

**VALUE CHAIN ANALYSIS OF ORGANIC HONEY: IN SHEKA ZONE OF  
SOUTHWESTERN ETHIOPIA; CASE OF MASHA WOREDA**

**M. Sc. Thesis**

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**Jimma University**

**VALUE CHAIN ANALYSIS OF ORGANIC HONEY: IN SHEKA ZONE OF  
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**In partial fulfillment of the requirements for the  
Degree of MASTER OF SCIENCE IN AGRIBUSINESS AND VALUE CHAIN  
MANAGEMENT**

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## **DEDICATION**

This thesis is dedicated to Yohannes Woldekidan.

## **STATEMENT OF THE AUTHOR**

I hereby declare that the thesis entitled VALUE CHAIN ANALYSIS OF ORGANIC HONEY: IN SHEKA ZONE OF SOUTHWESTERN ETHIOPIA; CASE OF MASHA DISTRICT, ETHIOPIA submitted by me for the partial fulfillment of M.Sc. in agri- business and value chain management to Jimma University is my original work and has not been submitted earlier to any other institution for the fulfillment of the requirement for any course of the study. I also declare that no section of this manuscript in whole or in part is lifted and incorporated in this report from earlier work done by others.

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## **BIOGRAPHY**

The author was born in Oromiya National Regional State in Agaro city in 1987. She attended her primary and high school education up to grade 12 at Ras Desta primary school and at Agaro secondary and preparatory school. Then she joined Haramaya University in 2005 and graduated with B.Sc degree in the Department of Agri- business management in 2007. After her graduation, she worked in SNNPR, Mash woreda office of agriculture and rural development as marketing expert. Then she joined the M.Sc. program in 2013 at Jimma University College of agriculture and veterinary medicine, department of agri-business and value chain management.

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## LISTS OF ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
BCS	Bio Control Systems
CSA	Central Statistical Agency of Ethiopia
DAs	Development Agents
EEPA	Ethiopian Export Promotion Agency
EPOPA	Export Opportunity for African Organic Honey and Beeswax
FAO	Food and Agricultural Organization
HH	Household
ILO	International Labor Organization
MELCA	Movement for Ecological Learning and Community Action
MoARD	Ministry of Agriculture and Rural Development
MoTI	Ministry of Trade and Industry
NGOs	Non-Governmental Organizations
NTFP-PFM	Non Timber Forest Product Participatory Forest Management
NTFPRDP	Non-Timber Forest Products Research and Development Project
OoARD	Office of Agriculture and Rural Development
OoMC	Office of Marketing and Cooperative
OoTI	Office of Trade and Industry
QSAE	Quality and Standard Authority of Ethiopia
SD	Standard Deviation
SID	Support Integrated Development
SNV	Netherlands Development Organization
VC	Value Chain



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# VALUE CHAIN ANALYSIS OF ORGANIC HONEY: IN SHEKA ZONE OF SOUTHWESTERN ETHIOPIA; CASE OF MASHA DISTRICT

## ABSTRACT

*This study was conducted in Masha Woreda of Southwestern Ethiopia in 2014. The objectives of the study were to analyze honey value chain, profit margin distribution along the value chain, determinants of honey value addition decision and extent of value addition, the gender role at the farm level and factors affecting market outlet choice of beekeepers. The data were collected from both primary and secondary sources. The primary data were collected from 147 beekeepers, 22 retailers, 13 cooperatives, 15 tej makers and 20 consumers through application of an appropriate statistical procedures. From the surveyed households there were only two female-headed HHs. The study result showed that the major value chain actors in the Woreda are input suppliers, beekeepers, retailers, cooperatives, tej makers, exporter and consumers. The support service providers are governmental organizations, NGOs, financial institutions and organic inspection and certification agencies. The result showed that the women participation is less in productive activities and decision making as compared with men and women's participation is higher in reproductive activities as compared with men's. The Tobit model result indicates that the value addition decision and extent is significantly affected by perception of beekeepers towards price of value added honey, cooperative membership of the HH head, HH adult equivalent, extension service, credit access, distance to the nearest market and education level of the HH head. There were four honey market outlet choices in the study area such as tej makers, retailers, cooperatives and processor. Multivariate probit model result showed that the market outlet choice of the farmers affected by age of the HH head, education level of the HH head, HH adult equivalent, extension service, distance to the nearest market, membership in cooperative, information access, credit access and mode of sale. Therefore, policies promoting farmers access to modern beekeeping technologies, improving extension service, credit and market information access, gender consideration and cooperative development are recommended to improve honey value chain in the study area. In addition, more study will also require improving the existing honey production and marketing system in the study area.*

# 1. INTRODUCTION

## 1.1 Background

Beekeeping is an important component of agriculture, rural employment, human nutrition and economic development. Honey is the most important primary product of beekeeping both from a quantitative and economic point of view, and has been used by humankind for many years as a source of food, medicine and for religious and cultural ceremonies (Cartland, 1970). Apiculture is currently one of the most widespread agricultural activities carried out throughout the world. There are approximately 56 million beehives in the world, which produce an estimated 1.2 billion tons of honey. About a quarter of the honey produced is traded and 90% of the exportation is made from around 20 countries that produce honey. Average honey production per hive is 20 kg throughout the world, and this figure is 33 in China, 40 in Argentina, 27 in Mexico, 64 in Canada, 55 in Australia, 40 in Hungary, and 16 kg in Turkey. These countries are also the highest honey exporting countries in the world. The countries that are the best honey importers are Germany, the United States of America (USA), Japan, England, Italy, Switzerland, France, Austria and other European countries. In addition to honey, bee products such as propolis, royal jelly, pollens and wax are also significant in the world trade (Kizilaslan, 2007).

A variety of voluntary social and environmental standards and certifications have evolved during the past 20 years in an attempt to differentiate products intended to meet specific ethical criteria from those produced in mainstream production systems. Organic certification has rapidly evolved over the last decade as a significant tool to promote sustainable forest management and access better market. Ethiopia has a large potential for sustainable production of organically grown agricultural products that can be produced to high - quality standards (NTFPRDP, 2005). To meet the organic standard, foods must be produced without or with a lowest proportion of chemical pesticides, synthetic fertilizers, or sewage sludge. In addition, genetically engineered crops, milk, and meat products that were produced from animals treated with growth hormones are not considered organic. In addition, the organic sector has its own barriers to market growth; the single biggest barrier to market growth of organic foods is the lack of certified organic crops and livestock products (Wil

liam, 2007). Ethiopia is one of the countries of the African continent with big honey production potential. Owing to its varied ecological and climatic conditions, Ethiopia is home to some of the most diverse flora and fauna in Africa. Its forests and woodlands contain diverse plant species that provide surplus nectar and pollen to foraging bees (Girma, 1998). Beekeeping is a long-standing practice in the farming communities of Ethiopia (Ayalew and Gezahegn, 1991). More than one million households are estimated to keep bees using traditional, intermediate and modern hives (Gidey and Mekonen, 2010). The annual honey production of Ethiopia is estimated to be 45,300 metric tons, which makes the country rank first honey-producing country in Africa and ninth in the world (FAO, 2010). In the country, more than ten types of traditional hives are used with an average honey yield of 5 to 8 kg per colony per year. The variation of hives is based on their volumes, shapes and the type of materials used for construction. Production is dependent on forest resources and Ethiopia's diverse sources of bee forage. (Nuru, 2007).

Southwest parts of the country in general and Kaffa, Sheka and Bench Maji Zones in particular are potential for beekeeping. The areas are endowed with natural tropical rain forests with suitable climates that favor high honeybee population density and forest beekeeping are widely practiced (Nuru, 2007). Based on morphometric and geographical distribution analysis honeybees from southwest Ethiopia are classified as *Apis mellifera scutellata* (Amsalu et al., 2004). From these honeybee colonies large volume of honey is produced annually (CSA, 2002). In these three Zones the majority of household keep honeybees as source of income from honey sell and beekeeping is an integral part of the farming communities of the area (Nuru, 2007). However, the honey production is very traditional which is practiced mainly by hanging traditional hives on tall trees in the dense forest far from human settlement areas (Hartman, 2004; Nuru, 2007). In areas where the forest covers was substantial the main pillar of income-generation for small-scale farmers is beekeeping (Hartman, 2004).

The main challenges that are affecting the promotion and development of honey production and marketing are dependence on traditional and low technology input, poor pre and post harvest management, inadequate extension services and poor marketing infrastructure. Furthermore, lack of smallholders' access to finance contributes to inhibiting the adoption of improved technologies for honey production. Poor quality, limited supply in the face of high local demand entailing higher domestic prices, coupled with the absence of an organized market channels and



lack of information have made Ethiopian honey uncompetitive in the international market. In spite of the existing constraints, a few honey processors and exporters have emerged; these have managed to certify their products and are able to penetrate markets in the United States, Europe and the Middle East (SNV, 2009).

## **1.2. Statement of the problem**

Honey is a much-valued product from forested areas around the world. The Ethiopian climate and the extended flowering season are favorable for apiculture. Beekeeping is widespread in most parts of Ethiopia; especially in the southwest montane forest region. (Mohammed and Freerk, 2006). Despite the huge potential, honey production has not been fully exploited in the Southwest part of the country. A number of factors such as honeybee enemies namely (ants, honey badgers, birds and small hive beetles), damaging of honeybee and stingless bee colonies during harvesting which causes drastic population reduction, the forest beekeeping practices that discourage the participation of women and old men in beekeeping, low adoption of improved beekeeping technology, low productivity of bees due to poor handling conditions, poor storage conditions of honey, absence of diversification of bee products (propolis, pollen and other high value of bee products), lack of skilled human power on apiculture to help beekeepers managing honey bees for better production, presence of honeybee poisonous plants, reduction of the sustainability of forest-based production due to high rate of deforestation, problems of sustainable marketing of bee products and high risk of forest beekeeping (falling from tall trees) (Awraris et al,2012). In addition, limited value addition activities, inadequate government and NGOs support survives, lack of processors, inefficient organized market and infrastructure and poor collaboration between value chain actors have contribution on un-exploitation of honey production and marketing potential and affect the entire value chain.

The importances of facilitating market access and value addition activities to farmers are valuable preconditions to improve their livelihoods. Therefore, farmers improve their incomes and diversify their livelihoods through value addition, diversification of income generating activities, vertical integration, and improved marketing arrangements through groups (Lundy *et al.*, 2002).

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).

Therefore, Value chain analysis is an important process in the study area to identify honey value chain actors, their roles and responsibilities, profit margin and their value addition activities, to analyze the gender role at the farm level and to investigate different problems from input supply up to consumption stage of honey value chain to improve the existing system because there is scanty information about honey value chain in the study area.

The value chain and cost-benefit analysis of honey: a comparative analysis of certified organic and conventional honey conducted by Amanuel (2011) in Gimbo Woreda of Kaffa Zone identified the value chain actors, cost benefit and their marketing margins, the role of certified organic and conventional honey production in HH food security. A comparison analysis of value chain development between cooperative and PLCs conducted by Chagwiaz et al (2011) in Masha district identified the constraints and opportunities for honey marketing among the cooperatives and PLCs, compared the entrepreneurial capacities between cooperatives and PLCs and identified the influence of cooperatives and PLCs on honey commercialization and innovativeness among producers. However the study on the identification and map of honey value chain, profit margin distribution of each actor, the value addition decision and extent of value added honey of honey producers, the gender role and market outlet choice of farmers were not done in the study area. Therefore, this study is designed to investigate the value chain analysis of organic honey in Masha district.

### **1.3. Research questions**

This research will try to answer the following major research questions.

1. What are the alternative honey market channels in the study areas? Who are the major actors involved in the chain? What are their functions?
2. What is the average level of net income/profit and profit margin obtained by actors along the chain?
3. What are the amount and type of marketing and material costs by the different actors along the chain? (Cost of transportation, cost of loading and unloading, cost of packing and storage etc)
4. What is the role of gender at the farm level?
5. What are the key factors affecting farmers honey market outlet choice decision?

## **1.4 Objective of the study**

### **1.4.1. General Objective**

The general objective of this study is to analyze the value chain of organic honey in Masha District of Sheka Zone

### **1.4.2. Specific Objectives**

1. To analyze honey value chain and marketing margin distribution along the value chain in the study area
2. To analyze factors that influence honey value addition decision and the level of participation of the producers
3. To analyze the role of gender in the farm level
4. To identify factors determining the market outlet choice of producers

### **1.5. Scope and limitation of the study**

This study was conducted in Masha Woreda of Southwest Ethiopia. The study was conducted in certified organic honey producing area by collecting important and necessary information from sampled households and other chain actor's operating in the Woreda. The reason why this study focus only in certified organic honey is that, in the area many beekeepers engaged in traditional beekeeping system by hanging the beehives in dense forest area, which is far from human settlement and any chemical contamination. Also in the study area, more than 500 beekeepers are registered in organic honey production by Bio Control Systems (BCS) agency. Hence, this investigation is conducted by applied information collected from only organic honey producers.

### **1.6. Significance of the Study**

The result of the study could provide background information for planners and policy makers to develop a sound strategy that can help increase the productivity and income of beekeepers. The output of this study could provide input for researchers for identifying research gaps and undertake a detailed value chain analysis in the area. This study also helps development actors in designing their intervention strategies in line with the existing production and marketing conditions in the area. Moreover, Farmers, traders and other actors are also expected to be beneficiaries from the possible strategies and interventions that could be developed using the information generated from the output of this study.

