive statistics and econometric models were used to analyze the data. To identify determinants of sesame supply to the market and factors affecting market outlet choice decision of sesame producers, multiple linear regression and multivariate probit models were used respectively. The value chain analysis revealed that the major actors in the woreda are sesame producers, collectors, cooperatives, wholesalers and exporters. The result of the multiple regression model indicated that market supply is significantly affected by quantity of sesame produced, land, membership in cooperatives and non-off farm income. The multivariate probit model results also indicated that the probability to choose the wholesalers outlet was positively and significantly affected by household education, distance from the nearest market, quantity produced and market price of sesame but negatively affected by collector market outlets. Similarly, the probability of choosing cooperative marketing outlet is positively affected by membership to cooperative and distance from the market whereas it is negatively affected by market price of sesame. Therefore, policy aiming at increasing farmers' access to modern inputs, developing and improving infrastructure, gender consideration, cooperative development and improving extension system are recommended to accelerate the value chain development.

Key words: Value chain analysis, sesame, actors, multiple regression model, multivariate probit model

1. INTRODUCTION

1.1. Background of the Study

Smallholder and family farming agriculture remain to be the key and leading sector in overall economic development of many developing countries in the world (Quan, 2011). According to (Quan, 2011), in addition to producing staple crops for domestic markets, smallholder farmers produce large shares of traditional exports in these countries. This shows how the economy of many developing countries still relies on smallholder-based agriculture. In Ethiopia, smallholder farming accounts for about 75 percent of agricultural production (FAOSTAT, 2012).

Sesame is currently among the major Ethiopian export crops and is one among the agricultural crops in which Ethiopia is known in international markets (Sorsa, 2009). Evidences indicate that Ethiopia ranks the fourth in sesame production in 2011/2012 (FAOSTAT, 2012) in the world, and the third in sesame seed export next to India and Sudan (Alemu and Meijerink, 2010). Evidences reveal that there is still potential arable land in different areas of the country to grow the crop and increase its supply in response to the considerable demand for Ethiopian sesame seed in international markets (Sorsa, 2009). This indicates that, growth and improvement of the sesame sector can substantially contribute to the economic development of the country by benefiting value chain actors at national, regional and local levels. Yet, it is important to unravel how the actors can benefit from the sector through value chain analysis.

Kaplinsky and Morris (2000) outlined three main reasons why value chain analysis is important in this era of rapid globalization. First, with the growing division of labor and the global dispersion of the production of components, systemic competitiveness has become increasingly important. Second, efficiency in production is only a necessary condition for a successful penetration of global markets. Third, entry into global market and making the best use of globalization requires an understanding of dynamic factors that are inherent in the whole value chain.

The transformation of the production system for major domestic and export agricultural commodities requires the existence of efficient marketing system that can transfer the produced agricultural commodities from the point of production to the required market. In addition, it is immensely important to maintain the required quantity and quality for both domestic consumption and export at the time at the least possible cost. Thus, scientific investigation to identify the marketing constraints and opportunities for the sector as a whole and by sector and commodity in particular required is important to tackle the constraints and to utilize the opportunities (Sorsa, 2009).

Thus, promotion of export potential cash crops is one among the current governments' strategy for raising agricultural GDP and rural income. This helps to promote a diversification out of low value crops into higher value crops for the markets including the export market, which in turn helps the improvement (MoFED, 2010). Of agricultural marketing systems in the country, especially, promotion of export potential cash crop is crucial if it generates higher income for the producers; and foreign currency for the country (MoFED, 2010).

In this regard, the empirical record suggests that export potential cash crops can provide higher returns to land and labor than food grains and thus present major opportunities to promote smallholders income growth, food security, and national foreign exchange generation (Poulton et al., 2001, Lukanu et al., 2004; Poulton et al., 2006, Schneider and Gugerty, 2010). According to Chauvin (2012), cash crops are a major source of export revenue for a large number of sub-Saharan African countries and the livelihood basis for millions of rural households who grow those crops (Chauvin, 2012).

The major sesame growing areas in Ethiopia are located in the Humera, Gondor and Wollega. Sesame from these areas is well known in the world markets. On one hand, the Humera and Metema sesame seeds are suitable for bakery and confectionary purposes due to their white color, sweet taste and aroma. On the other hand, the high oil content of the Wollega sesame gives it a major competitive advantage for edible oil production (USAID, 2010). This study focuses on the sesame value chain analysis in Gimbi Woreda, Western Wollega zone in the Oromia national regional state.

1.2. Statement of the Problem

Sesame is currently the country's principal export oilseed and is mainly produced by small-scale farmers (Sorsa, 2009). Thus, as a smallholder farmer's crop and an export potential crop, it is an opportunity for smallholder farmers to produce sesame and improve their livelihood. However, sesame yield has been very low due to biophysical and socio economic challenges and weak farmers' organizations to engage in value chain (Emana, 2010).

Studies on sesame production and marketing in Ethiopia were undertaken by different authors (e.g. Kindie, 2007; Amare, 2009; Sorsa, 2009, Wijnands et al., 2007 and 2009; Alemu and Meijerink, 2010; Thomas, 2011; Mheen, 2011 and Kemal, 2011). However, the majority of these studies where mainly focused on marketing aspect of the crop and some considered the common sesame production related problems. However, they did not address factors affecting sesame market outlet choice decisions and determinants of sesame supply to the market at household level. The main efforts made by these authors were on general production and trade arrangement problems. This allowed them to examine factors that were mainly external to individual farm households and common to all farmers in the area. However, identifying household specific factors, which are responsible for limiting households from sesame market participation and outlet choice decisions, is essential. Marketing outlet choice decisions were helps us to identify in which producers will sell their products to either of the market.

A review of literature in agro-industry value chain in Ethiopia indicates that the sector faces many challenges due to limited market outlets, limited efforts in market linkage activities and poor market information among actors (Dereje, 2007; Kaleb, 2008; Dendena *et al*., 2009). Mamo (2009) argued that small scale, dispersed and unorganized producers are unlikely to exploit market opportunities, as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices. Some case studies were undertaken regarding to sesame supply chain in Ethiopia (Kemal, 2011). He focused mainly on sesame supply chain problem. However, the important determinants of sesame supply to the market were not well identified. A good marketing system generates increased production by seeking out extra

supplies. If the production system works efficiently, it produces suitable incentives to meet consumer's needs more accurately in terms of type, quality and quantity of supply.

Value chain analysis is essential to explain the connection between all the actors in a particular chain of production and distribution and it shows who adds value and where, along the chain. It helps to identify pressure points and make improvements in weaker links where returns are low (Schmitz, 2005). Value chain analysis is an important process in the study area to identify sesame value chain actors, their roles and responsibilities, profit margin and their value addition activities, and constraint and opportunity of sesame marketing. Cognizant of these facts, this study was undertaken to seek possible answers to the following problems by conducting sesame value chain analysis in the Gimbi Woreda.

1.3. Research Questions

The study tries to answer the following questions:

1. What does sesame value chain looks like and who are the major actors in Gimbi Woreda?
2. What does the performances of actors look like in the sesame value chain in Gimbi Woreda?
3. What are the key factors affecting sesame supply?
4. What are the key factors affecting market outlet choice decision of sesame producers?
5. What are the major opportunities and constraints in the sesame marketing?

1.4. Objectives of the Study

The general objective of the study is to identify potential interventions that will make analyze of sesame value chains more competitive. The specific objectives of the study are:

1. To identify sesame value chain and examine the performance of actors in the chain;
2. To identify the determinants of sesame supply to the market in the study area;
3. To identify factors affecting outlet choice decisions of sesame producers; and
4. To identify the major constraints and opportunities in sesame marketing in the study area;

1.5. Scope and Limitations of the Study

The area coverage of this study was limited to Gimbi woreda . In addition, it focused on the analysis of sesame value chain and examines the performance of actors in the chain, analyzing the determinants of sesame supply to the market, identifying factors affecting outlet choice decisions of sesame producers in the study area. The data used for the analysis was collected from sesame producer farmers. A sample size of 127 sesame producer farmers were chosen from three major sesame-producing Kebeles namely: Tole, Jogir and Abba Sena based on the 2013/2014 level of sesame production year. In addition, 17 sesame traders were chosen from Gimbi, Nekemte, Tole and Jogir towns. This is mainly because of limited availability of resources and time to undertake the study on a wider scale. Nevertheless, some lessons learnt may be applicable to sesame farmers in other parts of the country. Congruently, lack of record keeping by chain actors was a challenge to collect relevant information in the channel. Thus, key informants and secondary sources are extensively used to complement preliminary information and to understand rationality behind the status of the sesame value chains. Some of the farmers were reluctant to frankly respond to some of the questions, and as farmers do not keep records and due to memory lapse, some of the questions lack exact answers. Hence, the study was limited spatially as well as temporally to make the study more representative in terms of wider range of time horizon.

1.6. Significance of the Study

The study analyzes the entire sesame value chain from input supplier to the exporter within the Gimbi woreda and from input supplier to exporter. It also provides a holistic picture of existing challenges, opportunities and entry points in the sesame value chain. Moreover, this study provides information on the determinants of sesame supply to the market, the determinants of market outlet choice decisions, marketing margin, benefit share of actors, and identifies opportunities and constraints of sesame value chain in the study areas. Therefore, it shades some light on required efforts to enhance the production and utilization of sesame at larger scale to bring about economic development of the area. The information result were also help a number of organizations including: research and development organizations,

traders, producers, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations and ultimately influence the design and implementation of policies and strategies.

1.7. Organization of the Thesis

This thesis is organized into five chapters. Chapter one constituted the introduction, which focuses mainly on the background, statement of the problem, objectives, research questions, the scope and limitation and significance of the study. Review of the theoretical and empirical literature pertinent to the concern of the thesis is presented in chapter two. Chapter three describes the research methodology that includes a brief description of the study area, data collection procedures and analytical techniques. Chapter four describes results of the study along with discussion. Finally, summary of the major findings, conclusion and recommendation are presented in chapter five.

2. LITERATURE REVIEW

2.1. Definition of Value Chain Management

Value chain means a group of companies working together to satisfy market demands. It involves a chain of activities that are associated with adding value to a product through the production and distribution processes of each activity (Schmitz, 2005). An organization's competitive advantage is based on their product's value chain. The goal of the company is to deliver maximum value to the end user for the least possible total cost to the company, thereby maximizing profit (Porter, 1985).

A value chain is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring agricultural product from its conception to its end use (Kaplinsky and Morris, 2001). Bammann (2007) identified three important levels of value chain.

- Value chain actors**:** The chain of actors who directly deal with the products, i.e. produce, process, trade and own them.
- Value chain supporters: The services provided by various actors who never directly deal with the product, but whose services add value to the product.
- Value chain influencers*:* The regulatory framework, policies, infrastructures, etc.

The value chain concept entails the addition of value as the product progresses from input suppliers to producers and consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added. Value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing as shown in Figure 1 for the case of a typical agricultural value chain.

Figure 1. Typical agricultural value chain and associated business development services.

Source: Adapted from Anandajayasekeram and Berhanu (2009).

Value chains encompass a set of interdependent organizations, and associated institutions, resources, actors and activities involved in input supply, production, processing, and distribution of a commodity. In other words, a value chain can be viewed as a set of actors and activities, and organizations and the rules governing those activities.

Value chain management is about creating the benefit at each link in the chain and a sustainable competitive advantage for the businesses in the chain. How value is actually created is a major concern for most businesses. Porter (1985) indicates that value can be created by differentiation along every step of the value chain, through activities resulting in products and services that lower buyers' costs or raise buyers' performance. It examines the performance of each economic agent at each stage of the chain rather than concentrating on just one level of activity. The analysis helps to determine the competitive advantage of actors in the entire commodity chain. This makes the analysis systemic and comprehensive by covering the entire gamut of activities involved and the corresponding types of governance involved.

2.2. Major Concepts Guiding Agricultural Value Chain Analysis

2.2.1. Effective demand

Effective demand can be defined as the force that pulls goods and services through the vertical system, in agricultural value chain analysis. Hence, value chain analysis need to understand the dynamics of how demand is changing at both domestic and international markets, and the implications for value chain organization and performance. Value chain analysis also needs to examine barriers to the transmission of information in the changing nature of demand and incentives back to producers at various levels of the value chain (MSPA, 2010).

2.2.2. Production

In agricultural value chain analysis, a stage of production can be referred to as any operating stage capable of producing a saleable product serving as an input to the next stage in the chain or for final consumption or use. Typical value chain linkages include input supply, production, assembly, transport, storage, processing, wholesaling, retailing, and utilization, with exportation included as a major stage for products destined for international markets. A stage of production in a value chain performs a function that makes significant contribution to the effective operation of the value chain and in the process adds value (Anandajayasekeram and Berhanu, 2009).

Producing the required amount effectively is a necessary condition for responsible and sustainable relationships among chain actors. Thus, one of the aims of agricultural value chain analysis is to increase the quantity of agricultural production. Understanding the mechanisms of the agricultural production greatly help to design appropriate policy that bring more gain to farmers and the whole society. For a long time, sector analyses have been used to measure the different economic aspects of production. However, sector analyses have not been without weaknesses. In particular, sector analysis tends to be static and suffers from the weakness of its own bounded parameters. Such analysis struggles to deal with dynamic linkages between

productive activities that go beyond that particular sector (Kaplinsky and Morris, 2000). By going beyond the traditional narrow focus on production, value chain analysis scrutinize interactions and synergies among actors. Thus, it overcomes several important limitations of traditional sector assessments.

2.2.3. Value chain governance

Governance refers to the role of coordination and associated roles of identifying dynamic profitable opportunities and apportioning roles to key players (Kaplinsky and Morris, 2000). Value chains imply repetitiveness of linkage interactions. Governance ensures that interactions between actors along a value chain reflect organization, rather than randomness. The governance of value chains emanate from the requirement to set product, process, and logistic standards, which then influence upstream or downstream chain actors and results in activities, roles and functions.

It is important to note that governance and coordination sometimes appear as synonymous or interchangeable terms in the literature. Already in the 1980s, Williamson (1979, 1985) used the term governance to define the set of institutional arrangements in which a transaction is organized. As Giraffe's work on Global Commodity Chains and the role of governance appeared, the term coordination took on a new meaning, basically, the vertical organization of activities. The application of contract/private ordering/governance leads naturally into the reconceptualization of the firm not as a production function (in the science of choice tradition) but as a governance structure (Williamson, 2002).