### **1.7. Organization of the thesis**

The study consists of five sections. The first section deals with the introduction of the study. The second section comprises relevant literature reviews. The third section describes the materials and methods, which include sampling technique and data analysis procedures. Section four comprises results and discussion. In the results and discussion section demographic characteristic of household respondents, honey value chain actors, roles, responsibilities and their marketing margin distribution, farmer's value addition participation and extent of participation, the gender role at the farm level, different market outlets for farmers and opportunities and constraints along the honey value chain have been discussed. Summaries of findings and recommendations were treated in section five.

## 2. LITERATURE REVIEW

### 2.1. Beekeeping in Ethiopia

Ethiopia is endowed with natural and cultivated flora in diverse agro-ecological and climatic zones that are well suited for beekeeping. Ethiopian beekeeping stretches back for millennia as evidenced by hieroglyphs of ancient Egypt that referenced Abyssinia as a source of honey and beeswax (SNV, 2009). This wide climatic condition makes the country highly suitable for sustaining a large number of bee colonies and the long established practice of beekeeping (Girma, 1998).

#### 2.1.1. Beekeeping Systems

##### 2.1.1.1. Traditional Beekeeping

The major portion of honey production in Ethiopia is done using traditional hives dominated by forest and backyard beekeeping. The largest portion of honey produced in the country comes from forest beekeeping; a practice in which farmers hang their traditional hives on natural forest trees. Forest beekeeping is practiced mainly in the south, south-west, west and south-east parts of Ethiopia; those parts having the highest forest coverage. Backyard beekeeping, on the other hand, is practiced mainly in the central, northern and eastern parts of Ethiopia. Wild bee colonies enter the traditional hives on their own volition if the hives are well prepared, lined/cleaned and smoked to attract them. This method of honey production has been in use for million years and is still the dominant scheme of production. The bulk of honey produced using traditional hives is utilized for tej and birz making although some cooperatives press honey from traditional hives and sell the semi-processed product to individual consumers and industrial processors (Nuru, 2002). In the study area farmers construct traditional beehives by dividing a tree trunk in to two halves and carving or making deep grooves to each half. Then the two halves brought together and then wrap it with *Arundinaria alpine* sheath locally called 'phesha'. Then they tie them with climbers locally called 'Hareg'. Finally to take the hives upon trees they use a very long (up to 40 m) and strong rope. Few beekeepers make beehive from bamboo (*Arundinaria alpine*) tree with large openings in two ends. The mean productivity of hive is 15 kg/hive (Awraris et al., 2012).

### **2.1.1.2. Transitional (Movable Top-Bar) System of Beekeeping**

Transitional hives, one of the modern hive types being promoted in the country, are the intermediate step between traditional and frame hives. Transitional hives have a higher honey yield over the traditional hives as well as provide a mechanism for monitoring the maturity of honey thus enabling harvest at optimal time. Moreover, the ratio of honey to beeswax produced for transitional hives is similar to that of traditional hives (Bradbear, 2002). In the study area the average number of intermediate hives owned by the beekeepers is 3 (range 1 to 10 intermediate hives/household). Of these, two were occupied by bees. The average yield is reported to be 18 kg per intermediate hive (Awraris et al., 2012). Transitional hive made from wood and bamboo. The productivity of wooden transitional hive is about 25kg/hive under optimal conditions and the productivity of the bamboo hives is approximately 15kg/hive (SNV, 2009).

### **2.1.1.3. Modern (Movable- Frame) System of Beekeeping**

Frame hives are modern hives made from wooden planks (Bradbear, 2002). Standard to frame hives are three compartments, each with ten frames with ready-made beeswax honey combs that enable bee colonies to start producing honey immediately after being transferred to the hive. Frame hives are good for honey production but have the lowest beeswax production at only 0.1% of the honey produced. Since honey from frame hives is suitable for production of table honey both for local and export markets, it is currently being promoted vigorously by the government and a number of private sector processors who have integrated farms. However, since the honey and beeswax subsectors only recently have received increased attention from the government and some NGOs (Chala, 2010;Bradbear, 2002). The annual productivity of frame hives generally falls within the range of 30 – 45kg/hive (SNV, 2009).

### **2.1.2. Economic Importance of Beekeeping in Ethiopia**

Honeybee exists everywhere in the continent where man lives, from the equatorial evergreen rain forest to the desert oasis, although they are more numerous in the drier savannah than in the wetter forest areas. They all produce honey (Chala, 2010). Production is mainly through indigenous means with most farmers having the traditional log, grass and bark hives. Due to their topology, background and design characteristics, traditional hives are universally low yielding in terms of honey production which is the main verifiable indicator (SNV, 2009).

Ethiopia has a huge natural resource base for honey production and beekeeping is traditionally a well established household activity in almost all parts of the country. It has the potential to produce 500,000 tons of honey and 50,000 tones of beeswax per annum, but currently production is limited to 43,000 tons of honey and 3,000 tones of beeswax but the benefit from the sector to the nation and beekeepers is not satisfactory (Beyene and David, 2007).

Moreover, the quality of Ethiopian honey is generally poor, as 95 per cent of beekeepers follow traditional beekeeping practices with no improved techniques or technology. Most honey is sold via formal and informal domestic spot markets and from this, lion share honey purchased by brewers of *tej*, a honey wine .Incomes from the sector is minimal, primarily due to low productivity and poor quality, but also because of limited market access, which forces producers to sell locally at low prices. Smallholders produce on average 5kg of honey per year from each hive, and must travel long distances to markets or sell at low prices to middlemen or local traders (Oxfam, 2011)

## **2.2. General Concepts on Value Chain Analysis**

Value chain describes 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) ranging from input suppliers, producers and processors to exporters and buyers engaged in activities required to bring agricultural product from its conception to its end use (Kaplinsky and Morris 2001). Three important levels of value chain could be identified according to Bammann (2007). These are:

- i. Value chain actors: The chain actors, who directly deal with the products, i.e. produce, process, trade and own them.
- ii. Value chain supporters: The services provided by various actors who never directly deal with the product, but whose services add value to the product.
- iii. 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 then to 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 (Anadaja and Berhanu, 2009)

The term 'Value Chain' was used by Michael Porter in his book "Competitive Advantage: Creating and Sustaining Superior Performance" (1985). The value chain analysis describes the activities of these organizations and links them to the organization's competitive position.

Value chain analysis describes the activities within and around an organization, and relates them to an analysis of the competitive strength of the organization. Therefore, it evaluates which value each particular activity adds to the organizations products or services. This idea was built upon the perception that an organization is more than a random compilation of machinery, equipment, people and money. Only if these things are arranged into systems and systematic activities will it become possible to produce something for which customers are willing to pay a price. Porter argues that the ability to perform particular activities and to manage the linkages between these activities is a source of competitive advantage.

Porter distinguishes between primary activities and support activities. Primary activities are directly concerned with the creation or delivery of a product or service. They can be grouped into five main areas: inbound logistics, operations, outbound logistics, marketing and sales, and service. Each of these primary activities is linked to support activities, which help to improve their effectiveness or efficiency. There are four main areas of support activities: procurement, technology development (including research and development), human resource management, and infrastructure (systems for planning, finance, quality, information management etc.)

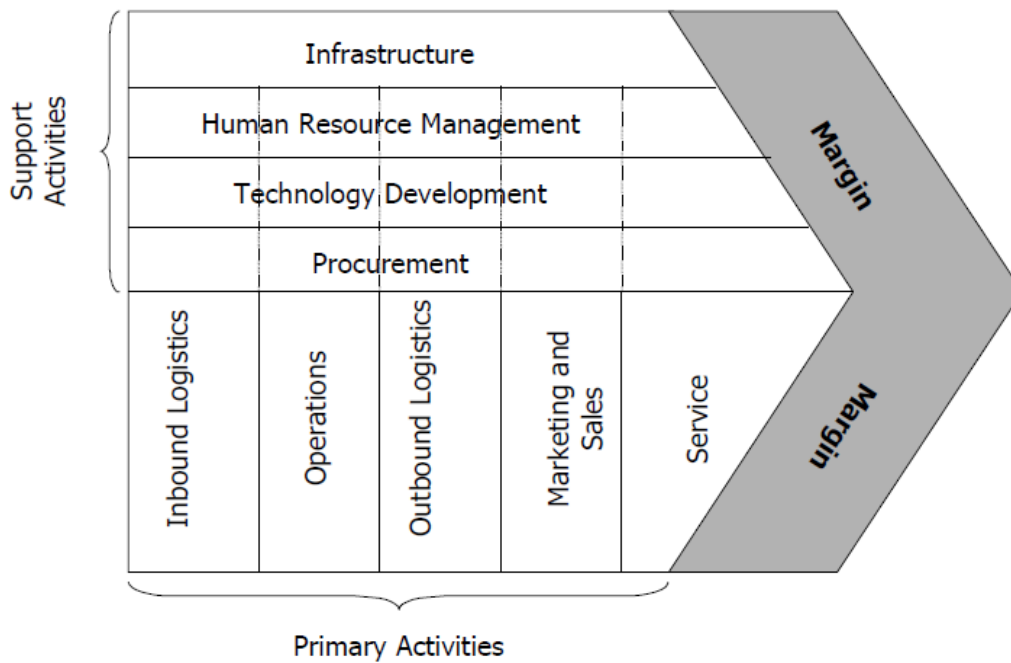


Fig1. The basic model of Porters Value Chain

The term ,Margin' implies that organizations realize a profit margin that depends on their ability to manage the linkages between all activities in the value chain. In other words, the organization is able to deliver a product / service for which the customer is willing to pay more than the sum of the costs of all activities in the value chain.

### 2.2. 1.Value chain governance

The term governance use to express that some firms in the chain set and/or enforce the parameters under which others in the chain operate. Governance ensures that interactions between firms along a value chain exhibit some reflection of organization rather than being simply random (Gereffi, 1994). According to Kaplinsky and Morris (2001) governance is not the same as co-ordination of activities by various actors within a value chain. Value chains are coordinated at different places in the linkages in order to ensure these consequences (intra firm, inter firm, regional) are managed in particular ways. Power asymmetry is thus central to value chain governance.

According to Gereffi (1994) governance is particularly important for the generation, transfer and diffusion of knowledge leading to innovation, which enables firms to improve their performance and sustain competitive advantage. Governance describes broadly in two terms of “buyer-driven” or “producer-driven” chains. In buyer drive chain commodity production is capital intensive. Trust and control are central issues. For that, many transactions are done inside the vertically-integrated company. Business relations in producer-driven chains therefore are often long-lasting and intensive ones. In producer-driven chains, huge producers dominate the chain due to their market power and brand names. In producer-driven chains commodity production is generally labor-intensive than capital intensive.

Governance concerns its depth and pervasiveness that is its “richness” and “reach” (Evans and Wurster, 2000). By depth we refer to the extent to which it affects the core activities of individual parties in the chain. Reach or pervasiveness refers to how widely the governance is applied and whether or not competing bases of power exists. The simplicity of the value-chain-governance concept is belied very often by the complexity of real-world relations and many value chains are characterized by a multiplicity of “governors”, often laying down conflicting rules to the poor producers who serve their needs.

### **2.2.2. 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 (Kaplinksy and Morris 2001). There are four types of upgrading in the firm such as process upgrading, product upgrading, functional upgrading and chain upgrading. Process upgrading refers to an increasing the efficiency of internal processes such that these are significantly better than those of rivals, both within individual links in the chain, and between the links in the chain. In Product upgrading there is an introducing of new products or improving old products faster than rivals. This involves changing new product development processes both within individual links in the value chain and in the relationship between different chain links. There is an increasing value added by changing the mix of activities conducted within the firm or moving the locus of activities to different links in the value chain in functional upgrading. Upgrading in value chain

can be achieved by value chain actors (retailer, industry, producer cooperative) or non chain actors (governmental organizations, NGOs or other parties in the business environment of the chain such as banking institutions or service providers) (Humphrey and Schmitz, 2000).

### **2.3. Honey marketing**

Marketing is an institution or mechanism, which brings together buyers (“demanders”) and sellers (“suppliers”) of particular goods and services. As a basic definition, marketing is the process of satisfying human needs by bringing products to people in the proper form and at the proper time and place. Marketing has an economic value because it gives form, time, and place utility to products and services (Barson and Norvell, 1983).

In Ethiopia, only about 10% of the honey produced in the country is consumed by the beekeeping households (MoARD 2003). The remaining 90% is sold for income generation and of this amount, it is estimated that 80% is used for *tej* brewing (Hartman 2004). According to Assefa (2011), domestic honey consumption is increasing due to highly increasing demand for *tej*, increased consumption of processed table honey in most urban areas and increased demand for honey in the local industries. According to Legesse (2014) the whole domestic honey market lacks proper structure and legality. It is of lengthy chain of actors that widens the access of producers to bigger and better paying markets. So, the beekeepers complain the business as not rewarding and even lacking market for their product, while the consumers see the ever increasing price of honey as unfair. Moreover, the market faces challenges like smuggling that pushes the legal actors out of market. In many cases, adulteration of honey has been a frustrating factor for both the producers and legal buyers and sellers as the traceability and accountability is far from practicability.

Honey contributes considerably to the national economy through export earnings. The total volume of exported honey between 2000 and 2008 has been increasing recently; 1.5 tons in 2000, 275 tons in 2010 and more than 730 tons in 2012 (Assefa 2011; EEPA, 2010, 2012). And the export trade of Ethiopian honey has reached more than 2.43 million USD (EEPA, 2012). The involvement of honey and beeswax processing companies is also an important factor for the increased export volume. In 2008, 17 honey and beeswax processing companies were registered

(Assefa 2011). The major importers of Ethiopian honey include Sudan, Norway, UK, Saudi Arabia, Kuwait, Yemen and other European countries and USA (EEPA 2010, 2012).

### **2.3.1. Honey marketing channels**

The analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (consumer). This knowledge is acquired by studying the “participants” in the process those who perform physical marketing functions in order to obtain economic benefits. In carrying out the functions, marketing agents achieve both personal and social goals. They add value to production and in so doing help satisfy consumer needs. This price also serves as a signal to all the actors in the marketing channel, i.e. producers, rural assemblers, transporters, wholesalers, and retailers (Mendoza, *et al.*, 1982).

According to Beyene and David (2007) *tej* brewery channel and honey processors and exporters channel were identified. These channels are complex and interconnected that implies absence of organized marketing channel and lack of formal linkages among the actors. Most of the harvested honey goes through *tej* brewery channel. Beekeepers directly sell their honey to local honey collectors (dealer or cooperatives) at district or zonal levels, which directly deliver the honey to *tej* brewery houses in their localities and/or transport it to the big honey dealers (verandah) for breweries in Addis Ababa. Some beekeepers who are producing large quantities of honey also directly supply it to *tej* houses in their areas. Honey processors’ and exporters’ channels also start from beekeepers and goes through the local agents of honey processors and/or honey marketing cooperatives, which supply the honey directly to the processing plants either with partial refining or as it is. The processing plants further refine the honey using advanced processing devices and pack into labeled containers for local markets (super markets, food groceries and big hotels) and to export markets.

### **2.3. 2. Distributions of Revenue, Cost and Profit**

The revenue (or retail price) is made up of marketing margins belonging to different actors in the value chain. Therefore, the marketing margin reflects the distribution of revenue to different chain actor’s .Marketing margin is the difference between selling price paid by the next stage and purchasing price paid to the previous stage. Marketing margin must cover all costs needed to

transfer the product from one stage to the next and a reasonable return to those perform the job (Shepherd, 2007). Total cost of the final product sold to the final customer is constituted of added costs incurred by different chain actors. Added costs computed by extracting from the total cost the purchasing price paid from the previous level in the value chain. Added costs reflect efforts of different chain actors in adding values to the final product. Finally, profit from selling the final product to the final customer comprises of profits accruing to different chain actors. (Gudmundsson *et al.*, 2006).

#### **2.4. Honey Processing**

Many tropical countries have successfully processed and marketed crude honeys using producers, cooperatives and small-scale processors (Crane, 1990). Processing crude honey has been also proved in improving honey quality and better utilization of resources. It is possible, even honey properly harvested from traditional and transitional hive, to process and market to produce a better quality table honey, since a traditional hive honey is a good quality as far as it is in the hive (Townsend, 1976). Honey can be processed in to diversified products. Using basic processing technology, it can be separated in to crude honey and crude beeswax which can be done at the household level. Intermediate processing technology can be in the form of separation of products to make liquid honey for use as table honey and beeswax for making candles and other wax related products. At the most sophisticated industrial level honey can be processed to produce ingredients in food manufacturing and pharmaceutical products (SID, 2010).

Locally processed and packed table honeys mostly suffer from granulation and problems associated with granulation like: coarse crystallization, different layers formation, fermentation and the resulting gas bubble production. Crystallized honey ferments more readily than liquid honey, which is because when dextrose crystals are formed in the honey the liquid phase has high water content than the entire honey had when it was uniformly liquid (Townsend, 1975). Hence, honey in uniformly liquid form is safer from fermentation by sugar tolerant yeasts (Crane, 1990). Moreover, most local people also associate coarse honey crystals with adulteration of honey with table sugar. For best consumer appeals mostly the honey should be in a clear liquid form (Crane, 1990). According to Awrariset *al.* (2012) the basic processing practice of farmers in the study area is to chunk the comb honey into a liquid mixture using sticks into the honey and compressing the sacks with their foot. And some use direct heating and

sunlight to melt their honey. Many farmers strain crude honey by simple drainage to remove the beeswax and any floating impurities simply using their hand.

## **2.5. Honey Consumption**

The honey sector is one of the few sectors that had the most inclusive ability to achieve transformation and growth across all categories of rural households. This is because of its large resource base and low barriers to entry. There are an estimated 5.15 million hives in Ethiopia, which are almost all entirely maintained according to traditional methods. Approximately 1.4-1.7 million farm households, who are keeping bees as a means of additional income generation, manage these hives. Beekeeping households consume about 10% of the honey produced in the country. The remaining 90% is sold for income generation; of this amount, it is estimated that 70% is used for brewing tej and the balance is consumed as table honey. Honey is a vital factor in job creation and maintaining livelihoods. However, current honey production estimate represents only 8.6% of the country's production potential (Paulos and Pite, 2013). The total volume of honey production in Ethiopia in 2007–2011 was 163,257.42 tons, of which 99.2 percent was consumed domestically and 0.8 percent was exported. The total volume of Ethiopian honey exports in 2007–2011 was 1,297,716 kg, with a total value of US\$4,066,528. Sudan was the single biggest importer of Ethiopian honey in terms of volume and monetary value. Although the volume of honey exported increases slightly when the totals for 2007 and 2011 are compared, Ethiopia's honey exports are still very low relative to Ethiopia's total honey production (Mikhail *et al.*, 2012).

Table 1. Honey production and exports versus domestic consumption, 2007–2011

Year	Total production volume (in kg)	Total export volume (in kg)	Total domestic consumption (in kg)
2007–2008	42,180,346	219,889	41,960,457
2008–2009	39,660,647	143,412	39,517,235
2009–2010	41,524,967	414,115	41,110,852
2010–2011	39,891,460	520,301	39,371,159
Total 2007–2011	163,257,420	1297717	161,959,703

\*Source: The Central Statistical Agency of Ethiopia (CSA) for volume of domestic production, and the Ethiopian Ministry of Trade for export volumes.

Table 2. Percentage shares of domestic consumption versus exports (out of total country production), 2007–2011

Ethiopian honey	Total (2007–2011)	2007–2008	2008–2009	2009–2010	2010–2011
Domestic consumption	99.2%	99.5%	99.6%	99.0%	98.7%
Exports	0.8%	0.5%	0.4%	1.0%	1.3%

\*Source: The CSA for volume of domestic production, and the Ethiopian Ministry of Trade for export volume.

## 2.6. Gender and beekeeping

Honey production is currently a male-dominated activity although records show that women are increasingly taking it up as an emerging Income Generating Activity. While women are taking up beekeeping as an income generating activity, their involvement remains limited despite their strategic positioning as farm managers and more active laborers factors that puts them at an advantage over their male counterparts (SNV, 2009). Women are engaged mainly in retailing



honey at the local market (or from home). They also occasionally participate in other activities preparation and cleaning of equipment/instruments for harvesting and storage, carrying materials to the harvesting site and carrying the honey back to their homes. There is a great shift, however, in the community's attitude regarding women's role in beekeeping. Above all, the cultural beliefs and social taboo that women farmers cannot practice beekeeping is completely removed. Since the introduction of modern hives however, certain aspects of traditional beekeeping (i.e. climbing trees to hang hives and retrieving them for harvesting) culturally excludes women from the practice. Among the relative advantages of beekeeping is that the whole family can be involved in beekeeping activities. There are different activities involved in beekeeping such as swarm catching, transferring, hive inspection, honeybee feeding, honey harvesting, honey extraction and marketing (Tessega,2009).

## **2.7. Honey Value Chain Actors**

Smallholder beekeepers, honey and beeswax collectors, collector centers and cooperatives, unions, wholesalers, retailers, honey processors, beeswax processors, tej brewers, input suppliers and exporters are the major actors in the apiculture subsector (SNV, 2009).

According to Paulos and pit (2005) to transform the beekeeping practice from subsistence to a commercial level micro finance access, extension services, modern\frame hives and commercial project financing are required. Different interventions are expected to encourage the beekeepers in making the first switch from existing subsistence beekeeping to semi-commercial beekeeping. The support to beekeepers will start with an effort to combine (prospective) semi commercial beekeepers in groups, associations or cooperatives, and linking them to honey processors or other downstream VC actors with a commercially provided "starter package" complemented with additional services and business linkages support.

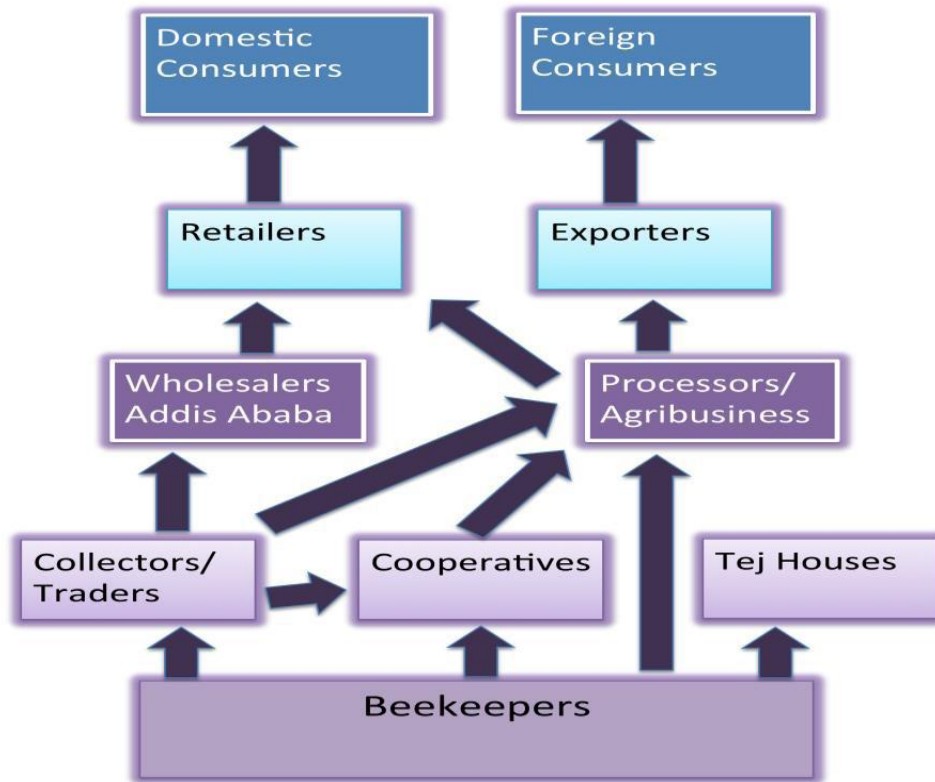


Fig.2. Honey value chain

Source: Mikhail et al. (2012).

## 2.8. Policy environment for honey

In response to Ethiopia’s food security and agricultural productivity challenges, the government instituted an overarching strategy of agricultural development led industrialization (ADLI). One of ADLI’s derivative features is the commercialization of smallholder agriculture through product diversification; hence the promotion of apiculture is in line with the national strategy. Honey and beeswax production, processing and exporting are activities that fall into the top priority agricultural and industrial strategies of the nation. In accordance with the strategy, the Ministry of Trade and Industry (MOTI) is facilitating and monitoring the export of honey and beeswax. The Ministry of Agriculture and Rural Development (MoARD) is also providing extension services to beekeepers. Furthermore, standards for beeswax, honey, and beehives have been developed by the Quality and Standard Authority of Ethiopia (QSAE) in 2005 (SNV, 2009).

## 2.9. Empirical works

There are a number of empirical studies on value chain approach and profit margin analysis of agricultural commodities. Value chain study conducted on apiculture subsector by SNV (2009) in Ethiopia indicates that the subsector faces a number of challenges and limitations including dependence on technologies with low productivity, poor pre and post harvest management, limited number of industrial honey processors, inadequate capacity building and extension service, poor marketing infrastructure, lack of access to inputs, inadequate access to finance by smallholder farmers and lack of information for marketing on both honey and beeswax. The study recommended that adoption of modern beehives, creation of market linkage and development and establishment of domestic honey testing laboratory to reduce the challenges.

Market assessment and value chain analysis conducted on honey by SID (2010) in Benishangul Gumuz Regional State of Ethiopia indicates that smallholders, collectors, local market wholesalers, brokers, AA market wholesalers, tej makers, processors, retailers and individual consumers are the actors involved in honey value chain in the region. The study indicates that the subsector faces a number of challenges including lack of organized market, low product quality, poor harvesting and handling techniques, poor road infrastructure, limited value addition activities, lack of honey processing equipments and skill and low adoption of modern beehives. The study recommended that Provide seed money/credit to initiate modern beekeeping, skill building in modern beekeeping, establish honey processing and marketing cooperatives/union, skill building in modern beekeeping and honey processing and packing, support private bee colony multiplication and marketing for income generation, link honey coops/union with the local market in Addis to reduce the challenges.

Kosgei *et al.* (2011) used cost benefit analysis on honey in west pokot district of Kenya and the result indicated that the main market participants for honey marketing in the region during the survey period were honey collectors, retailers and processors. Besides, a significant amount of honey produced is sold directly to consumers by producers. Major problems of the production identified and prioritized by beekeepers in the study area were drought, pests and diseases of honey bee, lack of apiary equipments, death of colony, marketing problems and shortages of bee forage and lack of adequate apiary skills.