According to Raikes *et al.* (2000), trust-based coordination is central for goods and services, whose characteristics change frequently, making a standardized quality determination for the purposes of industrial coordination difficult. This applies to the manufacturing industry as well as agri-food chains. It is possible to identify in one industry several coordination forms used by different firms where the choices rely on the trust existent between the firms.

Value chains can be classified into two based on the governance structures: buyer-driven value chains, and producer-driven value chains (Kaplinisky and Morris, 2000). Buyer-driven chains are usually labor-intensive industries, and so more important in international development and agriculture. In such industries, buyers undertake the lead coordination activities and influence product specifications. In producer-driven value chains that are more capital intensive, key producers in the chain, usually controlling key technologies, influence product specifications and play the lead role in coordinating the various links. Some chains may involve both producer and buyer driven governance. Yet in further work (Humphrey and Schmitz, 2002; Gibbon and Ponte, 2005) it is argued that governance, in the sense of a clear dominance structure, is not necessary a constitutive element of value chains. Some value chains may exhibit no governance at all, or very thin governance. In most value chains, there may be multiple points of governance, involved in setting rules, monitoring performance and/or assisting producers.

Chain governance should also be viewed in terms of 'richness' and 'reach', *i.e.*, in terms of its depth and pervasiveness (Evans and Wurster, 2000). Richness or depth of value chain governance refers to the extent to which governance affects the core activities of individual actors in the chain. Reach or pervasiveness refers to how widely the governance is applied and whether or not competing bases of power exists. In the real world, value chains may be subject to multiplicity of governance structure, often laying down conflicting rules to the poor producers (MSPA, 2010).

2.2.4. Value chain upgrading

Upgrading refers to the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities (Kaplinsky and Morris, 2000). Upgrading in firms can take place in the form of process upgrading, product upgrading, functional upgrading and chain upgrading. Upgrading entails not only improvements in products, but also investments in people, know how, processes, equipment and favorable work conditions. Empirical research in a number of countries and

sectors (e.g. Humphrey and Schmitz, 2000; Humphrey, 2003; Humphrey and Memedovic, 2006) provide evidence of the importance of upgrading in the agricultural sector.

2.3. Empirical Review

2.3.1. Determinants of sesame value chain actors

Emana (2010) identified the key actors and functions of oil seeds of sesame value chain in Benishangul Gumuz. He identified the role of oil seeds value chain actors and its activity such as producers, collectors (local traders), local/regional wholesalers, and commission agents, wholesalers in Addis Ababa, exporter, processors, and consumers. He also examined other actors along the value chain including transporters and facilitators like the agricultural inputs suppliers, extension services by the government institutions, research centers who generate and disseminate improved agricultural technologies.

Bammann (2007) has identified three important levels of value chain. Value chain actors**;** the chain of actors who directly deal with the products, i.e. produce, process, trade and own them, value chain supporters; the services provided by various actors who never directly deal with the product, but whose services add value to the product and value chain influencers; the regulatory framework, policies, infrastructures, etc.

Otieno (2010) used the value chain approach on peanut and its products and the effects of value addition on product price in Nairobi, Kenya. He used ANOVA, least square difference (LSD), Tukey post hoc tests and hedonic model in the analysis and he found that there were eight different levels of value addition for peanuts, and prices differed significantly across the levels of value addition. Product packaging, brand and product weight significantly influenced peanut product prices. He suggests policy interventions' to stimulate production of value added products, establishment of a national market education program in addition to strengthening agricultural research extension services.

Astewel (2010) used cost benefit analysis on rice in Fogera woreda and found that rice production is a profitable business for farmers. The net income obtained from production per hectare of rice was Birr 5006.48. The cost margin indicate that producers obtain on average 35.97 Birr per qt, assemblers get 139 Birr per qt, millers a profit of 5.4 Birr per qt, wholesalers 9 Birr per qt, urban distributors birr 3.88 Birr per qt and retailers around 19 Birr per qt respectively. However, assemblers get more profit, they also incur more marketing cost.

There are various actors in sesame value chain. These include producers, small traders (collecting intermediaries**),** wholesalers/brokers, oil millers, retailers, local consumers and exporters (ECEA 2009; Winands and Biersteker, 2007).

2.3.2. Determinants of marketed surplus

Kindie (2007) and Bosena (2008) identified the major factors that affect the marketable supply of sesame and cotton of farm households at Metema district respectively. They examined the relationship of marketable supply and the determinant factors using Ordinary Least Squares (OLS). According to Kindie (2007), factors identified to affect the household level of sesame marketable supply include yield of sesame, number of oxen, number of foreign languages spoken by the head of the household, modern inputs used, sesame area and time of selling influenced positively the marketable supply as expected.

Geremew (2012) examined factors affecting sesame market supply in Diga district based on the Hausman test and the post estimation tests of Durbin-Wu-Hausman endogeneity test. According to his study, the quantity of sesame marketed is likely endogenous variable to the model, which may result in inefficient estimation result. Basically such problems arise if some factors explaining the variation in the dependent variable (in this case, total income generated from sesame sale) could also affect of the potential repressors (e.g. quantity of sesame marketed).

A study on green beans by Lusby (2007) has revealed that, lack of crop husbandry skills and limited extension services has constrained the productivity of the sector. Simultaneously, Cormick and Schmitz (2001) have indicated even though firms in a system are formally independent of one another, an increasing network through personal relations and repeated transactions has assisted to inspect and alleviate the chain's core problems by developing their capacity and reducing the cost of the actors.

Abay (2007) identified the major factors that affect the supply of vegetables (onion and tomato) at Fogera District. His study revealed that owned oxen number, family size, and distance from development agent and experience has affected marketable supply of onion and tomato. In similar way, Adugna (2009) identified major factors that affect marketable supply of papaya in Alamata District. Adugna's study revealed that papaya quantity produced influenced marketable supply positively.

Similarly, Bezabih and Hadera (2007) explore use of low level of improved agricultural technologies, risks associated with weather conditions, diseases and pests, as the main reasons for low productivity. Moreover, due to the increasing population pressure the land holding per household is declining leading to low level of production to meet the consumption requirement of the household. As a result, intensive production is becoming a means of promoting agro-enterprise development in order to increase the land productivity. Horticultural production gives an opportunity for intensive production and increases small holders' farmers' participation in the market.

In sum, empirical evidences indicate that marketable supply approach has become an important framework to analyze economic agents in agricultural sector. In this study, an attempt was made to identify factors affecting the marketable supply of sesame. Only few of the explanatory variables were found to be significantly affecting the marketable supply of sesame by producer households. Quantity of sesame produce, land, members of cooperatives and non-off farm income influenced positively the marketable supply of sesame by household as predictable.

2.3.3. Determinants of market channel choices

Alessandro (2009) used multivariate probit model for market outlet choice for different agricultural commodities in order to determine factors affecting channel choices of the households. According to his study, a multivariate probit model was applied to reveal the determinants influencing these choices among various supply channels. He also identified variables influencing producers' decision among organic producers for channel choices. He suggested that farmers' personal characteristics influence their choice, and that more educated and skilled farmers are less likely to choose traditional marketing chains and more likely to engage in the direct marketing chains.

Kuma (2013) identified factors affecting milk market outlet choices in Wolaita zone, Ethiopia. Multinomial Logit model results of his study indicate that compared to accessing individual consumer milk market outlet, the likelihood of accessing cooperative milk market outlet was lower among households who owned large number of cows, those who considered price offered by cooperative lower than other market outlets and those who wanted payment other than cash mode.

Ferto and Szabo (2002) identified variables influencing producers' decision for channel choices. Multinomial logit model estimates showed that farmer's decisions with respects to supply channels were influenced differently by transaction costs. Producers sales to wholesale market was strongly and negatively affected by the farmer's age, information costs, and negatively by the bargaining power and monitoring costs. The probability that farmers sell their product to marketing cooperative was influenced by the age and information costs positively.

Geremew (2012) also identified factors determining the extent of sesame production participation in Diga district. He analyzed the problem using the probit regression and second stage of the double-hurdle model. He also identified ten explanatory variables (seven continuous and three discrete), which were hypothesized to influence the probability of participation decisions and included in the analysis.

3. METHODOLOGY

3.1. Description of the Study Area

This study was conducted in Gimbi woreda that is located about 441 km to the west of Addis-Ababa and 4km to the west of Gimbi town, the capital of Western Wollega Zone of Oromia region. It has an estimated area of 1,183.44 square km; bordering Haru woreda in the south, Yubdo woreda in the southwest, Lalo Asabi woreda in the west, and , East Wollega Zone in the east, Benishangul-Gumuz Region in the north and an exclave of the Benishangul-Gumuz Region in the southeast. The woreda has 32 kebles, of which 30 are rural based farmer's administration areas. The total population of the woreda and households are estimated to be 74,623, of which 39.75% were females. Average family sizes for the woreda was 6.5 persons per household. Ninty seven percent of the households are rural residents making their livelihood from agriculture (CSA, 2007).

Lowland and midland agro-ecological zones characterize the woreda's climate. The minimum and maximum annual temperatures are 14^{o}c and 26^{o}c respectively, and the mean annual rainfall ranges from 800 to 2000mm. The main rainy season in the woreda is from March to end of May and from June to mid September. Traditional cash and other crops production mixed with livestock husbandry dominate the economy of the woreda. The major crops produced in the woreda include coffee, sesame, maize and sorghum. (GWOoARD, 2013).

Gimbi woreda is known for its high potential for sesame, coffee and maize production. Besides, it is rich in small ruminant animals, incense and gum resources. Except for the very small areas under vegetables and fruits, crops in all farms (commercial and smallholders) are grown under rain fed condition. In the area, sesame, coffee, and maize are the most important marketable commodities, and accounted for 90% of the woreda-cultivated area.

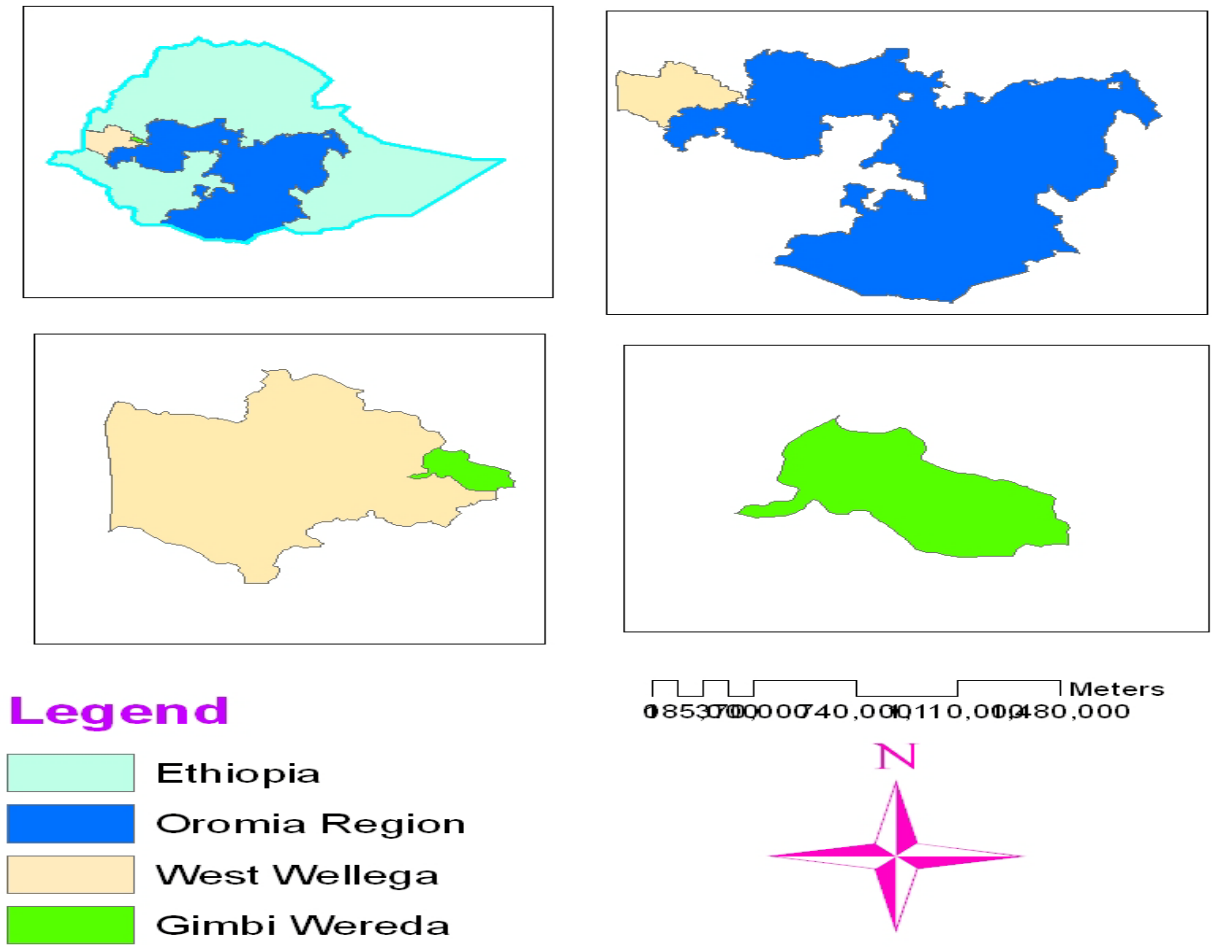

Figure 2. Geographical location of Gimbi woreda

3.2. Source of Data

Data needed for the study were collected from both primary and secondary sources. Primary data sources were smallholder farmers, assembler, cooperative, union, wholesalers and exporters from three purposely-selected kebeles.

Secondary data sources were Gimbi woreda trade and market development office and primary cooperatives, woreda and regional bureaus of agriculture, ECX, CSA and different publications, and ministry of agriculture. Secondary data on sesame seeds supply chain were also collected from different published and unpublished reports, bulletins, and websites.

3.3. Sampling Procedure

For this study, in order to select a representative sample of producer, a two-stage sampling technique was implemented. In the first stage, with the consultation of woreda agricultural experts and development agents, 3 out of 12 kebeles having potential for sesame production, were purposively selected based on the high production of the kebeles. In the second stage, using the list of sesame producing households in the sampled kebeles, 127 sample farmers were selected randomly. The sample size was determined at 95% confidence interval using the following formulas.

$$n = \frac{N}{1+N(e)^2} \quad \text{…….. (Yemane, 1967)}$$

$$n = \frac{N}{1+N(e)^2} = \frac{187}{1+187(0.05)^2} = 127 \text{…….....……...…...1}$$

Where n is the sample size, N is the population size, and e is the level of precision.

In general, using the above sample size and the total number of sesame producers from selected Keble's, the proportion and the number of sample households from three Kebeles can be summarized in table 1.

Table: 1 Sample distributions producers of Sesame in Gimbi woreda

Name of selected Keble	Total number of sesame producers	Proportion of households sesame producers	Number of sample households	% of female
Tole	65	0.35	45	11.11
Jogir	62	0.33	42	9.52
Abba Sena	60	0.32	40	7.5
Total	187		127	

Source: Own computation from OoTMD and Kebele administration data

Data were also collected from 17 traders (collectors, commission agents, wholesalers, and exporters). The sites for the trader surveys were Gimbi and Nekemte towns where good samples of sesame traders exist (OoTMD).

Table 2: Sample distributions traders of sesame in Gimbi woreda.

Name of Selected Kebles	Assembler	Wholesaler	cooperatives	Exporter	Total	% of female
Tole	1	4	1	0	6	16.67
Jogir	1	3	1	0	5	20
Abba Sena	1	3	1	0	5	20
Nekemte	0	0	0	1	1	-
Total	3	10	3	1	17	17.65

Source: Own computation from OoTMD and Kebele administration data

3.4. Data Collection

Development Agents (DAs) who have college diploma were employed for data collection. Before data collection, the enumerators were trained; and the questionnaire was pre-tested on farmers and traders to evaluate the design, clarity, simplicity, relevance of the questions and time taken for an interview. Modifications and corrections were made based on the feedback from the pretest of the questionnaire. Individual households were interviewed using structured questionnaire at the village level. The questionnaire covered different topics in order to capture relevant information related to the study objectives. In addition, it was prepared as simple as possible, which was later translated to Afan Oromo (the local language) in order to channel answers by the respondents. Discussions with agricultural experts in the woreda and the key informants were also used to triangulate the data. In addition, focus group discussions were organized with three groups consisting of 6-8 people from each kebeles and key informant interviews were held with 6 different organizations and institutions. Suitably, the data generated at various levels were triangulated with secondary data.

3.5. Data Analysis

Descriptive statistics and econometric analysis were used to analyze the data collected from sesame producers and traders.

3.5.1. Descriptive and inferential statistics

These methods of data analysis refer to the use of percentages, means and standard deviation in the process of examining and describing marketing functions, facilities, services, and household characteristics.

3.5.1.1. Value chain analysis

The following four steps of value chain analysis were applied to this study:

1. Mapping the value chain to understand the characteristics of the chain actors and the relationships among them, including the study of all actors in the chain, of the flow of sesame through the chain, of employment features, and of the destination and volumes of domestic and foreign sales.

2. Identifying the distribution of actors' benefits in the chain. This involves analyzing the margins and profits within the chain and therefore determining who benefits from participating in the chain and who needs support to improve performance and gains.

3. Defining upgrading needed within the chain. By assessing profitability within the chain and identifying chain constraints, upgrading solutions are defined. These include interventions to:

   (i) Improve product design and quality and move into more sophisticated product lines to gain higher value and/or diversify production;

(ii) Reorganize the production system or invest in new technology to upgrade the process and enhance chain efficiencies;

(iii) Introduce new functions where in the chain to increase the overall skill content of activities; and

(iv) Adapt the knowledge gained in particular chain functions in order to redeploy it.

4. Emphasizing the governance role. Within the concept of value chain, governance defines the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional distortions.

3.5.1.2. Analysis of sesame value chain performance

3.5.1.2.1. Marketing margin

Computing the Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$\text{TGMM} = \frac{\text{ConsumerPrice} - \text{ProducerPrice}}{\text{ConsumerPrice}} \times 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where, TGMM = Total gross marketing margin

To find the benefit share of each actor the same concept was applied with some adjustments. In analyzing margins, first the Total Gross Marketing Margin (TGMM) was calculated. This is the difference between producer's (farmer's) price and consumer's price (price paid by final consumer) i.e.

$$GMM_p = \frac{End\ buy\ er\ price - Marketing\ \ gross\ margin}{End\ buyer\ \ price} \times 100 \ldots\ldots\ldots\ldots\ldots\ldots 3$$

Where, GMMp = the producer's share in consumer price.

Total Gross Profit Margin (TGPM) also computed as:

$$\text{TGPM} = \text{GMM} - \text{TOE} \quad \text{.....4}$$

Where, TGPM is total gross profit margin, TGMM is total gross marketing margin and TOE is total operating expense.

Net Marketing Margin (NMM) is the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted. The equation tells us that a higher marketing margin diminishes the producer's share and vice-versa. It also provides an indication of welfare distribution among production and marketing agents.

$$\text{NMM} = \frac{\text{Gross marketing margin} - \text{Marrketing cost}}{\text{Consumer price}} \times 100 \quad \text{.....5}$$

Where, NMM = Net marketing margin

Dawit (2010) and Marshal (2011) did similar concept of profit margin that deducts operating expense from marketing margin.

Then profit margin at stage "i" is given as:

$$\text{GPM}_i = \frac{\text{GMM}_{i-\text{OE}_i}}{\text{TG}} \times 100 \quad \text{... ... ...6}$$

Where, GPMi =Gross profit margin at ith link

GMMi =Gross marketing margin at ith link

OEi =Operating expense at ith link

TGPM=Total gross profit margin

3.5.2. Econometric analysis

3.5.2.1. Market supply model

In order to expand the leading role agriculture plays in economic growth and poverty reduction, smallholder farmers need to improve their marketable surplus. A higher marketable surplus can help farmers to participate in a high value markets by increasing their level of income. Therefore, investigating the nature of marketable surplus is a major component of agro-value chains.

In this study, multiple linear regression models were used to analyze factors affecting farm level sesame supply to the market. This model was selected because of two reasons: first all sesame producers participate in the market and second the model is simple and easily applicable (Greene, 2000).

Following Green (2003), the multiple linear regression models is specified as;

$$Y_i = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14})$$

Where: Y_i = Quantity of sesame supplied to market

X_1 = Quantity of sesame produced

X_2 =Age of household head

X_3= Sex of the household head

X_4= Distance to nearest market education of the household head

X_5= Education of the household head

X_6 = Land size

X_7 = Access to market information

X_8 = Market price of sesame

X_9 = Credit access

X_{10} = Extension service

X_{11} = Income from none/Off farming activities

X_{12}= Membership to any cooperative

X_{13}= Ownership of transport facilities

X_{14} = Family size

Econometric model specification of supply function is expressed as:

$$\mathrm{Y} = \mathrm{X}'\beta + U \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 7$$

Where: Y = quantity of sesame supplied to market

X' =Vectors of explanatory variables

β= a vector of parameters to be estimated

U= disturbance term

3.5.2.2. Market outlet choice model

A multivariate probit model was applied to explain the effect of different factors on the choice of market channels. A multivariate probit was used previously in a number of adoption studies to account for simultaneous adoption of multiple varieties and the potential correlations among the adoption decisions. The multivariate probit is an extension of the probit model and is used to estimate several correlated binary outcomes jointly.

With respect to the structure of the theoretical model and the dependent variables, a recursive multivariate probit model is as a generalization of the bivariate probit model as presented in Maddala (1983). Generally, the multivariate probit model can be written as:

$$y^*_{im} = \beta_m X_m + \varepsilon_{im} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 8$$

Where y_{im} (m= 1... k) represent the dependent variable of sesame market outlet selected by the i[th] farmer. (i = 1… n). The dependent variables are the polychotomous variable indicating whether sales are made through the relevant marketing outlet. The outlet has been aggregated into three groups: wholesalers, cooperatives, and collectors. Each farm can use one or more

marketing outlet. X_{im} is a 1 × k independent variables that affect the choice of marketing outlet decisions and βm is a k× 1 vector of unknown par ameters to be estimated ε_{im}, m = 1, …, M are the error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix V, where V has values of 1 on the leading diagonal and correlations.

Above equation is a system of m equations that as shown in the following equations;

$$y_{1i}^{*} = \beta_1^{'} X_{1i} + \varepsilon_{1i} \quad \text{.....9}$$

$$y_{2i}^{*} = \beta_2^{'} X_{2i} + \varepsilon_{2i} \quad \text{.....10}$$

$$y_{3i}^{*} = \beta_3^{'} X_{3i} + \varepsilon_{3i} \quad \text{.....11}$$

The latent dependent variables are observed through the decision to choose the outlet or not (yki) such that:

$$y_{im} = \begin{cases} 1 & if \quad y_k^{*} > 0 \qquad k = 1,2,3. \\ 0 & otherwise \end{cases} \quad \text{.....12}$$

There are six joint probabilities corresponding to the six possible combinations of choosing and not choosing each of the three outlets. The probability that all three components of the sesame market outlet have been selected by household 'i' is given as:

$$\Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1) = pr\left(\varepsilon_{1i} \le \beta_1^{'} \times_{1i}, \varepsilon_{2i} \le \beta_2^{'} \times_{2i}, \varepsilon_{3i} \le \beta_{3i}^{'} \times_{3i}\right) \quad \text{.....13}$$

$$\Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1) = pr\left(\varepsilon_{3i} \le \beta_3^{'} \times_{3i}, \varepsilon_{2i} \le \beta_2^{'} \times_{2i}, \varepsilon_{1i} \le \beta_{1i}^{'} \times_{1i}\right) \quad \text{.....14}$$

$$\Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1) = Xpr\left(\varepsilon_{2i} \le \beta_2^{'} \times_{2i}, \varepsilon_{1i} \le \beta_1^{'} \times_{1i}, \varepsilon_{1i} \le \beta_{1i}^{'} \times_{1i}\right) \quad \text{.....15}$$

This system of equations is jointly estimated using maximum likelihood method. The estimation is done using the user-written STATA mvprobit procedure (Capellari and Jenkins, 2003) that employs the Gewek-Hajivassiliour-Keane smooth recursive conditioning simulator to evaluate the multivariate normal distribution (Train, 2003). The GHK simulator was

indicated (Capellari and Jenkins, 2003) to have desirable properties in the context of multivariate normal limited dependent variables that the simulated probabilities are unbiased, they are bounded within the (0, 1) interval, and the simulator is a continuous and differentiable function of the model's parameters.

3.6. Hypothesis, Variable Selection and Definition

In this study factors influencing sesame supply to the market and market channel choice decisions, the main task is exploring which factors potentially influence and how (the direction of the relationship) of these factors are related with the dependent variables.

3.6.1. Dependent variables

Marketing Outlet (MktO): Market outlet was identified three classes of dependent variables: first, whether the farmer choose to sell sesame to wholesalers, second, cooperatives and third, directly to collectors. Each farm can use one or more marketing outlet. In the analysis, it is measured by the probability of selling sesame to either of the markets. A farming household would be choosing one or more of the sesame market outlet if and only if the utility expected is higher than otherwise.

Quantity of Sesame Sold/Marketed surplus (VVS): It is continuous dependent variable used in the multiple linear regression models. It was measured in quintal and represents the actual supply by sesame farm household to the market in the survey year.

3.6.2. Independent variables

Quantity of sesame produced (QProdn): It is an economic factor and continuous variable that can affect the household level marketed supply and measured in quintals per hectare (qt/ha). It is assumed that the marketing of sesame by the farmer is positively related to the amount of production. Kindie (2007) and Tegegne (2008) found that the amount of sesame and cotton produced by farming households has augmented marketable supply of the

commodities significantly. According to Nyaupane and Gillespie (2010) found that quantity of crawfish of the household head has significantly and positively affecting with wholesaler outlet choice decision. For this study, quantity of sesame produced is expected to have positive effect with outlet choice decision of sesame producers.

Age of household head (Age): It is a continuous variable and measured in years. Aged household heads were believed to be wise in resource use, on the other hand, young household heads have long investment horizon and it is expected to have either positive or negative effect on volume of sesame sales. Adugna (2009) found that age of the household head have negative effect on the elasticity of onion supply to the market. Bongiwe and Masuku (2012) found that age of the farmers was significant determinant of the choice to use non-wholesale market channel over other-wholesale market channel. It is also expected to have either positive or negative effect with outlet choice decision of sesame producers.

Sex of the household head (Sex): A dummy variable taking "0" if the head is female and "1" if the head is male. Sign of influence could not be attached with the variable. Study conducted by Awol (2010) indicated negative relationship between sales volume of poultry and male-headed household. It is expected to have positive effect with outlet choice decision of sesame producers. Mamo and Deginet (2012) found that sex of the household head has statistically significant effect on whether or not a farmer participates in the livestock market and his/her choice of a market channel.

Distance to nearest market (DMkt): It is the distance of the sesame producer households from the nearest market as measured in minutes of walking time**.** The closer the market, the lesser would be the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. This was a variable expected to influence positively sesame marketable supply of farm households. Kindie (2007) reported that distance to nearest market negatively affects the volume of sesame sold. Distance to nearest market is expected to have positive effect for the choices of wholesaler's and cooperative market outlet were as negatively expected to have for collector market outlet choice.

Education of the household head (HEduc): This variable is measured using formal schooling of the household head and hypothesized to affect marketable supply positively. It has taken dummy values 1 if the household attended any formal education of any level and 0 otherwise. Astewel (2010) found that if paddy producer gets educated, the amount of paddy supplied to the market increases, which suggests that education improves level of sales that affects the marketable surplus. Education was expected to have positive effect with outlet choice decision of sesame producers. Formal education enhances the information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision-making (Fakoya *et al*., 2007).

Land size (Land): This refers to the total area of land that a farm household owned in hectares. In agriculture, land is one of the major factors of production. The availability of land enables the owner to earn more agricultural output that in turn increases the marketable supply (Desta, 2004). Therefore, land holding and marketable supply are expected to have direct relationship.

Access to market information (acc_mkt): This is measured as a dummy variable taking a value of 1 if the farmer had access to market information and 0 otherwise. This was a variable expected to influence positively sesame marketable supply of farm households. Because, producers that have access to market information are likely to supply more sesame to the market. Mohamed (2011) who found that if wheat producer gets market information, the amount of wheat supplied to the market increases. Access to market information was also expected to have either positive or negative effect with outlet choice decision of sesame producers. Producers that have access to market information are expected to be associated with sales to the wholesaler and cooperatives than collector market outlet.