Amanuel (2011) found that the certified organic honey producers incur lower unit production cost and higher profit margin than conventional honey producers in Gimbo Woreda. 83.0 percent of the total labor cost of certified producer comes from the family labor while, 57.3 percent of the total labor cost of the conventional honey producers emanates from family labor. The total average labor cost of the certified producers was birr 541.83 and birr 460.89 for the conventional producers. Material cost for the certified organic honey producers was 226.60 Birr per year and 100.53 Birr for the conventional one. The total production cost incurred by the certified producers was birr 1486 and the total revenue was birr 3964.12 while the production cost incurred by conventional producers was birr 1224.67 and total revenue was birr 1364.95.

Assefa (2009) used marketing margin analysis on honey in AtsebiWomberta district and he found that producers incurred the highest production cost, of which interest payment takes the largest proportion which was 39.29 percent followed by labor cost which accounts about 26 percent of the total production costs, followed by retailers. Rent for retail shop took the largest proportion for retailers about 58 percent of all marketing costs. About 17 percent of total gross marketing margin was added to honey price when it reaches to the final consumers at the regional capital of Mekelle. Out of the total gross marketing margin about 6% was gross margin of honey collectors, while 11% was that of retailers. The study pointed out that all marketing participants of the commodity operated at profit. This indicated that all the marketing agents were advantageous through the channel.

Risper (2009) used the value chain approach on honey value addition decision and extent of honey producers in Baringo district, Kenya. He was used Heckman two stage model and found that the decision to add value was positively and significantly influenced by the amount of honey harvested, group membership and amount of hours spent on off-farm activities. On the other hand, value addition was negatively influenced by the age of the farmers as well education level. He suggested that adoption of new technologies, farmers training and encouragement of value addition practices are needed to alleviate poverty.

Antenehet *al.* (2011) used market outlet choice approach on coffee in Sidama Zone, Ethiopia. The result indicated that the farmers sell their produce through different but limited marketing channels. The study found out that the main marketing channels existing in the area were coffee marketing cooperatives, private traders, neighboring cooperatives and informal traders. The study revealed that 42% of cooperative member coffee farmers sell their coffee to private traders and in opposite direction a 46% of non member coffee growers deliver their coffee to coffee cooperatives. They used Tobit regression model and the regression results for member farmers revealed that factors such as education, proportion of land allocated to coffee, proportion of off farm income to total income, coop performance, satisfaction on coop performance, and second payment affected market outlet choice. While age of the household head, proportion of off farm income, and access to training has positively influenced non member coffee grower's buyer selection decision.

Patrick (2010) also used the value chain approach on factors influencing agricultural products value addition by butchery agribusinesses in Igembe North district, Kenya. He used probit and ordered logit models to determine the socio-economic factors influencing value addition by butchery agribusiness. He found that value addition was positively and significantly influenced by household size and the type of the complementary businesses. Age, employment status, access to credit and frequency of slaughtering animals was negatively and significantly affect the value addition.

### **2.13. Conceptual Framework**

The conceptual framework in Figure 1 outlines the conceptualized interrelationships in the study, the key variables involved and how they are interrelated. The reasoning is that some farmers will decide to add value while others will choose not. The decision to add value is influenced by a number of factors discussed as follows. Market and institutional arrangements influence value addition as well as farmer and farm circumstances. Farmers who access credit for example can enhance their ability to practice value addition. Membership of cooperative vocalizes the choice and ability to practice in honey value addition. Membership of cooperative ensures accessibility to credit, equipment and collective marketing which is more effective than individual marketing thus fosters value addition. Value addition is also influenced by individual farmer and farm circumstances such as age, education level, sex and honey output. Education level may positively

influence value addition in terms of training and skills required to grasp new techniques and undertake value addition. The sex of household head may influence the ability of the household to adopt new technologies and the replication of these technologies. The quantity of honey produced will also positively influence value addition, with farmers having higher output expected to be participating in more value addition. There were four market outlet choices of honey in the study area such as tej makers, retailers, cooperatives and processor. The market outlet choices of farmers are influenced by different factors such as age, education level, experience, and market information access, mode of sale, distance to the nearest market outlet and membership of cooperative. Farmers who are cooperative member for example choose cooperative outlet to sale their honey than other market outlet choices.

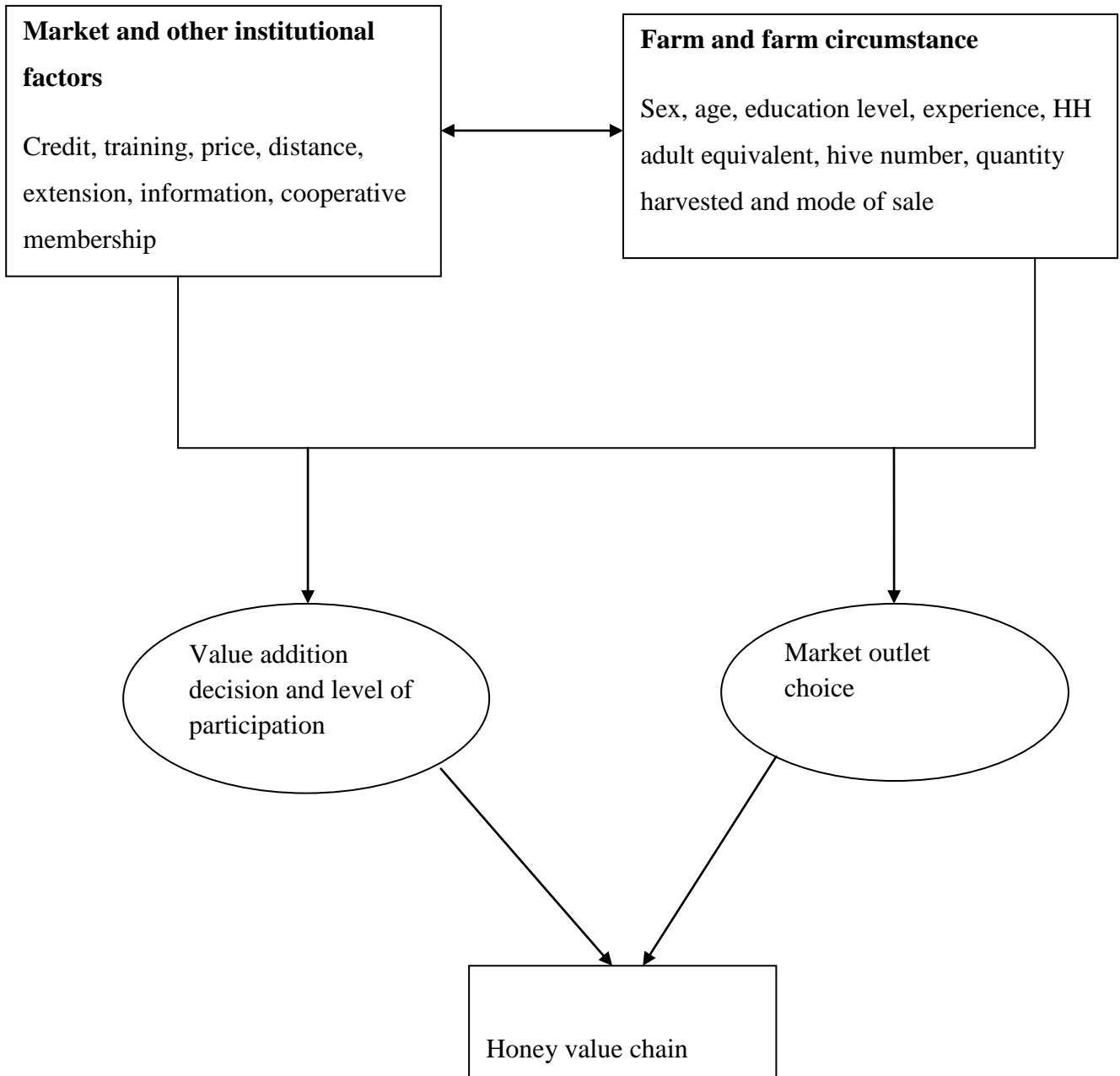


Fig.3. Conceptual framework  
Source: Own sketch from survey result, 2015

### 3. MATERIALS AND METHODS

#### 3.1. Description of the Study Area

Sheka Zone is located in Southern Nation's, Nationalities and People's Regional State (SNNPRS). Astronomically, the Zone lies between 70 24'-70 52'N latitude 350 13'-350 35'E longitudes. Altitudinally, it lies between 900-2750m. This Zone is bounded in north by Oromia Regional state, onto south by Bench Maji Zone, onto east by Keffa Zone and onto west by Gambella Regional State, and has a total land area of 2175.25 km<sup>2</sup>. Out of this land area, 47% is covered by forest including bamboo trees. This Zone has both highland and lowland types of land features. Highlands account about 2/3 of the total area of the Zone and the rest is covered by lowlands. It is one of the almost all year rainfall receiving area with heavy rain lasting for about 8-10 months of the year. The annual temperature range of the Zone is between 120c -290c. Agro climatically 993.44 km<sup>2</sup> or 45.67% is covered by Woinadega, 522.06 km<sup>2</sup> or 24% by Dega and the rest 659.75 km<sup>2</sup> or 30.33% by kola type of climate.

The Agricultural practice in the area depends upon the Agro-ecological type of the Zone. However, the predominant practice is mixed farming, crop production, livestock and other economically important activities such as, beekeeping for honey production (traditionally in the forest), spices collection and coffee harvesting. Most of the subsistence and income-generating activities of Shekacho community is endowed largely with the natural forests.

Sheka Zone has three Woredas (districts), namely Masha, Andiracha and Yeki. In total the Zone has 56 rural Kebeles, 5 urban Kebeles and 2 chartered towns or city administrations, Teppi& Masha. More specifically, Masha is the administration center of Sheka Zone and is located 676km southwest of Ethiopia from Addis Ababa along Addis-Jimma road. This Woreda is bordered on east by Gesha Woreda of Keffa Zone, on west by Sele- Nonno Woreda of Oromia region, on south by Diddo-Lallo Woreda of Oromia region and on north by Andracha Woreda of Sheka Zone. The Woreda has a total land area of about 90,802.82 hectares. Out of this land area about 23.9% is cultivated, 2.8% is grazing land, 40.5% is covered by forest, 5.5% arable land, 5.9% non-arable land and 21.4% is settled land area. This Woreda lies between 1600-2400m above sea



level and receives 2000mm rainfall. Agro climatically, the area is largely Woina dega type comprising about 75% of the total area, 22% and 3% are in Dega and kola types.

Masha woreda is notable for its relatively high forest cover as compared to other parts of Ethiopia. The forest is the major source of livelihood of the people in the area. Due to high level of dependency on forest resources, the local communities have developed traditional management practices based on religious taboos and customary tenure rights. Such management practices have sustained the forests for centuries and contributed to the better condition of the forests in the area. In general, the area is characterized by dense forests and woodlands that contain diverse plant species that provide surplus nectar and pollen to foraging bees (Tadesse and Masresha, 2007).

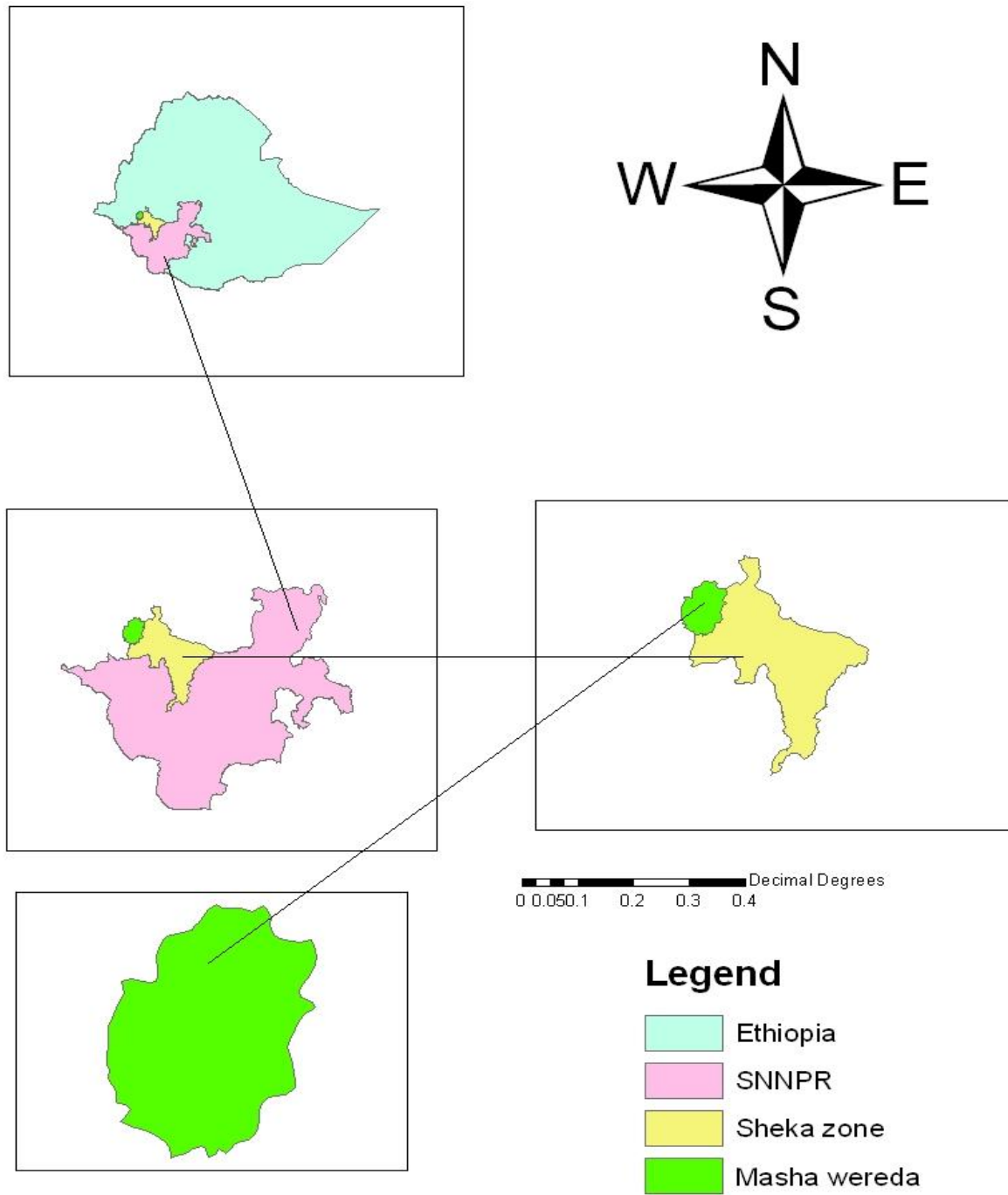


Fig.4. Map of the study area

### **3.2. Data type and source**

In order to get the overall picture of honey producers, cooperatives, traders, tej makers and exporter and consumers of the honey value chain in the study area; the study used both primary and secondary data. The primary data were collected from farmers focused on factors affecting honey value addition decision, size of output, market information, credit access, accesses to market, numbers of beehives owned, honey production cost, annual return from honey, extension service, and demographic characteristics of the household.