Market price of sesame (MRKTPRICE): This is continuous variable representing market price of sesame in the study area. It is measured in Ethiopian Birr (ETB) per quintal and is expected to positively influence the supply of sesame. Tomek and Robinson (1985) argued that the product price has direct relations with marketed supply. Staal et al (2006) found out

that higher price offered per liter of milk for a market channel, the more a household prefers that outlet for accessing and selling milk. Hence, this variable was also expected to have positive effect on market outlet choice decision of sesame producers.

Credit access (Credit): This is a dummy variable taking the value of 1 if the household takes loan and 0 otherwise, which indicates credit taken for sesame production. Access to credit will enhance the financial capacity of the farmer to purchase the inputs, thereby increasing sesame production and productivity. It was hypothesized to influence volume of sesame sales positively. Producers who had access to credit are expected to be associated with sales to the cooperatives market outlet. Therefore, this variable was expected to have positive effect with cooperative outlet choice decision of sesame producers. Urquieta (2009) found that access to loan was significant determinant of market channel choice.

Extension service (EXT_SER): The variable extension service was measured as a dummy variable taking a value of 1 if the household head has contact with a development agent and 0 otherwise. Extension was expected to have positive effect for market supply through its stimulation of production and productivity. Therefore, this variable was hypothesized to influence volume of sesame sales positively. Extension was also expected to have either positive or negative effect with outlet choice decision of sesame producers. Farmers that have frequent contact with DAs will be expected be associated with sales of sesame to the wholesalers and cooperatives market outlet rather than collectors. Because they are licensed and pay a competitive price for the producers.

None/Off farming activities (NOFI): It is a dummy variable represented by "1" if the household is involved in non/off farm activities and "0" otherwise. Farmers who gain more income from non/off farm income before production season want to supply their sesame to any nearest market outlet with low price in order to minimize transportation cost rather to go far. The study was hypothesized the earning from the non-farm income is higher than the sesame production. Therefore, in this study, non-farm income was expected negatively influence the marketing of sesame.

Membership to any cooperative (MCoop): It is binary variable taking a value of "1" if the household is member of a cooperative engaged in any business and "0" otherwise. It was hypothesized to influence volume of sesame sales positively. Thus, cooperatives improve understanding of members about market and strengthen the relationship among the members. Therefore, it is expected to have positive effect with cooperative outlet choice decision of sesame producers.

Ownership of transport facilities (OTran): households would use specifically vehicles, carts and transport animals to measure the availability of produce transportation facilities. In cases where households owned transportation facilities such as carts, donkeys and vehicles, the variable took the value of one, and zero if the household did not own any form of transport facility. This variable was also expected to have either positive or negative effect with outlet choice decision of sesame producers. The availability of transportation facilities helps reduce factor related to transaction cost with the potential to constrain supply (Jagwe, 2007).

Family size (MFamily): Family size of a respondent is a continuous variable measured in terms of number of family members in the household. As sesame, production is labor-intensive activity, sesame production in general and market supply of sesame products in particular is a function of labor. Accordingly, families with more household members tend to have more labor, which in turn increase sesame production and then increase sesame marketed supply. For this study, family size is expected to positively influence the volume of sesame supply to the market.

4. RESULTS AND DISCUSSIONS

This chapter presents the major findings of the study. It has five sub sections. The first sub section deals with descriptive and inferential statistics of the sample households. The second sub section presents value chain analysis of sesame that includes value chain map, actors and their roles, and value chain governance. The third sub section presents marketing channel and performance analysis of the value chain that includes marketing channels, marketing costs and margins, and benefit shares of actors in the value chain. The fourth sub section presents results of econometric analysis that contains the determinants of market supply of sesame by using OLS and the determinants of outlet choice of sesame producers by using multivariate probit model. The fifth sub section deals with the constraints and opportunities of sesame marketing in the study area.

4.1. Descriptive Results

4.1.1. Demographic and socio-economic characteristics of sample producers

The average age, family size and average years of farming experience related to sesame production during the survey period was 43.95 years, 6.5 persons and 10 years in Gimbi woreda respectively. Whereas, the average family size of the sample farmers during the survey period was 6.5 persons, with maximum and minimum family size of 11 and 2 persons, respectively. More than 90% of the sampled households are male headed. Educational status of the household head is also an important element in smallholder economic activities. However, the survey result revealed that about 77% of the sampled farmers are literate and attended different levels of schooling.

In the study area, only 29% of the sample households have no access to non-farm activities and they reported that the contribution of non-farm income to their portfolio is relatively small. About 71% of sampled households reported that crop production is the major and only source of their income. Among crops, sesame, sorghum and maize are their main source of food and income. The average income farmers generated from sale of sesame in 2013/2014

year was about 3260.75 birr. In 2014/2015 production season, the average income from sale of sesame is about 3625.50 birr, with a minimum of 750 birr and a maximum of 6500 birr (Appendix table 4). According to this survey result, about 83 (65.4%) of the sampled farmers are members of cooperatives.

Table: 3.Demographic and socioeconomic characteristics of sample producers (categorical variables)

Variables	Category/response	Frequency	Percent (%)
Sex	Male	115	90.6
	Female	12	9.4
Education	Literate	98	77.2
	Illiterate	29	22.8
Non/off farm income	Yes	90	71
	No	37	29

Source: Survey result, 2015

Table 4. Demographic and socioeconomic characteristics of sample producers (continuous variables)

Variable	Mean (N=127)	Standard Deviations
Age	43.95	9.95
Family size	6.5	2.39
Experience	10	1.79

Source: Own computation from survey result, 2015

4.2. Value Chain Analysis

4.2.1. Actors and their functions in sesame value chain

4.2.1.1. Input Suppliers

Input Suppliers are the first actors involved in the sesame value chain. Farmers in Gimbi woreda generally responsible to supply agricultural inputs like, fertilizers, herbicides, pesticides and farm implements, which are essential inputs at the production stage. For major sesames produced in Gimbi Woreda, about 52% sesame producers used their own seed (Table 5) while 48% of sample farmers used sesame seed from local market that is with unknown quality. Regarding fertilizers, some farmers used only organic fertilizer (manure and compost) while some farmers used both inorganic and organic fertilizers depending on the land size allocated to sesame, sesame type produced and the soil fertility status as perceived by the farmers. Mostly private vendors supply pesticides. Insignificant producers exercise on improved seeds trial and very limited use of chemicals observed in Tole kebele.

Table 5. Source of sesame seeds for sample respondents

Source of seed	Numbers of Households	Percent
Own production	66	52
Local market	61	48

Source: survey result, 2015

4.2.1.2. Producers

Sesame producers are the first link in the marketing channel and the second actors in the sesame value chain. They are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major value chain functions that sesame producers perform include land ownership, production, yield and quantity sold.

4.2.1.2.1. Land ownership of sesame producer

Survey result indicates that about 90.5% of respondents own land. That means, only 9.5% of sampled farmers did not possess their own land. The farm size of sampled farmers varies from 1 to 10 hectares and the average farm size for these sampled farmers is found to be 3.61 hectare.

As indicated in Table 6, the maximum and minimum land holding size of farmers who have participated in the production of sesame in 2014/2015 production season is found to be 10 and 1 hectare respectively with average hectare of 3.61. The minimum land potential for sesame and cultivated land under sesame is found to be 0.5 and 0.25 hectare respectively while the maximum is 8 hectares for both land potential for sesame and cultivated area. Moreover, the average cultivated land under sesame in this survey year is about 1.54 hectare.

Table 6: Land ownership of the respondents (ha)

Land status	Mean	Minimum	Maximum
Landholding size	3.61	1	10
Land potential and suitable for sesame	2.45	0.5	8
Cultivated area for sesame	1.54	0.25	7

Source: survey result, 2015

4.2.1.2.2. Sesame production calendar

According to Kindie (2007), the production of sesame from land preparation up to threshing requires a full year operation. Land clearing starts soon after harvest in November and continues until April 30. The seeding (Sowing) operation usually is conducted starting from June 12 to July 20. Thinning and chemical spray (herbicides) on weeds commonly practices at least two times in one production season. The first weeding usually is done in the second week of July and the second weeding is done starting from August 8 to 12. If weeding is missed during these critical periods, a significant portion of yield could be reduced. Hence, producers at these periods badly need and use laborers or herbicides.

4.2.1.2.3. Sesame productivity

The average sesame yield is estimated to be 7.07 qt/ha with significant variability among the different PKA in the Woreda (Table 7). The yield result obtained from the study is high as compared to Kindie (2007) and CSA (2005) but it is low according to the findings of different surveys for North Gondar 7.39 qt/ha by Demelash, 2004).

Table 7. Average yield of sesame

Category	Yield (qt)
Mean	7.07
Maximum	32.00
Minimum	1.00

Source: survey result, 2015

All sesame producers in Gimbi Woreda derived the biggest share of their income from sesame production. Of the sampled farmers, 97.5%, 73%, and 72% were engaged in sesame, sorghum and maize production respectively (Appendix table 4**)**. The average annual income of households was 3625.50; 1525 and 1380 Birr/household, from sesame, sorghum and maize respectively.

4.2.1.2.4. Quantity sold

On average, marketed supply of sesame by producers was 6.64 quintals in 2014/15 production season. As indicated in table 8, the maximum and minimum quantity of sesame supplied to the market in 2014/2015 production season was found to be 29.75 and 0.75 qt respectively.

Table 8. Average of sesame producer by the level of market supply

Category	Quantity sold (qt)
Mean	6.64
Maximum	29.75
Minimum	0.75

Source: Own computation from survey result, 2015

4.2.1.3. Assemblers /Village collectors/

It is the first link between producers and other traders. Assemblers in Gimbi woreda purchased 7.5% (789.1) qt of the farmers' marketed sesame in 2015 (figure 4). According to Emana (2010), these are small trading individuals who collect the product in small quantity directly from producers and resell to brokers/wholesalers, oil millers and exporters in a more marketable quantity. They act as intermediaries who do not add value but merely snatch the benefit that could have accrue to the producers. They use their financial resources and their local knowledge to bulk sesame from the surrounding area. They play important role and they do know areas of surplus well. Collectors are the key actors in the sesame value chain, responsible for the trading of sesame from production areas to wholesale and retail markets in the Gimbi woreda.

4.2.1.4. Wholesalers

They are larger suppliers who have better capacities in terms of finance and other facilities. They provide both price information and advance payments for selected reliable clients. They have better storage, transport and communication access than other traders do. Almost all wholesalers have a warehouse in a market either self-owned or rental basis. They have accounted the biggest purchased of the channel members' about 43.35% (4560.8) qt of the sesame supplied to the rural market and mainly sell their sesame to exporters after some time storage (figure 4). They are located in Tole, Abba Sena, Jogir, Gimbi and Nekemte towns but the number of wholesalers in Gimbi town market is higher than all other market towns.

4.2.1.5. Union and Cooperatives

One sales outlet of the small-scale farmer is the cooperatives and unions. Unions collect sesame from each farm household through their member cooperatives (Emana, 2010). The cooperatives in turn collect the sesame mainly from their member farmers. According to the study result, the marketing share of primary cooperatives and the union at local market level had been 30.5% (3308.9) and 18.65% (1962.16) qt respectively (figure 4). The unions store

and clean the sesame and look for export sale outlets. The unions prefer to participate in the ECX marketing framework as buyers rather than as sellers. This is because they have developed the necessary financial and organizational capacity to export. The government and/or concerned governmental organizations are doing their best to encourage unions to undertake high-value addition activities, including export and import of commodities and inputs.

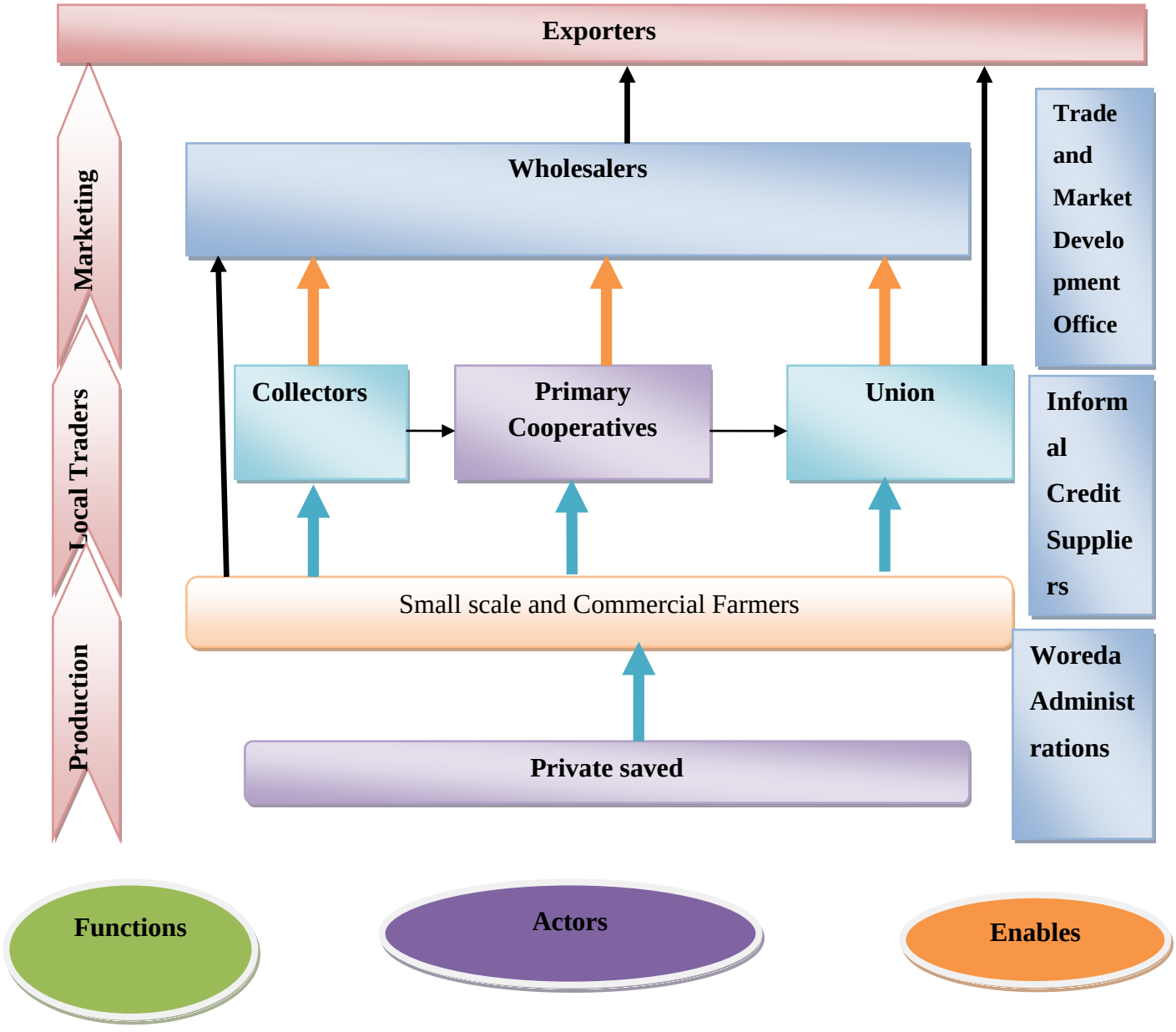

Figure 3: Sesame value chain map in Gimbi Woreda
Source: Survey result, 2015

4.2.1.6. Exporters

These public and private firms buy the seed from collectors and wholesalers to sell in the export market after processing and packing. The major operator in the sesame market is the exporter. These are the largest buyers of sesame from the wholesalers. These large-scale exporters, mostly located in Nekemte and Addis Ababa, have their own buying branches. These buyers buy most of the exported sesame using different instruments. They buy on the spot market, on cash from anyone willing to sell, competing merely on prices. In addition to spot purchasing, they have introduced foreword markets. Only few of the large-scale commercial farmers are involved in the export business. According to the study result, all of producers of sesame do not directly export their produce themselves. They instead sell their produce to different types of traders, which constitute the different sale outlets for the farmer.