The data collected from co-operatives includes most of the above information which is included in the farmer's questioners and other additional information such as storage facility, buying and selling price, source of market information, working capital and credit access.

The data collected from traders and exporter focus on, buying and selling strategies, initial capital, current working capital, source of working capital, source of market information, and marketing strategy.

Moreover, data were also collected from tej makers includes buying price, inputs used to make tej and cost incurred to tej making.

Secondary data were collected from different sources, such as the District Office of Agriculture and Rural Development (DOARD), marketing and cooperative office, reports, and websites was consulted to generate relevant secondary data on honey production and marketing.

### **3.3. Method of data collection and sampling techniques**

Primary data were collected using informal and formal surveys. Data were collected from key informants by using a checklist. The formal survey was undertaken through formal interviews with selected farmers, cooperatives, traders, processor, tej makers and consumers using a pre-tested semi-structured questionnaire for each group. The data were collected from selected farmers by trained enumerator's using semi-structured questionnaire.

The sample included all actors that participate in honey value chain in the study area. The sample size of the beekeepers was determined by using Yamane (1967) formula to calculate sample size.

$$n = \frac{N}{1 + N(e)^2}$$

Where; where n is the sample size, N is the population size which is 234, and e is the level of precision which is  $\pm 5\%$ .

Table 3. Name of the kebeles and samples were taken

No	kebeles	No of household	Honey producer households	Sample size was considered
1	Beto	504	62	39
2	Keja	1311	103	65
3	Uwa	610	69	43
	Total	2425	234	147

A three-stage sampling procedure was employed to select a specific honey producer household. First, one potential honey producer woreda were selected purposively from three woredas in the zone. Second, out of 19 kebeles in the district three Kebeles were selected purposively based on the presence of large number of organic honey producers. Finally, simple random sampling was used to select 147 representative households using list of organic honey producers in each kebeles as a sampling frame.

Data from retailers, cooperatives, tej makers, exporter and consumers were also collect. There were 22 registered honey retailers in the study area by Woreda trade and industry office and all of them were taken. There were 7 service and 6 honey producers and marketing cooperatives in the Woreda and all of them were taken. In addition 15 tej makers and 20 consumers were selected randomly.

### **3.5. Methods of data analysis**

Two types of data analysis, namely descriptive statistics and econometric models were used for analyzing the data collected from the value chain actors of the study area.

#### **3.5.1. Value chain analysis**

To analyze the honey value chain in the study area, the first step were mapping of the value chain to understand the characteristics of the chain actors and the relationships among them by studying all actors in the chain and the flow of honey through the chain. This information can be obtained by conducting surveys and interviews as well as by collecting secondary data from various sources. The second step was identifying the distribution of actors' benefits in the chain. This involves analyzing the margins and profits within the chain. Finally the structure of relationships and coordination among chain actors were emphasized by the governance role in the chain.

#### **3.5.2. Descriptive and inferential statistics**

Data analysis employed descriptive statistics such as mean, percentage, comparison, standard deviations, t-test and F-test.

Marketing margin is most commonly used to refer to the difference between producer and consumer prices of an equivalent quantity and quality of a commodity. However, it may also describe price differences between other points in the value chain, for example between producer and wholesale, wholesale and retail, prices (Scarborough and Kydd, 1992). Marketing costs and margin analysis is especially comparison of prices at different levels of marketing over the same period. Computing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer and is expressed in percentage (Mendoza 1995).

$$TGM = \frac{P_c - P_p}{P_c} \times 100$$

Where  $TGM$  = total gross marketing margin,  $P_c$  = Final consumer price, and  $P_p$  = Producer price.

It should be emphasized that producers that act as middlemen also receive an additional marketing margin. The producer's margin is calculated as a difference:

$$GM_p = \frac{P_c - TGM}{P_c} \times 100$$

Where  $GM_p$  = gross marketing margin of the producer.

The net marketing margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted.

$$NMM = \frac{TGM - MC}{P_c} \times 100$$

Where, NMM = Net marketing margin

Another parameter related to marketing margin is the producer's share. The producer's share is the ratio of producer price to the consumer price (retail) (Mudiantono, 1990). The producer's share can be expressed as:

$$PS = \frac{P_x}{P_r} = 1 - \frac{MM}{P_r}$$

Where: PS = the producer's share

$P_x$  = producer price of honey

$P_r$  = Consumer price of honey

MM = Marketing margin

The above 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. The magnitude of marketing cost depends on factors such as time and place of marketing, market conditions, and the market channel involved. The marketing will be composed of marketing service cost and the result will be interpreted. Margins at each stage will be computed and the share will be compared.

### 3.5.3. Harvard analytical framework

To analyze the gender role in the farm level Harvard analytical framework was used. By using this framework first the productive and reproductive role of both women and men was identified and then whether women or men have access to resources, who controls their use and who in the household controls the benefits from them was analyzed.

### 3.5.4. Econometric analysis

To analyze factors that influence the practice and extent of honey value addition of the producers Tobit model was used. Because of the restrictions put on the values taken by the regressand, this model can be called limited dependent variable regression model. The data have a censored sample as dependent variable, 55.1% of household didn't participate in honey value addition even if they produce honey from the total of 147 samples, the data are censored, and Tobit estimation is relevant. If zero values of dependent variables were the result of rational choice of farmers, a Tobit model would be more appropriate (Abrar, 2004). Thus, maximum likelihood Tobit estimation (Tobin, 1958) was used in the analysis of factors that influence the practice and extent of honey value addition. One can concern with the model; recall that in a Tobit with left-censoring at zero:

$$Y_i^* = \beta_0 + \sum_{i=1}^m \beta_i X_i + U_i, \quad i = 1, 2 \dots m;$$

Where  $Y = Y^*$ , if  $Y^* > 0$ ,  $Y = 0$  if  $Y^* \leq 0$  and  $Y = \max(Y^*, 0)$

Where  $Y_i^*$  = amount of value added honey (dependent variable)

$\beta_0$  = an intercept

$\beta_i$  = coefficients of  $i^{\text{th}}$  independent variable

$X_{i=}$  independent variable, and 'i' is 1, 2, 3... m

$U_i$  = unobserved disturbance term

Where, for the  $i^{\text{th}}$  observation,  $Y^*$  is an unobserved continuous latent variable,  $Y_i$  is the observed variable,  $X_i$  is a vector of values of the independent variables,  $U_i$  is the error term, and

$\beta_i$  is a vector of coefficients. This model assumes that  $U_i$  is uncorrelated with  $X_i$  and is independently and identically distributed.

The model parameters are estimated by maximizing the Tobit likelihood function of the following form;

$$L = \prod_{y_i^* > 0} \frac{1}{\delta} f\left(\frac{Y_i - \beta_i X_i}{\delta}\right) \prod_{y_i^* \leq 0} F\left(\frac{-\beta_i X_i}{\delta}\right)$$

Where  $f$  and  $F$  are respectively, the density function and cumulative distribution function of  $Y_{i^*}$ .  $\prod_{y_i^* > 0}$  means the product over those  $i$  for which  $y_{i^*} > 0$ , and  $\prod_{y_i^* \leq 0}$  means the product over those  $i$  for which  $y_{i^*} \leq 0$ .

1. The marginal effect of an explanatory variable on the expected value of the dependent variable is:

$$\frac{\partial E(Y_i)}{\partial (X_i)} = F(z) \beta_i$$

Where,  $\frac{\beta_i X_i}{\sigma}$  denoted by  $z$ , following Maddala, (1997)

Where  $f$  and  $F$  are respectively, the density function and cumulative distribution function of  $Y_{i^*}$ ,  $\pi_{y_i^* > 0}$  implied the product over those observations for which  $y_{i^*} > 0$ , and  $\pi_{y_i^* = 0}$  implied the product over those observations for which  $y_{i^*} = 0$ .

2. The change in the probability of value addition participation as independent variable  $X_i$  changes:

$$\frac{\partial F(z)}{\partial X_i} = f(z) \frac{\beta_i}{\sigma}$$

3. The change in intensity of value added honey with respect to a change in an explanatory variable:

$$\frac{\partial E(Y_i / Y_i^* > 0)}{\partial X_i} = \beta_i \left[ 1 - Z \frac{f(z)}{F(z)} - \left( \frac{f(z)}{F(z)} \right)^2 \right]$$



Where,  $F(z)$  is the Cumulative Normal Distribution of  $z$ ,  $f(z)$  is the value of the derivative of the normal curve at a given point (i.e., unit normal density),  $z$  is the Z score for the area under normal curve,  $\beta_i$  is a vector of Tobit Maximum Likelihood estimates and  $\sigma$  is the standard error.

Finally, to identify factors affecting honey market outlet choices, Multivariate Probit model was used. Farmers choose a mix of outlets to deal with a multitude of market outlet choices, so the market outlet choice of farmers is inherently multivariate (Dorfman, 1996). A shortcoming of most of the previous studies on market outlet choice is that they do not consider the possible inter-relationships between the various choices. These studies mask the reality faced by decision-makers who are often faced with market outlet alternatives that may be chosen simultaneously and/or sequentially as complements, substitutes, or supplements. Such choice analysis is possible when other market choices decisions are made exogenously. This suggests that the number of market outlet choices may not be independent, but path dependent. Some recent empirical studies of market outlet choice decisions assume that farmers consider a set (or bundle) of possible market choices and choose the particular outlet bundle that maximizes expected utility. Thus, the market outlet choice decision is inherently multivariate and attempting univariate modeling excludes useful economic information contained in interdependent and simultaneous market outlet choice decisions. In this paper, multivariate probit (MVP) econometric technique was adopted, which simultaneously models the influence of the set of explanatory variables on each of the different outlet choices. In contrast to MVP models, univariate probit models ignore the potential correlation among the unobserved disturbances in the outlet choice equations, as well as the relationships between the choices of different market outlets. The multivariate probit econometric model is characterized by a set of binary dependent variables. Generally, the multivariate probit model can be written as:

$$\begin{aligned}
y_{1i}^* &= \beta_1' X_{1i} + \varepsilon_{1i} \\
y_{2i}^* &= \beta_2' X_{2i} + \varepsilon_{2i} \\
&\vdots \\
y_{Mi}^* &= \beta_M' X_{Mi} + \varepsilon_{Mi}
\end{aligned}$$

Here, there was  $m=1 \dots M$  equations and  $i=1 \dots N$  observations. For the latent dependent variables, we assume that:

$$y_m = \begin{cases} 1 & \text{if } y_m^* > 0 \\ 0 & \text{otherwise} \end{cases}, m = 1, \dots, M$$

Moreover,  $X_{mi}$  are vectors of exogenous variables,  $\beta_m$  the associated parameter vectors and  $\varepsilon_{1i} \dots$  are error terms distributed as multivariate normal with variance-covariance matrix  $V$ , where  $V$  has values of 1 on the leading diagonal and correlations  $\rho_{jk} = \rho_{kj}$  as off-diagonal elements for  $j, k = 1, \dots, M$  and  $j \neq k$ . In the study area, there were four market outlet choices as dependent variables such as tej makers, cooperatives, traders and processor.

For both methods, STATA software was employed.

### 3.5. Definition and Hypothesis of variables

#### 3.5.1. Dependent variable:

**Honey value addition decision:** A dependent variable takes a value of one if the household participates in value addition and zero otherwise. The value addition practice was expressed by semi processing of crude honey.

**Quantity of value added honey (kg):** It is a dependent variable of the quantity of value added honey. It was measured in kg of semi- processed honey.

**Market outlet choice:** This dependent variable represents honey market outlets of the beekeepers. There were four outlets for honey marketing in the study area such as cooperatives, traders, tej makers and processor outlets. In the analysis, it is measured by the probability of

selling honey to either of the markets. The outlet choices might be along farmers decision involving in four alternative markets.

### **3.5.1.1. Independent variables:**

**Beekeepers perception towards price of value added honey:** This is a dummy independent variable take the value one if the beekeeper says the price of value added honey is attractive and zero otherwise. If the price of value added honey is attractive, the beekeepers participate in value addition activity. Therefore, the price of value added honey is hypothesized to affect the value addition decision and level of participation positively.