4.2.2. Supporting actors

Such actors are those who provide supportive services including training and extension, information, financial and research services. According to Martin *et al*. (2007), access to information or knowledge, technology and finance determines the state of success of value chain actors. OoARD, primary cooperatives, micro finance, NGOS and Trade and Market Development Office are main supporting actors who play a central role in the provision of such services.

Access to finance

In the study area, cooperatives, Oromia Credit and Saving Share Company (OCSSCO) and individual lenders have been identified as a potential source for credit both in kind or on a cash basis. The survey data revealed that due to the special nature of the product, high unit value and high successive production operation cost (from land clearing to threshing), finance is the crucial element in sesame subsector. The study result at local and woreda level revealed that about 50.4 percentages of the producers had access to credit for sesame productions. About 49.6 % of them are not participating in credit market because of the high interest rate

charged by private lenders. With regard to credit source out of 64 sampled farmers who took credit, 39 farmers took credit from OCSI, 14 farmers from service cooperatives, 5 from traders especially from wholesalers and relatives and the remaining took credit from more than one sources. Sources of credit for wholesalers are also the same as producers except some big wholesalers get credit from banks. All of the assemblers found in the Gimbi woreda are members of cooperatives and they took credit from service cooperatives.

Table 9. Proportion of households accessing services

Variables	Numbers of Households	Percent
Credit	64	50.4
MInformation	106	83.5
Extension	70	55

Source: Own computation from survey result, 2015

Access to market information

More than 80% of the sampled households have accessed market information with significant difference in access among farmers in the different PKAs. This study testified that almost all sesame-marketing actors (producers to exporters) had market information access though timeliness and quality of information is questionable. In Gimbi woreda, getting market information is not the problem. At local level friends, client traders, personal visit of the market and nearby farmers, and rarely radio served as the sources of market information. For the better off traders (wholesalers, exporters) the main information source has been the internet. Despite the availability of these formal sources, none of the studied individuals neither producers nor traders responded using this channel of information (radio and newspapers) as a source. The main reasons according to Demelash (2004) are suggested as; the information is not timely and reliable. Some producers tried to get scanty and outdated price information from their respective cooperatives. Even there are times to change the price within a day. Sesame exporters had better access to all information through electronic media, the internet and played significant role in price decision. In the existing marketing system,

cooperatives and small traders followed the price trends of big institutional buyers and exporters in their price setting.

Access to extension services

The survey result revealed that more than 50 percent of the sampled have been taken advice service on the sesame value chain in Gimbi Woreda (Table 9). OoARD through its DA backed by the Woreda subject matter specialists is the major actor who provides information and advisory service on sesame production and management practices. In addition, the contact of development agents with producer farmers was not frequent and regular. Furthermore, sample farmers indicated that they are getting information particularly of input availability and price from primary cooperatives and kebele administration.

4.2.3. Value chain governance

The dominant value chain actors play facilitation role. They determine the flow of commodities and level of prices. In effect, they govern the value chain and most other chain actors subscribe to the rules set in the marketing process. The study result indicates that the exporters and wholesalers assisted by the brokers are the key value chain governors. In most cases, the business relations between the various operational actors are of free market exchange and uncoordinated. Due to the lack of a proper market information system and minimal bargaining power, farmers are forced to sell their product at the price offered by traders. Traders in Gimbi woreda usually refer to Nekemte and Addis Ababa markets for price fixation. The smallholder farmers are not organized and are not governing the value chain. There is no vertical linkage between value chain actors but there is horizontal linkage between traders. In some cases, there are conflicts among the traders regarding payment and failure to keep their commitment. Overall, the governance of the sesame value chain is buyer driven with minimum trust between various actors. Traders are always complaining that the farmers are not providing quality product while farmers are blaming the traders for offering low prices.

4.2.4. Producers' characteristics by marketing outlets

In this study, three major sesame market outlets were identified as for the farmers to sell majority of their sesame products. More than 90% of male households chose wholesaler and cooperative market outlet respectively. However, about 91.9 and 83% of female households sell their products to the cooperative and collectors respectively. Although the role of agricultural cooperatives in smallholder farmers marketing is recognized as vital, many of them reported that cooperatives as alternative market outlet in their sesame marketing. Accordingly, from those who are members of cooperatives, more than 70% of them sold their sesame to the cooperatives whereas 27.8 and 47.4% of them sold to the wholesalers and collector respectively.

Compared with the collector's outlet, households with more education may have greater access to choose wholesalers and cooperative market outlet. Accordingly, of the literate households, about 78% they sold their sesame to the wholesaler's market outlet. Educated farmers may have a greater ability to decide to choose any of better outlets from market channel. On the other hand, more than 80% of illiterate households choose collector market outlet to sell their sesame. Less educated households may be less likely to choose market outlet and practices, since they may be able to earn higher capital if they are used in other outlet. Thus, the probability and level of adoption increase with the education level of the farmers.

Table 10. Proportion of producers by demographic characteristics across marketing outlets (percentage)

variables	Items	Wholesaler	Cooperative	Collector
Sex	Male	94.5	90.1	8.6
	Female	13.6	91.9	83
HEduct	Literate	78.1	74.4	24.4
	Illiterate	27.3	83.8	80.9
MCoop	Yes	27.8	72.2	47.4
	No	61.7	30.2	46.2

Source: Own computation from survey result, 2015

Table 11. Proportion of producers by demographic characteristics across marketing outlets (%)

Variables	Wholesaler	Cooperative	Collector
Age	43.01	43.05	44.23
Land	3.61	3.51	3.62
DMkt	22.66	24.17	23.71

Source: Own computation from survey result, 2015

4.3. Marketing Channels and Performance Analysis

4.3.1. Marketing channels

A marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumer).

The initial links for sesame marketing channels are producers and the final destinations in country are exporters. In between lots of intermediaries existed which play significant roles for the movement of the product to its final destination. The magnitude of these channel participants measured based on 2014/15 business transaction. During the 2015 production season, the total sesame production in the woreda was estimated to be 12520 quintals. As per the findings of the study, the marketed surplus of sesame that would flow to the market through channel members was estimated to be 10521 quintals. Hence, the total woreda marketed surplus of sesame seeds flow at channel members was estimated by multiplying completely marketed surplus by their respective share in the channel. The shares are quantified based on the reports from the survey participants.

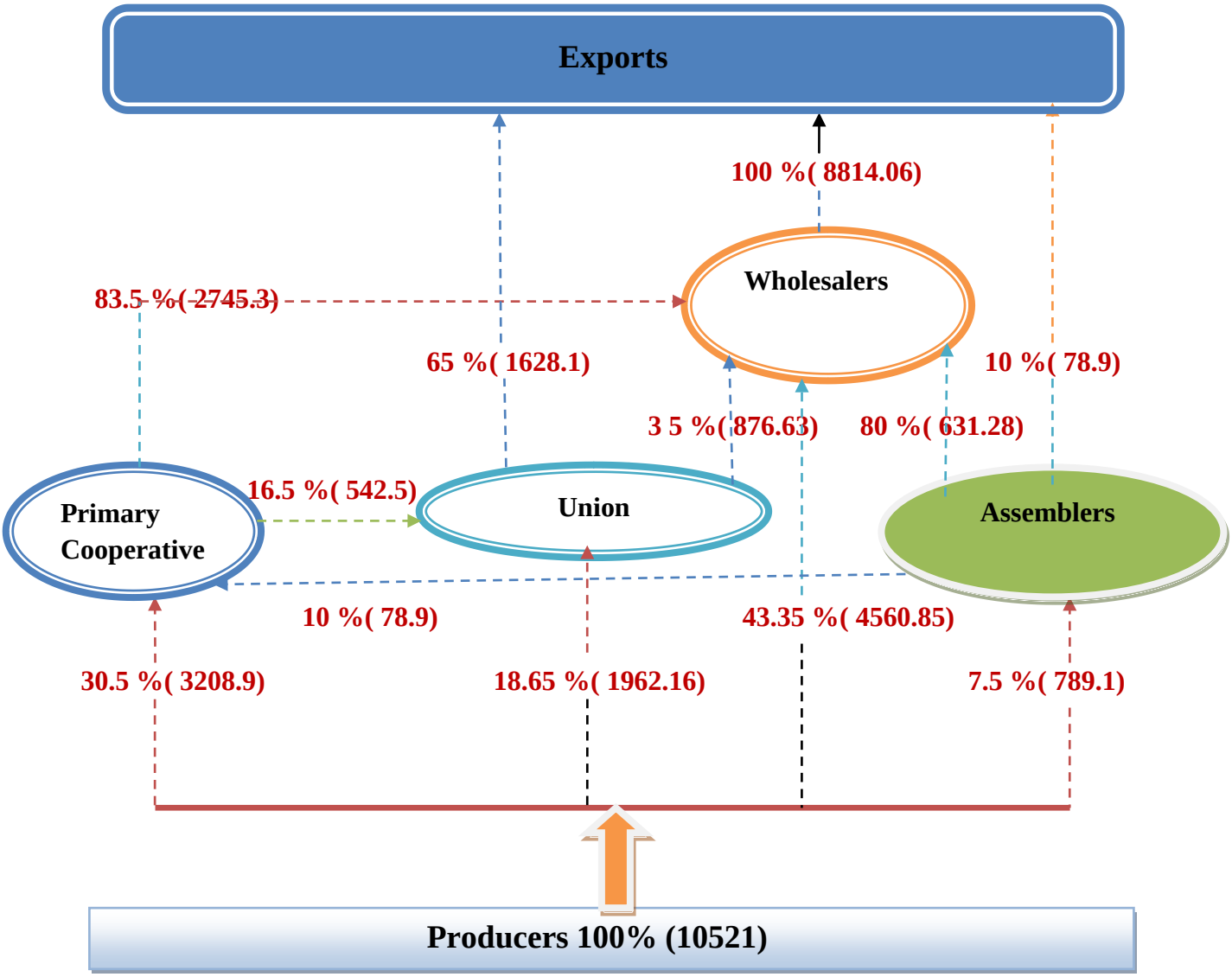

Figure 4: Sesame market channels, 2015
Source: Survey result, 2015

The identified market channels depicted in above figure 4 are:

1. Producer → Primary Cooperatives → Cooperative Union → Wholesaler → Exporter
2. Producer → Primary Cooperative → Wholesaler → Exporter
3. Producer → Union → wholesaler → Exporter
4. Producer → Union → Exporter
5. Producer → Assembler → Exporter
6. Producer → Assembler → Wholesaler → Exporter

7. Producer ⟶ Wholesaler ⟶ Exporter

8. Producers ⟶ Assembler ⟶ Primary Cooperative ⟶ Wholesalers ⟶ Exporters

The most important channels in the sesame marketing chain are those that move from farmers to assemblers, wholesalers and through primary cooperatives.

4.3.2. Performance of sesame market

The performance of sesame market was evaluated by considering associated costs, returns and marketing margins. The methods employed for analysis of performance were channel comparison and marketing margin. The distribution of costs and gross income at different levels is important in the business of sesame. The marketing cost of the sesame mainly involves the cost of pre-harvest and post-harvest activities incurred before reaching the consumer. This includes cost of land clearing and preparation, ploughing, seed, chemicals, fertilizer, weeding, harvesting, threshing, transporting from farm to home, packing materials, loading and unloading and tax costs. Generally, these components constitute a large share in the total margin between the final retailer price and the cost of production. The margin calculation is done to show the distribution throughout the various actors as sesame move from production to collectors, wholesalers, retail market, and finally to consumers.

Marketing margin can be used to measure the share of the final selling price that is captured by a particular agent in the value chain. The relative size of various market participants' gross margins can indicate where in the marketing chain value is added and/or profits are made. In order to calculate the marketing margin of an agent, the average price of sesame for that particular agent was taken. For instance, the buying price of consumers was obtained by computing the weighted average of the final prices. In order to measure the market share of each agent, the marketing channel where all agents have participated was selected. Marketing margins, associated costs and benefit share of value chain actors through different main channels is presented in table 15.

4.3.2.1. Cost structure and profitability of sesame producers

The profitability of Gimbi woreda producers was calculated by taking the average total income and expenses of all the sample producers' operation in 2014/15. The study result revealed diverse nature of cost structures. The result showed clearly that sesame production was profitable for the specified period. Producers earned a net profit of Birr 15748.25/ha, and Birr 2227.48/quintal. The average yield of producers for the year (7.07qt/ha) and the average selling price of all producers' marketed surplus was used to estimate profitability per hectare (Table: 12).

Table 12. Cost structure and profitability for sesame producers in Gimbi Woreda, 2015

Cost Items	Cost Per unit(Birr/ha)
Land clearing and preparation	650.75
Plowing	345.25
Inputs/seed, chemicals, fertilizer/	120
Seeding	250.5
Weeding	750
Harvesting	560.5
Threshing	450.75
Transport from farm to home	850
Packing materials	150.5
Loading and Unloading	105.5
Store rent	85
Land rent	1250
Transportation to market	450
Market search cost	150

Total Cost/ha	*6168.75*
Total cost/qt	*872.52*
Average producers price per qt	*3100.01*
Total Value of sesame per ha per year	*21917*
Profit/ha	*15748.25*
Profit/quintal	*2227.48*

Source: Survey Result, 2015

The producer's share from the export market was 92.85%, which is by far larger than the exporter's share (4.01%).Table 11 shows that the cost for land rent the highest among the costs incurred by producers accounting for 20.26 percentage followed by transport cost that accounts for 12.16%. The producers' net marketing margin is estimated to be 66.72%, which is a big share in the sesame business.

4.3.2.2. Cost structure and profitability of sesame wholesalers

Profitability of sesame wholesalers was analyzed using average sells' price and average costs of the sesame wholesalers found in Gimbi woreda. The study indicated that average purchase price of sesame wholesalers was 3100 Birr /Qt, total wholesalers cost for the year was 92.5 Birr/Qt and wholesalers sales value 3205 Birr/ Qt. Wholesalers gross margin and wholesalers net benefit for the year was 105and 12.5 Birr/ Qt respectively. Based on the above information and other cost components, the profitability of sesame wholesalers was calculated as indicated in (Table 13).

Table 13. Profitability of sesame wholesalers (2015)

Cost Items	Cost (Birr/qt)
wholesalers Purchase Value	*3100*
Loading Unloading	6
Transport expenses	20
Store Rent	1.5
Losses	20
Tax	15
Market Search costs	25
Overhead Costs	5
Total Wholesalers Cost	*92.5*
Wholesalers Sales Value	*3205*
Wholesalers Gross Margin	*105*
Wholesalers Net Benefit	*12.5*
Wholesalers Sale/Exporters Purchase value	*3205*

Source: Survey Result, 2015

4.3.2.3. Cost structure and profitability of sesame exporter

Profitability of sesame exporter was analyzed using average sells' price and average costs of the sesame exporters found in Nekemte town. The study indicated that average purchase price of sesame exporter was 3205 Birr /Qt, total exporter cost for the year was 127.75 Birr/Qt and exporter's sales value 3338.55 Birr/ Qt. Exporter gross margin and exporter net benefit for the year was 133.55 and 5.8 Birr/ Qt respectively. Based on the above information and other cost components, the profitability of sesame wholesalers was calculated as indicated in (Table 14).

Table 14. Profitability of sesame exporter (2015)

Cost Items	Cost (Birr/qt)
Exporters Purchase Value	*3205*
Transport cost	65

Loading unloading costs	6
Seed cleaning	12
Packing	8
Certification	3
Standard fees	3
Forwarding fees	1.5
Weight and Quality fees	1.5
Impurity Losses	15
Interest rate	6
Overhead cost	5
Storage costs	1.75
Total Exporters Marketing Costs	*127.75*
FOB Price	*3338.55*
Exporters Gross Margin	*133.55*
Exporters Net Benefit	*5.8*

Source: Survey Result, 2015

The analysis clearly showed that the net earnings of wholesalers are larger than the earnings of exporters. The net benefit calculated for wholesalers and exporters were Birr 12.5, and Birr 5.8/quintal, respectively. Of the marketing costs of wholesalers and exporters, transport costs are the major components respectively accounting for 21.62% and 50.88 %,(Table 13). Particularly the transport cost ratio of exporters was similar to the findings of Kindie (2007) which was 60.20%.

4.3.2.4. Marketing margins

Based on the reported prices by the different market participants, summarized in (Table 15), the different indicators of marketing margins for sesame are calculated and the estimates are:

TGMM (complete distribution channel) =7.14%

GMM (wholesalers) = 3.14%

GMM (exporters) = 4.01%

GMMp (producers participation) = 100% - 7.14% = 92.85%,

Table 15.Price of sesame at different market level, 2005

Marketing Channel Participant	Selling Price(birr/qt)	Share (%)	Net Marketing Margin (%)
Producer	3100	92.85	66.72
Wholesaler	3205	3.14	0.37
Exporter	3338.55	4.01	0.17

Source: Survey Result, 2015

4.4. Econometric Results

4.4.1. Determinants of sesame marketed supply

Sesame is one of the most important cash crops for Gimbi district farmers. The result indicated that 97 percent of the total sesame produced in 2014/15 production year was supplied to the market. According to our study, all the households in our have supplied the commodity to market during the survey period. Several variables are hypothesized to determine the sesame supply to the market (look at section 3.6.2 for the detail).

Before running the OLS regression model, all the hypothesized explanatory variables were checked for the existence of multicollinearity and heteroscedasticity problems. The study used Variance inflation factor to investigate the degree of multicollinearity among continuous explanatory variables and contingency coefficient among discrete (dummy) variables. A statistical package known as StataSE-8 was employed to compute the VIF. The results for all VIF values were ranging between 1.13 and 2.29. Hence, Multicollinearity was not a serious problem both among the continuous and discrete variables. For details (Appendix Table 1).

In this study, heteroscedasticity was tested for all variables by running heteroscedasticity regression using stataSE-8.There were no serious problem of heteroscedasticity in the model. Hence, all the explanatory variables were included for the model analysis of determinants of market supply of sesame. The overall goodness of fit of the regression model is measured by

the coefficient of determination (R^2). It tells what proportion of the variation in the dependent variable, or regress and, is explained by the explanatory variable. R^2 lies between 0 and 1, the closer it is to 1, and the better is the fit. Hence, the overall model goodness of fit represented by model count R-square is very good and over 92.38 percent of the household were correctly predicted out of the 127 households heads.

Table 16. Determinants of sesame quantity supplied to the market

Variable	Coef.	Std. Err.	t	P>|t|
Sex	-0.121	0.511	-0.24	0.813
Age	-0.004	0.014	-0.30	0.763
Education	0.113	0.320	0.35	0.724
Family size	-0.121	0.079	-1.52	0.131
Land	0.313**	0.102	3.06	0.003
Cooperative	0.775**	0.375	-2.07	0.041
Credit	0.069	0.371	0.19	0.852
NOFI	-0.524*	0.298	-1.76	0.082
Dist.Market	-0.012	0.012	-0.96	0.339
Quantity	0.861***	0.035	24.46	0.000
Price	0.027	0.029	0.91	0.366
Transportation	-0.134	0.379	-0.35	0.724
MInformation	0.024	0.462	0.05	0.958
Agr. Extention	0.385	0.262	1.47	0.145
_cons	1.036	1.284	0.81	0.422

Note: Dependent variables are amount of Sesame sold in quintal. N=127, prob> F = 000 , R-Squared = 0.9328, Adt R-Squared = 0.9238, ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Std.Err is robust.

Source: Own computation from survey result, 2015

Only few of the explanatory variables were found to be significantly affecting the marketed supply of sesame by producer households (Table 16). Quantity of sesame produce, land, members of cooperatives and non-off farm income influenced positively the marketed supply of sesame by household as predictable.

Quantity of sesame produced (QProdn): A positive coefficient for quantity of sesame produced imply that an increase in quantity of sesame produced increase marketed supply of sesame. It indicates that households who produce more quantity of sesame had also supplied more to the market. The result also shows that due to insignificant consumption of sesame at household level, a unit increase in the quantity of sesame produced per hectare, causes a 0.861 quintals increase for supply. Similarly, previous studies conducted by Abera (2009), Wolelaw (2005), Rehima (2006), Kindie (2007) and Bosena (2008) respectively found that the amount of grain, rice, red pepper, sesame and cotton produced by households significantly increases marketed supply of each of the commodities.

Membership to any cooperative (MCoop)): It was positively and significantly associated with sesame sale volume at less than 5% significance level. The result shows that on average, if sesame producer is member of cooperative the amount of sesame supplied to the market increased by 0.775qts. It could be because of the different productivity enhancing services such improved verities and fertilizers cooperatives provide to their members. This in turn might help members of cooperatives increase sesame quantity produced and thereby increase sesame supplied to the market.

Land size (Land): The positive and significant relationship between the variables indicates that as the land holding of sesame producer rises, the quantity of sesame sold at the market also rises. This result implies that farmers, who have more farm size, are most likely to produce sesame, keeping the effects of other variables constant. If the land holding of a sesame producer increase by one hectare, the amount of sesame supplied to the market increase by 0.313 quintals. This suggests that land shortage is a constraint for sesame production (Desta, 2004). The study by Poulton et al (2001) suggests that land is an important factor in influencing farmer's decision to produce any cash crop (Poulton et al., 2001), hence support the finding of the current study.

Non/Off farm income (NOFI): It was negatively and significantly associated with sesame sale volume at 10% significant level. The result showed that if sesame producers do have

non/off farm income, sesame supply decreased by 0.524qt compared to farmers who do not have non/off farm income. This is because majority of non/off farm activities that are farmers participating in crop production such as maize and sorghum as their main source of income.

4.4.2. Determinants of sesame market outlet choices

Table 17 presents the results of the multivariate probit model. The results showed that, the correlation coefficients among the equations are highly significant, which means that the multivariate probit model is superior to the individual probit models. In addition, a likelihood ratio test rejects the restrictions implied by separate probit models for the three outlets. According to Alessandro (2009), the correlation is positive between the wholesalers and the cooperatives but is negative between the wholesalers and the collectors' outlets as well as cooperatives and collectors. This suggests that farmers who start using an alternative chain to the collector one are more prone to using another one.

According to Nyaupane and Gillespie (2010), the signs of the parameters too confirm that the collector outlet is alternative both to the wholesalers and to the collector outlet, while wholesalers and cooperative are largely influenced in the same way by the variables. Larger farms are more likely to choose the wholesaler outlet, as indicated by the significant and positive relevant parameter. The corresponding parameters are significant and negative for the cooperative and collector outlet.

Starting with the household education and quantity productions both variables negatively and significantly related with collector outlet choice. By contrast, the signs for these variables were positive for the wholesaler's outlet. Education is believed to give individuals with the necessary knowledge that can be used to collect information, interpret the information received, and make production and marketing decisions. Accordingly, farmer's education level increases their ability to choose any of better outlets from market channel increases. The result also indicated that, higher production is expected to be associated with sales to the wholesaler rather than collector outlet because of their capacity to purchase in bulk.

Table 17. Results of the multivariate probit

Variable	Wholesalers			Cooperatives			Collectors		
	Coef	Std.er	Z	Coef	Std.er	Z	Coef	Std.er	Z
Sex	0.074	0.498	0.15	0.779	0.564	1.38	-723	0.486	-1.49
Age	-0.021	0.013	-1.63	-0.026	0.015	-1.69	0.167	0.012	0.01
HEduc	0.371**	0.013	1.18	-0.148	0.342	-0.04	-0.358*	0.307	-1.17
MCoop	-0.429	0.411	1.05	0.381***	0.011	1.00	-0.599	0.383	-1.56
Credit	0.349	0.401	-0.85	0.231	0.368	0.62	-0.693	0.377	-1.84
DMarket	0.211**	0.012	1.76	0.321**	0.015	2.02	-0.045*	0.012	-0.17
QProdn	0.114*	0.028	0.51	-0.055	0.031	-1.83	-0.889*	0.028	-0.01
Price	0.076*	0.031	0.19	-0.023*	0.034	-0.15	-0.341**	0.027	-1.23
OTran	0.391	0.362	1.08	-0.667	0.503	-1.33	-0.296	0.353	-0.84
MInfmn	-0.326	0.435	0.75	0.301	0.613	0.49	-0.491	0.414	1.19
AExtnton	0.184	0.263	0.70	-0.046	0.281	-0.16	0.144	0.248	0.58
-cons	1.903	1.101	1.73	1.652	1.208	1.37	-1.319	1.062	-1.24

Correlations	(Coef , t-ratio)
R (Wholesalers, Cooperatives)	(0.641***, 4.15)
R (Wholesalers, Collectors)	(-0.548***, -4.48)
R (Cooperatives, Collectors)	(-0.431***, -2.79)

Likelihood ratio test of rho21=rho31=rho32= 0: chi2 (3) = 29.058 prob>chi2 = 0.0000

Log likelihood= -181.076 Number of obs = 127; ***, **,*: significant at 1%, 5%, and 10%, respectively.

Source: Own computation from survey result, 2015

Distance from the nearest market positively and significantly affect the probability of choosing wholesaler and cooperatives market outlets whereas it negatively affects collector market outlet. The result showed, households who are closer to market were assumed to have more probability to choose wholesalers and cooperatives outlet whereas household who are far from the market were expected to be associated with sales to the collector market outlet.

This is may be due to the reason that as the distance to the market center increases transportation and other marketing costs increased.

Membership to any cooperative positively and significantly affects the probability of choosing cooperative market outlet. This could be due to the reality that those multipurpose cooperatives passing down production and market information they accessed directly or indirectly to their members. Although the role of agricultural cooperatives in smallholder farmers marketing is recognized as vital, many of them reported cooperatives as alternative market outlet in their sesame marketing.

Market price of sesame positively affect wholesalers market outlet whereas negatively and significantly related with cooperative and collector outlet choice respectively. According to the result the majority of the households received higher price from the wholesaler's market outlet compare to cooperative and collector market outlet because they may be able to earn lower capital from these outlet.

4.5. Constraints and Opportunities in Sesame Marketing

4.5.1. Marketing constraints

Almost all sesame producer farmers responded that there were market problems in their area (Table 18). The major sesame marketing constraints are related with non-availability of market/limited access to market, low price of product, and lack of storage, lack of transport, low quality product demand and lack of packaging material.

Again all traders engage in sesame value chain confirmed that there is marketing problems in sesame value chain. The major sesame marketing constraints mentioned by traders are related with the limited power of price setting, the problem of supply shortage, lack of storage facility, problem in information flow, low product quality and lack of support from concerned bodies (Table 18).

Table 18. Major marketing constraints of sesame producers

Major Problem	Total Household (127)	
	Number	Percent
Lack of finance	63	49.6
Low price of products	37	29.1
Lack of Packaging material	31	24.4
Lack of storage	26	20.5
Lack of transport	19	15

Source: Own computation from survey result, 2015

Problems related to finance

Though the study finding indicated that 50.4% of producers had access to credit at an interest rate of 25 percent and the major source of credit was Oromia Credit and saving (Micro finance). About 49.1% of respondents cannot get maximum birr from micro finance because of interest rates. Credit facilities are lacking because of the absence of financial institutions in the high potential areas. Hence, shortage of finance was explained as the critical problem for both traders and producers. The high percentage share and the incredibly high interest rate of users in credit provision activities can be a simple justification of the existence of finance shortage and absence of strong development oriented financial institutions.

Low selling price of sesame

Sesame production is associated with high cost of production. However, sells price of seed sesame is reported as low. The survey result indicated that 29.1 percent of the producers mentioned low sells price of sesame as one of the major problems in sesame marketing.