**Age of the household head:** The age of the household head plays a key role in determining the participation of a household in value addition. The older the head, the less likely that a household will practice value addition. This arises from the fact that as the decision maker grows older, they become risk averse and are not willing to venture into new fields or take part in activities that they are not certain about. Furthermore, older members are less energetic and therefore find it hard engaging in activities, which require quite some energy. This variable is also expected to have relationship with outlet choice decision of honey producers. As the age of the household head increases, they tended to produce and sell more unprocessed (crude honey) than young aged households. Therefore being old aged household head is hypothesized to affect accessing tej maker's outlet positively than other outlets.

**Access to credit:** Access to credit is measured as a dummy variable taking a value of one if the household has access to credit and zero otherwise. Credit access is assumed to have a positive significant to the value addition of honey, because a farmer who has access to credit service can purchase improved box beehives, beekeeping equipment's and hence increase the production and value addition of honey. This variable is also expected to have relationship with outlet choice decision of honey producers. Households who had access to credit expected to produce more and sell to cooperative. Therefore, access to credit hypothesized to affect cooperative market outlet positively as compared to other market outlets.

**Availability of labor in the household:** These implying that the larger the household in terms of adult equivalent, the higher the number of adults in a household, the higher the value addition

done by the household. This could be related to the decisions being made pertaining to value addition and the energy required to undertake the activity. As the number of adults increased in the household, they had an access to get market information. Therefore, the higher the number of adults in the household is hypothesized to affect accessing cooperatives outlets positively than other honey market outlets.

**Education Level of the household head:** It is a dummy variable taking one if the household head is literate and zero if the household head is illiterate. Those household heads who had formal education determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and participate in value addition. This variable is also expected to have relationship with outlet choice decision of honey producers. Therefore, formal education of a household head is hypothesized to affect accessing cooperative market outlet choice positively as compared with accessing other market outlets.

**Distance to the nearest market:** It is a continuous variable and is measured in kilometers which farmers spend time to sell their product to the market. If the farmer is located in a village or distant from the market, he is weakly accessible to value addition practices and the market outlets. The closer to the market the lesser would be the transportation cost and time spent. Therefore, households who are at far away from the nearest market are hypothesized to affect the likelihood of accessing cooperative and tej maker market outlet positively as compared with accessing other market outlets.

**Membership in cooperative:** This is a dummy independent variable that takes the value 1 if a household has a membership to cooperative and 0 otherwise. The beekeepers who are cooperative membership are expected to get information and training through their cooperative and will participate in honey value addition. Risper (2009) found that group membership affect the honey value addition positively. Households who are member to cooperative are supposed to sell honey for honey cooperative rather than selling to other market outlets and participate in value addition activities.

**Training access:** It is a dummy independent variable taking value of one if the producer had training access and zero otherwise. Households who had training access on value addition activities is more participate in value addition. Households who had access to training expected to produce more and sell to cooperative. Therefore, access to training hypothesized to affect cooperative market outlet positively as compared to other market outlets.

**Extension services:** it is a dummy independent variable taking value 1 if the producer has got extension services and 0 otherwise. Farmers who have extension services accept and practice new ideas than those farmers who has not get extension services Therefore extension services is assumed to have direct relation with value addition decision and level of participation. This variable is also expected to have relationship with outlet choice decision of honey producers. Therefore, access to extension service is hypothesized to affect accessing cooperative market outlet choice positively as compared with accessing other market outlets.

**Access to market information:** This is measured as a dummy variable taking value of 1 if the producer had access to market information and zero otherwise. The better information farmers had out is likely to add value on honey and households marketing decision is based on market price information. This variable is also expected to have relationship with outlet choice decision of honey producers. Therefore, the variable is hypothesized to affect accessing cooperative market outlet choice positively as compared with accessing other market outlets.

**Mode of honey sale:** This is a dummy independent variable that takes the value 1 if mode of honey sale is in cash and zero otherwise. If the mode of sale is in cash, the beekeepers are motivated to sale honey to that market outlet. Most households need cash from honey sale to their urgent needs. Therefore, cash based mode of payment is hypothesized to affect accessing trade and tej maker market outlet positively as compared with accessing cooperative market outlets.

Table 4. Name, type and hypothesized sign of explanatory variables for honey value addition

Variable name	Variable type	Hypothesized sign
Education Level of the household head	Dummy	(+)
Distance to the nearest market	Continuous	(-)
Household adult equivalent	Continuous	(+)
Age of the household head	Continuous	(-)
Beekeepers perception towards price of value added honey	Dummy	(+)
Frequent extension contact	Dummy	(+)
Access to market information	Dummy	(+)
Membership to cooperative	Dummy	(+)
Access to credit	Dummy	(+)
Training access	Dummy	(+)

Table5. Definition of variables and descriptive statistics for market outlet choice

Dependent variables		Mean	SD
Tej maker (TM)	Tej maker market outlet choice(1=yes, 0=no)	0.78	0.41
Cooperative (COOP)	Cooperative market outlet choice(1=yes, 0=no)	0.56	0.49
Trader (T)	Trader market outlet choice(1=yes,0=no)	0.52	0.50
Processor (P)	Processor market outlet choice(1=yes,0=no)	0.32	0.46
Independent variables			
Age	Age of household head (years)	43.60	10.98
Adult	HH adult equivalent(years)	3.87	2.21
Distance	Distance to nearest market(in km)	3.46	1.77
Education	Education level of household head (1=literate,0=illiterate)	0.44	0.49
Cooperative	Membership in cooperative(1=yes,0=no)	0.43	0.49
Info	Information access of the HH(1=YES,0=No)	0.32	0.46
Credit	Credit access of the HH(1=yes,0=no)	0.28	0.45
Training	Training access of the HH(1=yes,0=no)	0.34	0.47
Extension	Access to extension service(1=yes,0=no)	0.44	0.49
Mode of sales	Mode of honey sale(1=cash,0=credit)	0.64	0.48

## **4. RESULT ND DISCUSSION**

This chapter presents the major finding of the study that addressed the objectives of the study. It has five sections. The first section deals with value chain analysis of honey that includes value chain map, actors and their roles and value chain governance. The second section discusses the marketing channels and performance analysis. Determinants of participation decision and the level of participation in honey value addition dealt in the third section. The role of gender in the honey value chain is presented in the fourth section. Finally, the determinants of honey producer's market outlet choice are presented in the fifth section.

### **4.1. Household characteristics**

#### **4.1.1. Socio-economic and demographic characteristics of honey producers' household**

The total sample farmer respondents of the survey were 147. Out of 147 samples, 98.6 % were male-headed and 1.4 % was female-headed households. This arises from the traditional believe that beekeeping is a man's activity and women are therefore not allowed to venture into the activity. In the study area beekeeping is practice in dense forest areas by hanging the beehives in large trees and it is a taboo for women to harvest honey and therefore, the few women that are involved are required to employ men to undertake most of the tasks ranging from hive construction, hanging of hives on trees and subsequently harvesting. Concerning education level of beekeepers, 37.4% of the respondents were literate and 62.6% were illiterate. About 88.4% of the bee keepers are married, 10.2% are single. The rest 0.7 and 0.7 were widowed and separated. 22.4 %, 10.2 %, 27.2% and 40.2 % of the respondents were political leader, spiritual leader and elder and community member respectively. The mean age of members of households involved in beekeeping is 44.76 years (maximum 70 and minimum 23) and this indicates that those involved in beekeeping are the active and energetic members of society. Each household has an average of 6.5 members (maximum 13 and minimum 3), with average adult equivalents of 4.8(maximum 13 and minimum 2) per household.



#### **4.1.2. Beekeeping activities**

In Masha Woreda, many farmers engage in beekeeping for a longer period. In the area, the majority of household keep honeybees as source of income from honey sell and beekeeping is an integral part of the farming communities of the area. However, the honey production is very traditional which is practiced mainly by hanging traditional hives on tall trees in the dense forest far from human settlement. Currently, three types of beehives undertake beekeeping: - traditional, intermediate and Zander model box hives. In the area traditional hive, beekeeping practice is the dominant while intermediate and modern hives are less used. Only very few beekeepers reported having intermediate hive that has been supplied by different Non-Governmental Organizations like MELCA Mahiber, Non-Timber Forest Products Project and Zonal and Woreda Agricultural and Rural development Bureaus. According to the survey result 1.45, 4 and 87.35 were the average number of modern, transitional and traditional hives\household. Of the total owned traditional hives, < 40% of the hives was found occupied by bees while the rest were empty. Mean productivity of crude honey from one beehive\year was 15kg (ranging from 5-25kg), 19kg (ranging from 8-30kg) and 25kg (ranging from 15-35kg) for traditional, transitional and modern beehives. In the study area the majority of farmers construct their traditional beehives from different locally available plants locally called, hareg (*Solanecoangelatus*) and bamboo. Traditional hives have a cylindrical shape with a length of 0.75 to 1.5 meters. Constructing and hanging of traditional beehives are made exclusively for men due to its cumbersome nature and culture.

#### **4.1.3. Honey Producers' characteristics by honey value addition**

In this study value addition activity means the participation of farmers in straining(semi processing) of crude honey by using different materials such as cloth, sieves, decantation and by hand. There was also a price difference in crude and semi-processed honey. In the study area most farmers use decantation to strain (semi-process) their honey.

Honey producers participate in value addition activities depending on different demographic and socioeconomic characteristics of the households. In average 46.9% of honey producers participate in honey value addition in 2014 production season. Table 6 present demographic and socioeconomic characteristic of sample respondents across the value addition decision.

Table 6.Characteristics of surveyed households across honey value addition

Variables	Those who participate in value addition		Those who do not participate in value addition		t-test
	Mean	SD	Mean	SD	
	Age	37.8	6.9	50.7	
Adult equivalent	5.9	1.8	2.2	0.42	- 18.07***
Distance to market	1.7	1	4.8	0.78	0.12

Source: Own computation from survey result, 2015

Compared to the farmers who participate in honey value addition, the farmers who do not participate in honey value addition had relatively lower adult equivalent, experience and quantity harvested. In addition farmers who participate in honey value addition is relatively younger than who do not participate in value addition.

Table 7.Percentage characteristics of surveyed households across honey value addition

Variables	Those who participate in value addition		Those who do not participate in value addition		$\chi^2$ -test
	N	%	N	%	
	Education				
Literate	42	63.6	17	21	
Illiterate	24	36.4	64	79	
Access to Extension service					120***
Yes	61	92.4	6	92.6	
No	5	7.6	75	7.4	
Information access					66.3***
Yes	44	66.7	3	3.7	
No	22	33.3	78	96.3	

Cooperative membership					123***
Yes	62	93.9	2	2.5	
No	4	6.1	79	97.5	
Credit access					66.3***
Yes	40	60.6	2	2.5	
No	26	39.4	79	97.5	
Price of value added honey					103***
Attractive	63	95.4	8	9.9	
Not attractive	3	4.6	73	90.1	

Source: Own computation from survey result, 2015

Table 7 shows, farmers who participate in honey value addition relatively had frequent extension contact, better information and credit access and they are literate as compared to farmers who do not participate in value addition.

#### **4.1.5. Opportunities and constraints in honey value chain in the study area**

Problem identification and solution searching is important to utilize the beekeeping sub-sector more efficiently and effectively. During the survey, the respondents identified many challenges in honey production and marketing. As a result, prioritization of the problems was made to identify the most important constraints that hinder the development of beekeeping sub-sector in the study area.

Based on the result of this study, beekeepers much suffered from a number of difficulties and challenges that are antagonistic to the success desired in honey production. Very low adoption of improved technologies and lack of beekeeping equipments (protective cloth, modern beehives, smoker, honey presser, honey compressor, casting mould and honey extractor) are the major challenges in honey production. Almost all beekeepers practice traditional beekeeping in the study area. According to the respondents, there is very low provision of improved beehives from governmental and nongovernmental organizations and it is expensive to purchase the modern beehive. Due to this problem, the productivity and quality of honey become low.

Honeybee enemies (ants, small hive beetles and lizards), damaging of honeybee during harvesting, poor marketing infrastructure and poor storage conditions are the second challenges identified by beekeepers. Honeybee enemies reduce the productivity and quality of honey. During harvesting beekeepers use smoke to harvest honey and this results in the reduction of honeybee population by damaging the honeybees. After harvesting poor marketing infrastructures such as road to transport honey into marketplace and poor storage condition, which results quality loss, are the major challenges.

According to the respondents, the third most important constraints are lack of training and credit access, absence of diversification of bee products (wax, propolis, pollen and other high value products), lack of market information and limited women participation in honey production and marketing.

There is still huge potential to increase honey production and to improve the livelihood of the beekeepers in the district. The presence of dense forest, far from any agro chemicals that affect organic production and human settlements, is the major opportunity for the production of organic honey in the area. Besides the existing natural base, government has recently put in its agenda the need to develop apiculture as one of the strategies to reduce poverty and to diversify national exports. NGOs like MELCA Ethiopia and NTFP-PFM, are also giving more attention to the sub-sector than ever before as an important intervention to support the poor and particularly the women. This will give Masha district farmers the opportunity to access improved technologies and capacity building (training on apiculture). Availability of market demand throughout the year, growing number of buyers, high experience in honey production and trade, marketing situation of bee products are some of the opportunities for honey production and marketing by most of the producers. In addition, Beza mar-agro industry support will give a good opportunity to create increasing demand for honey and competitive market in the area and to promote export of hive products, which will in turn result in endogenous technological change and overall development of the sub-sector for the district.