Packaging material

The availability, cost and quality of packaging materials were serious issues considered by farmers during the survey. About 24.4 percent of the farmers mentioned unavailability of packaging material (sisal sack), from this, 14.4 percent of them reported high cost of

packaging material (sisal sack) and 10 percent of them mentioned poor quality of packaging materials (sisal as well as polythin sacks) as their major problems on packaging materials issue.

Storage

About 20.5 percent of the farmers considered unavailability of storage facility as a problem, about 15 percent indicated it is costly for them to rent storage and 5.5 percent of them reported loss of products at storage as problems. Absence of modern warehouses in the nearby areas has resulted in mishandling of output. Producers are unable to build their own storage devices due to tenure insecurity.

Problems related to transport

Out of the major sesame producing areas, Gimbi woreda is relatively good in terms of road condition, availability and transport rates. However, these factors are not evenly distributed to all PKAs and have their own problems. About 15 percent of the assemblers reported that they lack transport for marketing sesame. Many are constrained with lack of all-weather access roads to and from farming areas that made difficult transporting outputs soon after threshed. The rate of transportation was so high for localities away from the main road. This high transportation cost had implications on the price paid to producers. Beside, at local level there existed seasonal shortage of transport vehicles consequently created high transportation costs.

4.5.2. Marketing opportunities

1. Availability of labor: sesame production is labor-intensive and there is available labor force in the country. From this labor force, some are migrating to Gimbi district in search of job opportunity. Therefore, it is possible to use this labor as major input in the production of sesame. It is possible to make labor an affordable input by increasing the productivity of sesame.

2. Demand for processed products with good quality is high in the local market;

3. Access to foreign markets: As Mbwika (2003) noted, sesame is the most important oil seed export crop in Ethiopia and its contribution to foreign exchange earnings in the country has been increasing over the years. Ethiopia has the advantage of having good local varieties, favorable growing conditions, vast suitable area for sesame growing and relatively cheap labor that are important manual harvest of sesame are few of the advantages we have at hand. Ethiopia has access to a number of countries to export sesame products. The country's proximity to Middle East markets also gives it an advantage over some other countries such as Far and East countries (China and India). We can also take the advantage of the Israel market, which for political reasons cannot import from Arab countries such as Sudan (World Bank, 2002).

Given that sesame is largely commercially grown in the country, its level of management is higher when compared to other African countries where production is predominantly by small-scale producers. The organic nature of Ethiopian sesame is another preferred trait in the international market that can fetch higher price to the country. Besides, the yearly new ads of exporters into the export market are few of the opportunities that we could explore (World Bank, 2002).

.

The yearly 5% increase of world demand for sesame (World bank, 2002) and special offer of free import tariffs by EU countries market made the Ethiopian sesame fortunate and opportunist.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary and Conclusion

This study was aimed at analyzing value chain of sesame in Gimbi Woreda of Oromia region. The specific objectives of the study include identifying sesame value chain and examining the performance of actors in the chain; analyzing the determinants of sesame supply to the market in the study area; and identifying marketing channels and factors affecting outlet choice decisions of farm households. The data were generated from both primary and secondary sources. The primary data were collected from individual interview using pre-tested semi-structured questionnaire and checklist. The primary data for this study were collected from 127 randomly selected households from Gimbi Woreda and17 traders. The analysis was made using descriptive statistics and econometric model using SPSS and STATA software. All the sampled households were sesame producers. Market outlet choice decision and marketed surplus of sesame are found to be important elements in the study of sesame value chain. Therefore, in identifying determinants that affect the marketed surplus of sesame, a multiple regression model was used, and multivariate probit model was applied to analyze factors affecting market outlet choice of farmers for selling sesame in the study area. The findings of this study were summarized as follows.

Of the 127, interviewed sesame-producing households, 90.6% were male headed and the rest 9.4% were female-headed households in Gimbi Woreda. The average ages of the sampled respondents were 43.95 years Gimbi Woreda. The average family size was 6.5 in Gimbi Woreda.

Sesame value chain analysis of the study areas revealed that the main value chain actors are sesame producing farmers, wholesalers, collectors, cooperatives and exporters. There are also governmental and nongovernmental supportive actors who support sesame value chain directly or indirectly. Value chain supporters or enablers provide facilitation tasks like creating awareness, facilitating joint strategy building and action and, the coordination of support. The main supporters of the sesame value chain in the study areas are office of

agricultural and rural development (OoARD), Office of trade and Market Development, Woreda administrations, Oromia saving and credit institution, informal credit suppliers and banks.

Constraints hindering the development of sesame value chain are found in all the stages of the chain. At the farm-level, sesame producers are faced with lack of improved input supply and high postharvest losses. On marketing side, limited access to market, low price of product, lack of storage, lack of transport, and low quality of product are the major problems.

Sesame produced in this area passes through several intermediaries, *i.e.* collectors, wholesalers and exporter, with little value being added before reaching the end-users. The intermediate buyers obtain the sesame from the farmers at a lower price and they sell to the wholesalers at a higher price. The average price that sample respondents received for a quintal of sesame was reported to be 3100.01 Br/qts. The research result also indicated the absence of organized institution and system group marketing, and lack of processing activities have made traders in a better position to dominate the roost in pricing.

The results of the study show a slight difference between total production and marketable surplus; making sesame a market oriented product. The result of the multiple regression models indicates that marketable supply of sesame is significantly affected by quantity of sesame produce, land, and members of cooperatives and non-off farm income. The results for all VIF values were ranging between 1.13 and 2.29. Hence, multicollinearity was not a serious problem both among the continuous and discrete variables. There was no serious problem of heteroscedasticity in the model. Hence, all the explanatory variables were included for the model analysis of determinants of market supply of sesame. The overall goodness of fit of the regression model is measured by the coefficient of determination (R^2). It tells what proportion of the variation in the dependent variable, or regress and, is explained by the explanatory variable. R^2 lies between 0 and 1, the closer it is to 1, and the better is the fit.

Sesame producers in the study areas supply their produce through different market outlets. Farmers were classified into three categories according to their outlet choice decision:

wholesalers, cooperatives, and collectors. The multivariate probit model was run to identify factors determining farmers' market outlet choice decision. The model results indicated that the probability to choose the wholesalers outlet was positively and significantly affected by household education, distance from the nearest market, quantity production and market price of sesame but negatively affected by collector market outlets. Similarly, the probability of choosing cooperative marketing outlet was positively affected by membership to any cooperative and distance from the market whereas negatively affected by market price of sesame.

5.2. Recommendations

Based on the findings of this study, the following policy measures could be recommended, because there is a need for the promotion of sesame value chain in the study area.

Farmers do not have access to information on improved production practices, market intelligence, value addition, better post-harvest handling and demands on quality and standards in different markets. Such information may be included in state extension programs for dissemination to all stakeholders in the sesame seed value chain. Small production units that require an elaborate product assembly process characterize sesame production. They would also be in a position to take to produce to regional market centers and earn higher returns as compared to selling at assembly level.

The intervention of both governmental and non-governmental organizations is needed to improve sesame value chain in the study area. To increase the production as well as the sesame value addition and women's participation in the sesame value chain are essential. In the study area farmers are small scale and unorganized, this state of affairs clearly needs strong governmental and non-governmental organizations intervention. In addition, improving credit, training, and market information access is needed to improve the existing sesame value chain in the study area.

The results of econometric analysis indicate that land size and quantity of sesame produced positively and significantly affect sesame supply to the market. Therefore, these factors must be promoted in order to increase the amount of sesame-marketed supply. Increasing the production and productivity of sesame per unit area of land is better alternative to increase marketed supply of sesame. Sesame supply to the market is negatively and significantly affected by non/off farm income activity. Accordingly, these factors must be considered by strengthening the supportive activities such as information centers and input supply systems would enhance sesame supply.

The model results indicated that collector outlet choice is negatively and significantly affected by household education, distance from the nearest market, quantity production and market price of sesame. Therefore, the findings of this study suggests that farmers' personal characteristics influence their choice, and that more educated and skilled farmers are less likely to choose collector market outlet and more likely to engage in wholesalers market outlet. Therefore, these factors must be considered in future intervention by strengthening efficient and area specific extension systems, improving road infrastructure, supporting DAs by giving continuous capacity building trainings and separating DAs extension work from other administrative activities so that they train farmers and enhance their on how to choose beneficial market outlet.

6. REFERENCES

ADLI (Agricultural Development Lead Industrialization), 2001. Rural Development Policies and Strategies: Department of press and Audiovisual, Ministry of Information. Addis Ababa, Ethiopia.

Adugna Gessesse, 2009. Analysis of fruit and vegetable market chains in Alamata, Southern Zone of Tigray: The case of onion, tomato and papaya. M.Sc thesis presented to the school of graduate studies, Haramaya University. pp98.Africa, 21:3, 531-554.African Centre for Economic Transformation, http://acetforafrica.org/

Alemu, Dawit and Gerdien W. Meijerink, 2010. Sesame Traders and the ECX: An Overview with Focus on Transaction Costs and Risks, VC4PPD Report #8, Addis Ababa.

Alemu, Dawit, 2009. 'Role of the Ethiopian Commodity Exchange (ECX) in the Sesame Value chain in Ethiopia', Final Report, Action Research Program Sesame Value Chain Ethiopia.

Amare, H. S, 2009. Production and Marketing Analysis of Sesame in Kafta_Humera Woreda (Western Tigray). Mekelle, Tigray Agricultural Research Institute Humera Agricultural Research Center.

Anandajayasekeram, P. and Berhanu Gebremedhin, 2009. Integrating innovation systems perspective and value chain analysis in agricultural research for development: implications and challenges. Improving Productivity and Market Success (IPMS) of Ethiopian farmers project working paper 16. ILRI (International Livestock Research Institute), Nairobi, Kenya.

Bammann, H., 2007. Participatory value chain analysis for improved farmer incomes, employment opportunities and food security. Pacific Economic Bulletin, 22, (3):125.

Bongiwe G. and B. Masuku, 2012. Factors affecting the choice of marketing channel by vegetable farmers in Swaziland. Canadian Center of Science and Education. Sustainable Agriculture Research; 2, (1); 123.

Bryceson, K and J. Kandampully, 2004. The balancing act: "E" issues in the Australian agri-industry sector. Proceedings of the McMaster World Congress on the Management of Electronic Business, 14–16 Jan 2004, Hamilton, Ontario.

Central Statistical Agency (CSA-2010).Agricultural Sample Survey 2009/10: Report on Crop and Livestock Product Utilization, Volume II, Addis Ababa.

Central Statistical Agency (CSA-2011). Agricultural Sample Survey 2010/2011 (2003 E.C.); Report On Area And Production of Major Crops, Volume I, Statistical Bulletin, April 2011, Addis Ababa.

Central Statistical Agency (CSA-2012).Agricultural Sample Survey 2011/2012 (2004 E.C.), Area and Production of Major Crops, Statistical Bulletin, May 2012, Addis Ababa.

Chauvin, Nicolas, 2012 .More cash from cash Crops: Giving Farmers a Better Deal in Africa,

CIAT (Centro International de Agricultural Tropical), 2004. Increasing the competitiveness of market chains of smallholder's producers. Manual, 3: Territorial Approach to Rural Agro Enterprise Development Project.

CSA (Central Statistical Agency), 2006. Federal Democratic Republic of Ethiopia. Statistical Abstract. 2005. CSA, Addis Ababa, Ethiopia.

CSA, July 2007.Agricultural Sample Survey 2006-07, Volume I, Addis Ababa.

Daniel Endale, 2008. Investigation of the Genetic Variability among Land Races of Sesame from Ethiopia, MA Thesis, University of Hohenhein, Stuttgart, Germany.

Desta Beyera, 2004. Impact of community managed irrigation on farm production efficiency and household income. The case of Weliso and Wenchi districts of Oromiya Regional State. M.Sc. Thesis Presented to the School of Graduate Studies, Haramaya University. 46p

Emana, Bezabih, 2010. Market assessment and value chain analysis in Benishangul Gumuz Regional State, Ethiopia. SID-Consult-Support Integrated Development, Addis Ababa, Ethiopia.

Ethiopian Investment Agency (EIA, 2012): http://www.ethioinvest.org/ Ethiopia Investment Guide_ 2012.php/

Ethiopian Revenue and Custom Authority (ERCA), Export Data-2012, www.erca.gov.et.

Evans, P. and T. Wurster, 2000. Blown to bits: How the new economies of information transform strategy. Harvard Business Scholl Press, Cambridge, Massachusetts, USA.

Fakoya, O., M. Agbonlahor and A. Dipeolu, 2007. Attitude of women farmers towards sustainable land management practices in South-Western Nigeria. *World Journal of Agricultural Sciences*, 3(4): 536-542.

FAOSTAT: http: Export Data, 2012.www.FAOSTAT.Com -Top Five Sesame Seed Producing Countries.

Ferto, I. and Szabo, G.G., 2002. Vertical coordination in transition agriculture: A cooperative case study. Institute of Economics, Hungarian Academy of Sciences, Discussion Paper.

Food Crop Debate" Crop Post Harvest Program, Issue Paper 3.

Geremew, Kefyalew,2012.Analysis of Smallholder Farmer's Participation in Production and Marketing of Export Potential Sesame in Ethiopia, with particular reference to Diga area, MSc Paper, Addis Ababa University.

Gibbon, P. and S. Ponte, 2005. Trading down: Africa, value chains and the global economy. DIIS, Copenhagen.

Gilberto, Mendoza, 1995. Price, Products and People, A primer on marketing channels and margins. The Lynne Rienner Publisher, Inc.257p.

Greene, W., 2003. Econometric Analysis. Fifth edition. Prentice Hall, New Jersey.

Greene, W., 2012. Econometric Analysis. 7th edn. NJ: Prentice Hall, Pearson.

Humphrey, J. and H. Schmitz, 2002. How does insertion in global value chains affect upgrading in industrial clusters? Institute of Development Studies, Brighton.

Humphrey, J. and O. Memedovic, 2006. Global value chains in the agri-food Sector UNIDO Working Paper, Brighton.

Jagwe, J., E, Ouma and C, Machethe, 2007. Transaction costs and smallholder farmers' participation in Banana Markets in the Great Lakes Region, Pretoria, South Africa.

Kaplinsky, R. and M. Morris, 2000. A handbook for value chain research, IDRC. Ottawa, Canada.