#### 4.2. Value chain analysis of honey in Masha Woreda

Identification of honey value chain actors, their roles and mapping of honey value chain in Masha Woreda is assessed in this part. Inputs supply, production, processing, marketing and consumption are the main activities along the honey value chain in Masha Woreda.

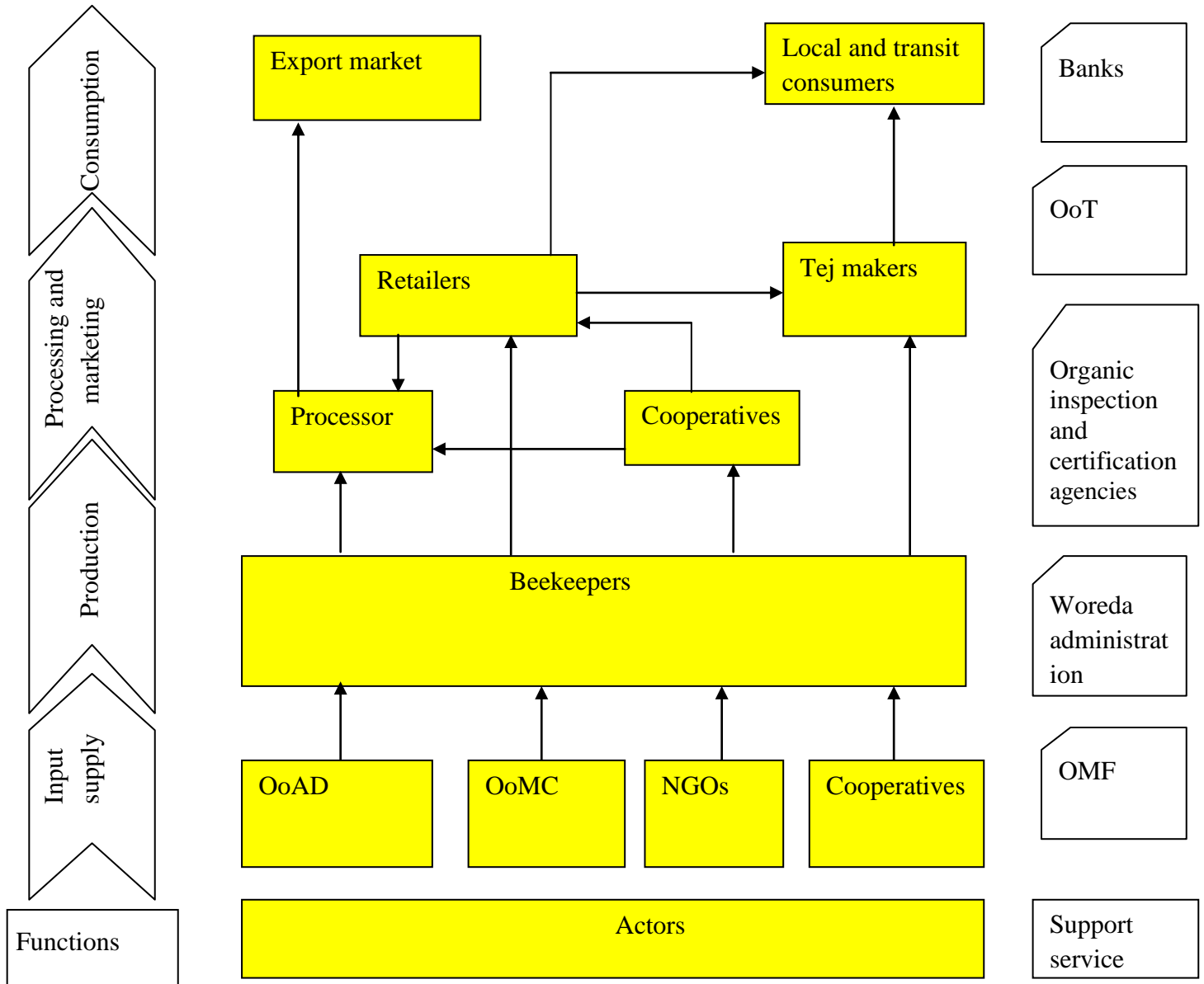


Fig.5. Honey value chain map

Source: Own sketch from survey result, 2015

#### **4.2.1. Chain actors and their roles**

There are major and support actors along the honey value chain in the study area. The major actors are actors those involve directly in the chain such as input suppliers, producers, cooperatives, retailers, tej brewers, processor and consumers. Support actors are actors those involve in the chain indirectly to provide different financial and non-financial supports such as government organizations (woreda agricultural development office, woreda marketing and cooperative office), nongovernmental organizations (MELCA Ethiopia, Beza mare and NTFP) and financial institutions (Omo microfinance and cooperatives).

#### **4.2.2. Honey value chain major actors**

##### **Input suppliers**

There are different inputs in honey value chain such as different types of beehives, beekeeping equipments, training and credit services are some of the input types supplied by different value chain support actors. There are governmental and nongovernmental organization involve in the value chain by providing different support services. Woreda agricultural development and woreda marketing and cooperative offices are the main actors by giving training; extension survives and linking the beekeepers with other donors to improve honey production in the study area. There are different NGOs involving in the honey sector in the Woreda such as MELCA Ethiopia association, Beza mare agro-industry, NTFP-PFM project and Sheka Nordic honey processing company. MELCA Ethiopia provide inputs like protective materials, modern beehives, honey extractor, honey presser, bee brush, kilograms and training for farmers on free base without any payment. NTFP-PFM projects mostly provide training to cooperative members and build office to cooperatives on free. Beza mar agro-industry is the only processor company involves in the woreda and provides training and honey containers for farmers to sustain honey production and quality for its foreign market by exporting to different countries especially to EU countries after processing in Adama. In addition Beza mar-agro industry enable to register around 500 beekeepers by BCS as organic honey producers and two cooperatives by ILO in fare trade in 2007 European calendar. Sheka Nordic project is a new company in the area starts in 2013 and this project is in the way to start the entire work but now the project starts beehive distribution to beekeepers.

## Producers

Individual beekeepers and cooperatives are the main producers of honey in the woreda. The higher proportion of the product comes from small-scale beekeepers, who sell to cooperatives, exporter, retailers and tej makers at the local market. The major functions that honey producers perform include beehive preparation, harvesting and post harvest handling. The diverse agro-climatic condition and large coverage of forest can make honey production highly cost effective and competitive. But beekeepers have not been used these opportunities because of very low adoption of modern beekeeping technologies and lack of different beekeeping materials. From the sample beekeepers only 21.7% beekeepers was used intermediate beehives with an average of 4 hives per household and 10.8% of beekeepers was used modern beehive with an average of 1.45 beehive per household. There are six cooperatives involves in honey production and marketing in study area.

Table 8. Honey producer and marketing cooperatives established by NGOs like MELCA Ethiopia and NTFP-PFM

Cooperative name	Kebele	Members		
		Men	Women	Total
Grawina	Beto	23	-	23
Gedaemi	Woloshoba	23	2	25
Wododinbarona	Woloshoba	30	20	50
Wondimamachoch	Chago	5	7	12
Mati ganity	Abelo	21	4	25
Yerishunity	Chago	31	20	51
Total		133	53	186

## Cooperatives

In Masha Woreda there were seven service cooperatives and they are widely involved in honey marketing by purchasing honey from their members and other non-member beekeepers. They purchase honey from member beekeepers in both cash and credit but they also purchase from non-member beekeepers only in cash. The major function performed by service cooperatives include buying of honey, semi processing, storing, member beekeepers get dividend after honey soled, out of seven service cooperatives two (Degele and Ganobay) cooperatives were registered by ILO in 2007 on fare trade though Beza mar company and they get 0.2 dollar premium price honey sold. This premium price used by the cooperatives for different development activities in the area.

Table 9. Service cooperatives in Masha Woreda

Cooperative name	Kebele	Members		
		Men	Women	Total
Ganobay	Keja	302	118	420
Degele	Degele	175	67	242
Techifo	Atteso	259	32	291
Girobay	Yina	163	57	220
Akaachi	Gatimo	300	20	320
Ganity	Abelo	176	77	253
Andinet	Atile	247	148	395



## **Retailers**

There are retailers in Masha Woreda who collect honey from small-scale farmers and cooperatives and sell it at the local market to consumers, tej houses and processor. They mostly buy from small-scale farmers. The retailers in this Woreda sell their honey with 2 to 3 additional birr to the farm gate price. Some of the retailers undertake semi processing manually before selling the honey to get 5- 10-birr price advantage and pack it with locally sold plastic vessels that hold 2 to 5 kilograms.

## **Processor (exporter)**

Semi processing is done at the farmers' level to be marketed at local market and supplied to the processor company located at Adama. Beza mar processing company is the only processor company in the woreda. The company has processing capacity of 200 tone of honey per year collected from individual farmers and cooperatives in Masha Woreda. The processor company at Adama exports all the processed honey to Europe.

## **Tej brewers**

One of the value additions on honey is Tej brewery that is to be prepared at household level for consumption or at local commercial level. Tej brewers obtain crude honey directly from the beekeepers, cooperatives and retailers at the local market. The Tej brewers sell a one-litter bottle of Tej at a price of 10Birr to the local consumers. In addition, the tej brewers get additional advantage from beeswax selling. They sell one kg of beeswax from 90-120 birr.

## **Consumers**

Honey consumed by the peoples in the woreda or transported to other woredas and zones. Honey is eaten alone or with bread but mostly taken in the form of beverage such as tej and birz in Masha Woreda. Both children's and old persons to get energy and heat eat honey.

### **4.2.3. Honey value chain service providers**

There are different governmental and nongovernmental organizations involving in honey sector by providing support services such as inputs, training and information access to honey producers in the study area.

#### **Governmental organizations**

Woreda agricultural development office and woreda marketing and cooperative office are the major governmental support services providers in the study area. Woreda agricultural development and woreda marketing and cooperative offices to beekeepers mainly provide training. From the result of the survey 30% participated in honey production, postharvest management and marketing in the last five years. Furthermore, sample farmers indicated that they had market information from woreda marketing and cooperative office, service cooperatives and by asking farmers each other.

#### **Financial services**

Omo micro finance, cooperatives and individual lenders are the main financial service providers to the beekeepers in the study area. From the sample respondents only 28.5% of sample respondents took credit. The main reason for most farmers not participating in credit was unavailability of credit agents and high interest payment especially to take credit from Omo micro finance institution. According to the beekeepers before getting the credit, it must be mandatory to save 20% of money in Omo microfinance, the interest payment is 8%, and it is very high to take the credit. Out of 42 credit got beekeepers 29 beekeepers took credit from cooperatives, 4 beekeepers from Omo micro finance, 5 beekeepers from traders and relatives and the remaining 4 beekeepers took credit more than one source.

#### **Nongovernmental organizations**

There were few NGOs in the study area those involve in honey sector. MELCA Ethiopia, Beza mar, NTFP-PFM project and Sheka Nordic processing industry are the major actors those involve in the honey sector by providing modern beehives, different beekeeping equipments, building office for cooperatives and training to the beekeepers. These NGOs work in collaboration with government offices. MELCA Ethiopia and NTFP-PFM projects mainly work

on forest preservation and sustainable use of non-timber forest products by participating elders in the society. Beza mar agro industry is the only honey and beeswax-processing company involve in the study area until 2005. This company involves different functions including collecting of honey from small-scale farmers, cooperatives and traders, giving honey containers and training to beekeepers and DAs and woreda experts on honey production, quality control and marketing. Through SNV and Beza Mar companies, around 500 beekeepers registered by BCS (Bio Control System) as organic honey producers and it is in the process to register additional beekeepers as organic honey producers.

### **Organic inspection and certification agencies**

In Ethiopia, there are few organic certification agencies that provide inspection and certification services for agricultural production, post-harvest handling, food processing and export. Bio Control Systems (BCS), Control Union Certification (CUC), Institute for Market Ecology (IMO) and Certification of Environmental standards (CERES) are the certification agencies that operate in Ethiopia. BCS inspects and certify certified organic honey production in Masha Woreda for both individual beekeepers and processor (Beza Mar Company).

#### **4.2.4. Value chain governance**

In the study area, Beza Mar is the only honey Processor Company. This company plays a dominant role regarding the price of honey. The result of the study indicates that the Beza Mar Company assisted by the cooperatives is the key value chain governor. Mostly, the relation between the actors is unorganized. 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 cooperatives and processor. Overall, the governance of the honey value chain is buyer driven with minimum trust between various actors. Processor is always complaining that the beekeepers are not providing quality product while beekeepers are blaming the processor for offering low prices. The beekeepers are not organized and are not governing the value chain. Hence, they are price takers.

### **4.3. Marketing channels and marketing margin distribution among honey value chain actors**

#### **4.3.1. Honey marketing channels**

A marketing channel consists of individuals and firms involved in the process of making a product or service available for use or consumption by consumers or industrial users (Berkowitz, 2011). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (Scott, 1995). During the survey there were seven honey marketing channels in the study area.