Kaplinsky, R. and M. Morris, 2001. A handbook of value chain analysis. Working paper prepared for the IDRC, Institute for Development Studies, Brighton, UK.

Kemal, Shkur, 2011.Supply Chain Assessments of Sesame Oilseed from humera to Djibouti port, MSc Paper, Addis Ababa University.

Kindie, Aysheshum, 2007. Sesame Production and Marketing in Ethiopia, with particular reference to Metema area, MA Paper, Hara Maya University. MOARD (Ministry of Agriculture and Rural Development), 2003. Draft sesame development plans. Addis Ababa, Ethiopia.

Lukanu; Maryann, Green; Peter, Greenfield & Steve, Worth, 2004. Farmers' cash crop cultivation decisions in Southern Niassa province, Mozambique, Development Southern

Mamo Girma and Degnet Abebaw, 2012. Patterns and determinants of live stock farmers' choice of marketing channels: micro-level evidence. Ethiopian Economics Association, Addis Ababa, Ethiopia. P55.

McFadden, D., 1978. Quantal choice analysis: a survey. *Annals of Economic and Social Measurement*, 5(1976):363-390.

Mendoza, G., 1995. A premier on marketing channel and margins. Lyme Rimer Publishers Inc., USA.

MOTI (Ministry of Trade and Industry), 2004. Report on diagnostic trade integration study. Addis Ababa, Ethiopia.

MSPA (Mauritius Sugar Producers' Association), 2010**.** Value-added products of sugarcane. http://www.mspa.mu/index.php?rubrique=15. Date accessed: December 10, 2012.

Muhammed Urgessa, 2011. Market chain analysis of teff and wheat production in halaba special Woreda, southern Ethiopia. M.Sc thesis submitted to the School of Graduate Studies, Haramaya University. 104p.

Otieno, G. 2010. Effect of value addition on price: a hedonic analysis of peanut in retail supermarkets in Nairobi, Kenya.

Porter, M., 1985. Competitive advantage: creating and sustaining superior performance. The Free Press, New York.

Poulton, C., R. Al-Hassan, G. Cadish, C. Reddy and L. Smith, 2001.The Cash Crop versus

Raikes, P., M. Jensen, and S. Ponte, 2000. Global commodity chain analysis and the Frencfiliére approach: comparison and critique. *Economy and Society*, 29 (3): 390-418.

Schmitz, H., 2005. Value chain analysis for policy makers and practitioners. International Labor Office and Rockefeller Foundation, Geneva, Switzerland.

Schneider, Kate and K.Gugerty, Mary, 2010. The Impact of Export-Driven Cash Crops On Smallholder Households, Evans School of Public Affairs University of Washington; EPAR Brief No. 94

Sorsa, Debela Gelalcha, 2009. Sesame trade arrangements, costs and risks in Ethiopia: A baseline survey. VC4PD Research Papers.

Sturgeon J. Timothy, 2001. How Do We Define Value Chains and Production Networks.*IDS Bulleting*, Vol. 32, No.3. Industrial performance Center, Massachusetts Institute ofTechnology.

Thomas, Tekle, 2011. "Marketing of Sesame in Ethiopia the Case of East Wollega Zone of Oromia Region", M.A. thesis, Addis Ababa University, May 2011, Addis Ababa.

Urquieta, A., 2009. Effects of access to information on farmer's market channel choice: The case of potato in Tiraque Sub-Watershed (Cochabamba - Bolivia). M.Sc thesis submitted to the Faculty of the Virginia Polytechnic Institute and State University. Blacksburg, Virginia.102p.

USAID-Ethiopia Agribusiness and Trade Expansion; Market Bulletin, 2010: No. 9.

Wijnands J.and Biersteker J. Oil seeds business opportunities in Ethiopia; The Hague, 2007.

Wolday Amaha, 1994. Food grain marketing development in Ethiopia after reform 1990. A case study of Alaba Siraro. PhD Dissertation Presented to Verlag Koster University, Berlin 293p.

Yamane, Taro, 1967. *Statistics: An Introductory Analysis*, 2nd Ed., New York: Harper and Row.

7. APPENDICES

7.1. Appendix A.

Appendix table 1. The result of multicollinearity test

Variables included in market supply model

Variables included in market supply model		
Variable	VIF	1/VIF
Credit	2.29	0.437
QPron	2.16	0.464
Land	2.14	0.467
MCoop	2.14	0.468
OTran	2.06	0.484
MInformation	1.96	0.511
Sex	1.49	0.672
Price	1.42	0.703
FARMSZE	1.33	0.751
Age	1.28	0.781
HEduc	1.26	0.796
NOFI	1.22	0.818
SFExperience	1.17	0.854
AExtention	1.13	0.886
DMarket	1.13	0.887
Mean VIF		1.61

Source: Own computation from survey result, 2015

Appendix table 2. Income sources of Gimbi Woreda

Income sources	Average Annual Income	Percents	Ranking
sesame	3625.50	97.5%	1
sorghum	1525	73%	2
maize	1380	72%	3

Source: Own computation from survey result, 2015

Appendix table 3. Income sources of Gimbi Woreda

Variable	Mean	Standard Deviations	Minimum	Maximum
Yield	7.07	5.14	1.00	32.00

Source: Own computation from survey result, 2015

7.2. Appendix B.

Interview Schedules

"Analysis of Sesame Value Chain: The Case of Gimbi District, Western Wollega Zone of Oromia Regional State**"**

Prepared by: Fikiru Temesgen Geleta, Jimma University Department of Agricultural Economics and Extensions.

Purpose: This questionnaire is prepared to collect data pertaining to Analysis of Sesame Value chain in Gimbi, Western Wollega Zone of Oromia regional state. It will be provided a major input for my master's thesis and it is purely conducted for academic purposes. Therefore, the respondent is kindly requested to provide his/her valid responses to the sets of questions included in the questionnaires. All your responses remain confidential.

We thank you in advance for your cooperation.

1. Producers Interview Schedules

A. Household Head Demographic Characteristics

1. Name of Respondent: _____

2. Zone: _____Woreda: _____Kebele: _____ Village: _____

3. Sex of the respondent (√): 1. [ ] Male 2. [ ] Female

4. Age (in years) _____

5. Education level of the respondent (√): 1. [ ] No formal education 2. [ ] 6thgrade or less 3. [ ] 7th to 12th grade 4. [ ] Certificate 5. [ ] Diploma 6. [ ] Degree

6. Number of total family members 1.[ ] Male 2. [ ] Female

7. Number of active household members aged between 15 and 64 years fulltime on farm activity:

Year			
Age	0-15	15- 65 and above	65 and above
Number of active family members			
Number of non-active family members			

8. Is your family labor adequate for farm activities? 1= Yes 2 = No

9. Total amount of hired labor for the production year (2013/14) [ ] _____

10. Total land holding size (in hectare) _____

11. Land size suitable for sesame production _____ (in hectare)

12. Did you involve in land renting activity in 2013/2014 production year? 1=Yes 2= No

13. If your answer to question #12 is "Yes", are you: 1 = Rented out 2 = Rented in

B. Source of Household Income

1. From where did you get income you used to cover all family expenditures? 1=crop sales 2=livestock sales 3=transfer of funds 4=credit 5= labor sale 6=others (please specify------)

2. Would you rank your income sources from major to minor (use the above code):1st=_____ 2nd =_____ 3rd =_____ 4th = _____ 5th = _____

3. Would you list the major 5 crops you grow currently?

Type of crop	Area Cultivated (ha)	Quantity produced(qut)	Quantity sold(quintal	Price per quintal	Value sold (in Birr)
1					
2					
3					

4. Number of Oxen owned_____

5. If you get income from sale of crop productions, which crop type you used to sell in the market most of the time? 1= food crops 2 = cereals 3 = vegetables 4= cash crops 5=fruits

6. Would you rank these crops according to primary crop income sources from major to minor? (Use the above code) 1st=_____ 2nd =_____ 3rd =_____ 4th = _____ 5th = _____

7. What are the major crops produced for market (cash crops) you grow in your area? 1= --------- -- 2=----------3= ---------- 4= ---------- 5= ----------

8. Would you list these according to your level of production participation?

1st=_____ 2nd =_____

3rd =_____ 4th = _____ 5th = _____

9. Are you a member of any rural cooperatives? 1= Yes 2=No

10. Do you have access to credit/loan? 1=Yes 2=No

11. Do you participate in non-farm income generating activities? 1= Yes 2 = No

12. Do you produce sufficient food for your family for the whole year? 1= Yes 2 = No

13. Traveling time from home settlement to extension services _____ (in minutes)

14. Traveling time from home to farm places _____ (in minutes)

15. Traveling time from home to nearby markets _____ (in minutes)

16. Traveling time from home to nearby rural weather road _____ (in minutes)

17. Dou you have production/marketing contracts for any agricultural products with any Organization? 1 = Yes 2 = No

18. If you have contract, for what?

1 = cash crops 2= food crops 3= livestock 4= other (specify _____)

19. Did you receive advisory services on sesame production? 1 = Yes 2 = No

20. Did you participate in production of sesame in any year of the last two crop seasons? (2004/2005 or 2006/2007 E.C. Crop seasons): 1 = Yes 2 = No

21. What direction had the farm gate price of sesame shown in these two years?

1= increased 2 = decreased 3= remain the sesame

22. Was there any sesame crop failure in any of these years? 1 = Yes 2 = No

23. If yes, what are the sources of such failures? (Multiple answers are possible)

1 = sesame disease 2 = pest infestations 3= long/short rain

4 = other (specify_____)

24. Did you participate in the production of sesame in 2006/2007 (E.C) cropping season?

1= Yes 2=No

(If your answer to **Q#24** is "**No**", skip to question **#37**)

25. Land size allocated for sesame in 2006/2007 cropping season_____ (in hectare)

26. Which means of land preparation methods you used for sesame production:-

1= own oxen/donkey 2 = rented oxen/donkey 3 = traditional instruments 4= rented tractors

27. Type of sesame seed used:

1= traditional 2 = improved

28. From where did you get the seed?

1= own production 2=Market 3= cooperatives 4 = agricultural offices

5 =buyer contractor 6 = other (specify_____)

29. Amount of sesame seed used as input per hectare _____ (quantity)

30. Amount of sesame seed used as input per hectare _____ (in birr)

31. Did you use fertilizer for sesame production? 1= Yes 2 = No

32. If your answer to question #31 is" No", what is the reason?

1=No need 2=Not available

3=No potential to purchase 4=others (specify_____)

33. The land you used for sesame production in 2006/2007 production year was:

1 = fresh land 2 = land used for sorghum last year

3= land used for maize previous year 4= land used for Niger seed previous year

5=land used for other crop in previous year

34. Are you producing sesame for continuous years in the same land?

1= Yes 2 = No

35. If your answer for question **#34** is "**No**" what is the reason?

1 = due to decrease in productivity 2= cannot grow sesame 3 = other_____

36. What do you think to be done to improve productivity of Sesame? 1. [ ] Using the Extension services 2. [ ] Using the Improved variety 3. [ ] Using the row planting 4. [ ] Using the Fertilizers 5. [ ] Using the training 6. [ ] Others specify

37. If your answer to question #24 is "No", what are the main reasons that limit you from Production of sesame?

s.no	Possible reasons	1=serious problem	2=Minor problem
1	Decreased productivity of sesame from year to year		
2	Lack of improved sesame seeds		
3	Fear of crop failure		
4	Shortage of land		
5	Poor soil fertility		
6	Fear of market related problems		
7	Lack of awareness about its importance		
8	Shortage of input supply		
9	Fear of food shortages		
10	Other unlisted problems		

C. **Marketing:**

1. Quantity of sesame produced in 2006/07 E.C _____ (in quintal)
2. Quantity of sesame marketed _____ (in quintal)
3. Quantity of sesame consumed _____ (In Quintal)
4. Quantity of sesame saved for seed _____ (In Quintal)
5. Did you sell your sesame immediately after harvest?

1= Yes 2= No

6. On which month you usually prefer to sell your sesame produce?

1=December 2=January 3=February 4=March 5=April 6=May 7=others

7. How did you sale your sesame produce?

1=directly to the purchaser/traders 2=through brokers 3=others

8. Where did you sell mostly your sesame produce?

1= local buyers (collectors) 2= Cooperatives 3= traders at primary market 4=others

9. From whom you get better price? 1= local collectors 2= cooperatives 3= traders at primary market 4= others (specify_____)

10. Is there any problems created by any marketing agents? 1= Yes 2 = No

11. If your answer to question #10 is "**Yes**", the problems are:

1= weight/scale cheating 2=Limit client 3= Charge high brokers price 4= other

12. Did you face difficulty in finding sesame buyers? 1= Yes 2= No

13. If your answer to question #12 is "**Yes**", is it due to: 1 = inaccessibility of market 2= low Price offer 3= lack of price information 4= other

14. Who set your selling price?

1 = yourself 2=market 3= Buyers 4= negotiations 5 =other _____

15. Did you know the nearby market price before you transport to your sesame to market?

1=Yes 2= No

16. Did you know Addis Ababa market price before you sold your sesame? 1=Yes 2=No

17. What is the price of sesame per kilogram in your local? _____

18. What is the price of sesame per Kilogram at nearby market? _____

19. Do you have a transport access to the nearest market? **1= yes 2= No**

20. How did you transport your sesame produce from home to market places?

1 = head/back loading 2= pack animals 3 = Vehicles 4 = other (_____)

21. Do you have access to market information? **1= Yes 2= No**

22. From where did you get market information?

1= local traders 2= neighbor 3= cooperatives 4=media 5= other_____

23. Are you confident enough in your buyer? **1=Yes 2=No**

24. What are the major costs you incur in selling your sesame?

1. Transportation cost_____ (birr per quintal)

2. Packaging Cost_____ (birr per quintal)

3. Threshing and cleaning cost_____ (birr per quintal)

4. Costs while waiting at the market _____ (birr per quintal)

5. Others _____ (birr per quintal)

25. Have you ever had any marketing contracts with commercial buyers of sesame?

1 = Yes 2 =No

26. What is the amount of total income you earned from sesame produce?

1. 2005 E.C_____ 2. 2006/07 E.C _____

27. What is the farm gate price of sesame per kilogram last year-20006/07 E.C? _____ (in birr)

28. Did you considered this price when you decide to produce sesame in 2007/2008 E.C crop Season? 1 = Yes 2 = No

29. What is your prediction about the coming year sesame price? 1= increase

2= decrease 3=remain constant 4 = no idea

30. If you have any comment please list here: _____

Thank you very much for responding to the questions.