**Channel 1** Beekeepers – Retailers – Consumer (2055.9kg)

**Channel 2** Beekeepers – Retailers – Tej makers – Consumers (913.5kg)

**Channel 3** Beekeepers – Retailers – Processor – Export (1598.6kg)

**Channel 4** Beekeepers – Cooperatives – Retailers – Consumers (545.2kg)

**Channel 5** Beekeepers – Cooperatives – Processor – Export (6057.5kg)

**Channel 6** Beekeepers – Cooperatives – Tej makers – Consumers (807.7kg)

**Channel 7** Beekeepers – Tej makers – Consumers (9134.6kg)

**Channel 8** Beekeepers – Processor – Export (4025.5kg)

**Channel 9** Beekeepers – Cooperatives – Retailers – Processor – Export (424kg)

**Channel 10** Beekeepers – Cooperatives – Retailers – Tej makers – Consumers (242.3kg)

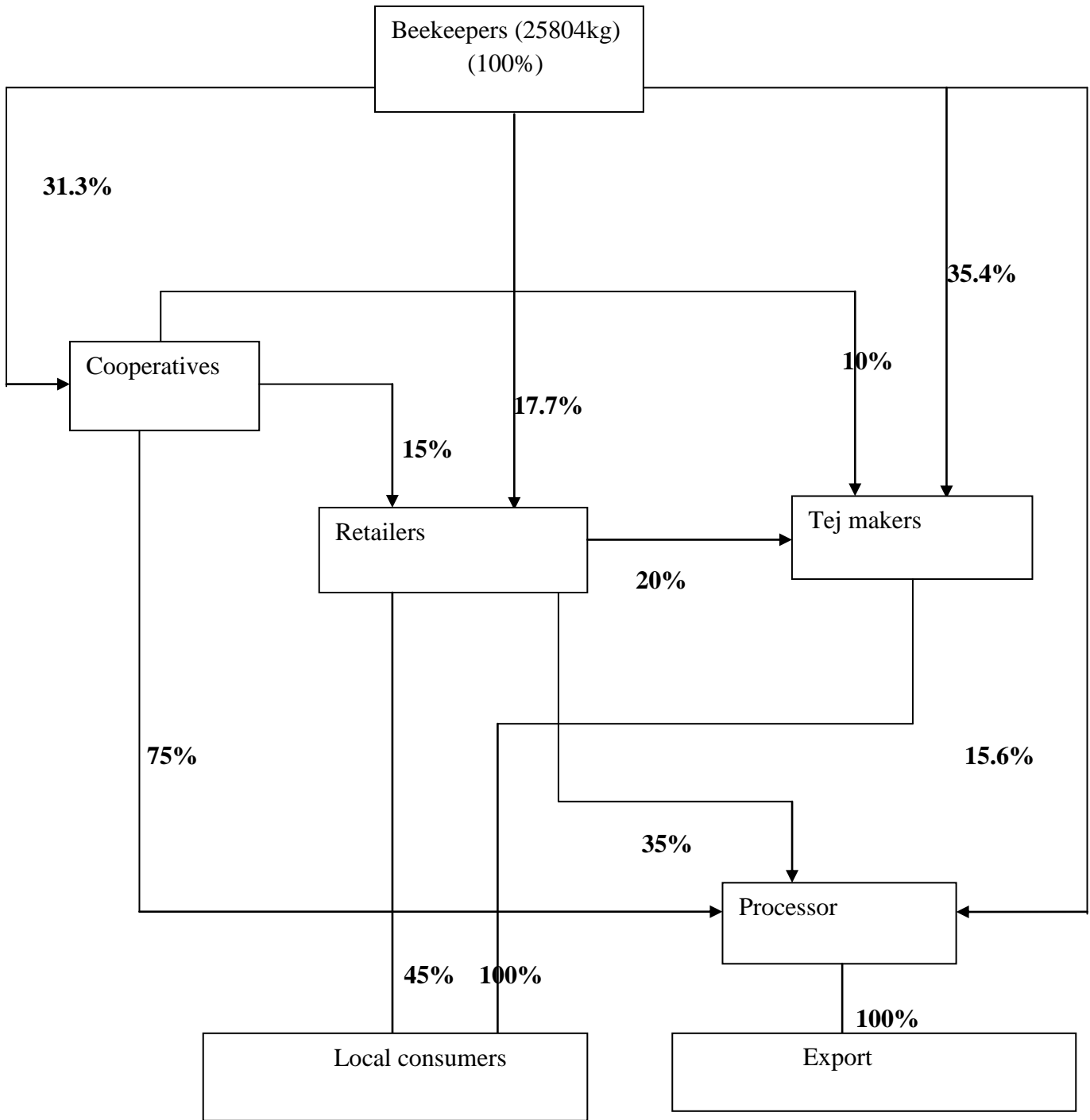


Fig.6.Honey marketing channel  
 Source: Own sketch from survey result, 2015

#### **4.3.2. Performance of the honey market**

To analyze the honey market performance marketing costs, benefits and marketing margins were taken into account for key marketing channels. Hence, on the consideration of 2013/14 production year, costs and purchase prices of the channel actors, margin at producers,' retailers,' cooperatives, tej makers and processor level was conducted.

Table 10. Marketing profit of actors in marketing channels

		Marketing channels									
Value chain actors		1	2	3	4	5	6	7	8	9	10
<b>Crude honey</b>											
Producers	purchase price										
	Production costs		8.6	8.6		8.6	8.6	8.6	8.6	8.6	8.6
	selling price		32.3	32.3		32.3	32.3	32.3	32.3	32.3	32.3
	profit		23.7	23.7		23.7	23.7	23.7	23.7	23.7	23.7
Cooperatives	purchase price					32.3	32.3			32.3	32.3
	marketing costs					0.4	0.4			0.4	0.4
	selling price					34	34			34	34
	profit					1.3	1.3			1.3	1.3
Retailers	purchase price		32.3	32.3						34	34
	marketing costs		2.05	2.05						2.05	2.05
	selling price		36	36						37	37
	profit		1.65	1.65						0.95	0.95
Tej makers	purchase price		36				34	32.3			37
	marketing costs		6.72				6.72	6.72			6.72
	selling price		50				50	50			50
	profit		7.28				9.28	10.98			6.28
Processor	purchase price			36		34			32.3	37	

	marketing costs		1.7		1.7		1.7	1.7
	selling price		71.64		71.64		71.64	71.64
	profit		33.94		35.94		37.64	32.94
	<b>Semi processed</b>							
Producers	purchase price							
	production costs	14.9	14.9	14.9	14.9		14.9	14.9
	selling price	41.3	41.3	41.3	41.3		41.3	41.3
	profit	26.4	26.4	26.4	26.4		26.4	26.4
Cooperatives	purchase price			41.3	41.3			41.3
	marketing costs			0.4	0.4			0.4
	selling price			44	46			44
	profit			2.3	4.3			2.3
Retailers	purchase price	41.3	41.3	41.3				41.3
	marketing costs	5.05	5.05	5.05				5.05
	selling price	55	55	55				55
	profit	8.65	8.65	8.65				8.65
Processor	purchase price		55		46		41.3	55
	marketing costs		1.7		1.7		1.7	1.7
	selling price		71.64		71.64		71.64	71.64
	profit		14.94		23.94		28.64	14.94

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Source: Own computation from survey result, 2015



#### **4.3.2. 1. Marketing margin analysis of honey along the value chain**

Marketing margin or price spread is a commonly used measure of the performance of a marketing system (Abbott and Makeham, 1990). It can be a useful descriptive statistics if used to show how the consumers' expenditure is divided among market participants at different levels of the marketing systems. It is defined as the difference between the price the consumer pays and the price that is obtained by producers, or as the price of a collection of marketing services, which is the outcome of the demand for and supply of such services.

Table 11. Marketing margins of actors in different marketing channel of honey

Marketing margin	Marketing channels									
	1	2	3	4	5	6	7	8	9	10
TGMM(ch)		35.4	54.9		54.9	35.4	35.4	54.9	54.9	35.4
TGMM(sh)	24.9		42.35	24.9	42.35			42.35	42.35	
GMMp(sh)	75		57.6	75	57.6				57.6	57.6
GMMp(ch)		64.6	45		45	64.6	64.6	45	45	64.6
GMMr(sh)	24.9		19	24.9					19	
GMMr(ch)		7.4	5.2						4.2	6
GMMc(sh)				4.9	6.5				3.8	
GMMc(ch)					2.4	3.4			2.4	3.4
GMMtm(ch)		28				32	35.4			26
GMMp(sh)			23.2		35.8			42.4	23.2	
GMMp(ch)			49.7		52.5			54.9	48.3	
NMMr(sh)	15.7		12	10.8					8.3	
NMMr(ch)		5.3	3.7						1.4	1.9
NMMc(sh)				4.9	3.2				3.2	
NMMc(ch)					1.8	2.6			1.8	2.6
NMMtm(ch)		12.5				18.5	21.9			12.5
NMMp(sh)			20.8		36.2			40	20.8	
NMMp(ch)			46		50			52.5	46	

As indicated in table 11 the total gross marketing margin (TGMM) is the highest in channel 3, 5, 8 and 9 for both crude and semi processed honey, which is about 54.9 % for crude honey and 42.35% for semi-processed honey. Producers have the highest gross marketing margin in channel 1 and 4 for semi-processed honey and in channel 2, 6, 7 and 10 for crude honey. Retailers have the highest gross marketing margin in channel 1 and 4 for semi-processed and in channel 2 for crude honey. Cooperatives have the highest gross marketing margin in channel 5 for semi-processed honey and in channel 6 and 10 for crude honey. Tej makers have the highest gross marketing margin in channel 7. Processor has the higher gross marketing margin in channel 8 for both semi-processed and crude honey. Retailers have the higher net marketing margin (NMM) in channel 1 and 2 for semi-processed and crude honey respectively. Cooperatives have the higher net marketing margin in channel 4 for semi-processed honey and on channel 6 and 10 for crude honey. Tej makers got the higher net marketing margin in channel 7. Processor got the higher net marketing margin in channel 8 for both semi- processed and crude honey.

#### **4.4. Analysis of the gender role at the farm level**

##### **4.4.1. Gender division of labor at the farm level**

Gender division of labor is socially determined ideas and practices, which define what roles and activities, are deemed appropriate for women and men. Women are invisible and underserved suppliers, buyers in many agricultural value chains (Mayoux 2010, Manfre 2010) .Women are generally expected to fulfill the reproductive role of bearing, and raising children, caring for other family members, and household management tasks, as well as home based production. Men tend to be more associated with productive roles, particularly paid work, and market production. As indicated in table 7 both man and women participate in different activities in the beekeeping sector. 56 (38.6%) females and 89 (61.4) males were interviewed for the gender related issues by leaving the tow female-headed households.

Table 12. Gender division of labor

Activities	Women (%)	Men (%)	$\chi^2$ -test
<b>Productive activities</b>			
• Hive preparation and hanging		100	
• Harvesting		100	
• Processing	45	55	6.65***
• Packaging	51.7	48.3	0.44
• Transporting	34.5	65.5	12.3***
• Selling	29.3	70.7	23***
<b>Reproductive activities</b>			
• Fetching water	87.9	12.1	60.25***
• Collecting firewood	68.9	31.1	18.66***
• Food preparation	100		
• Child care	91.4	8.6	95.1***

Source: Own computation from survey result, 2015

From the above table the participation of women in productive activities was less when we compare with men and the women participation was higher than men in reproductive activities were. Also as indicated in table 13 the decision making level of women's were less as compared with men's.

#### 4.4.2. Decision making level of men and women

Table13. Decision making level of men and women in honey production and marketing

Activities	Women (%)	Men (%)	$\chi^2$ -test
Deciding what, when and how to produce	25.8	74.2	33.1***
Deciding to whom and at what price to sell	17.2	82.8	67.2***
Deciding on the use of income from honey	39.5	60.5	12.9***

Source: Own computation from survey result, 2015

#### 4.4.3. Opportunities and challenges faced for women's to participate in honey production and marketing

##### Opportunities

The opportunities for both women and men to participate in honey production and marketing particularly for women's is the government attention and the presence of extension services at the kebeles level is a good opportunity for women to get information and participate equally with men. Awareness of women about the advantage of the value chains through different forums, trainings and field visits and equal access of credit to women are some of the opportunities for women to participate in beekeeping. The presence of FTCs (Farmers Training Centers) is also an opportunity for women and men farmers, which serve as centers of extension service and information due to their proximity.

## **Challenges**

Despite these opportunities, women faced different challenges that affect them from efficiently participating and benefiting from the beekeeping sector. These challenges are emanated from cultural influences, low economic capacity, and cumbersome nature of honey production and information gap between women. The specific challenges that affect women's participation in the value chain are the forest beekeeping practices that discourage the participation of women. Women also lack skill, efficiency and capacity due to their low participation in trainings, field visits and less access to radio and paper media and some inherited cultural perceptions about women's roles. Due to cultural influences and the workload at home, women have low mobility to get information and to use alternative markets. The workload of women as household heads, mothers and producers affects their efficiency in the beekeeping sector.

### **4.5. Econometric results**

#### **4.5.1. Tobit estimation result**

The Tobit model estimated results of the variables that are expected to determine the amount of value added honey is presented in Table 16. Out of 10 variables, 7 were found to significantly influence the intensity of honey value addition. Accordingly, perception of beekeepers towards the price of value added honey, HH adult equivalent, education level of the HH head, extension service, distance to the nearest market, membership in cooperative and credit access head significantly affected the intensity of honey value addition. The overall joint goodness of fit for the Tobit model parameter estimates is assessed based on the log likelihood ratio test. The null hypothesis for the log-likelihood ratio test is that all coefficients are jointly zero. The model chi-square tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the Tobit model is statistically significant at a probability of 1%. This shows that jointly the independent variables included in the Tobit model regression explain the intensity of honey value addition.

Table 14. Tobit estimation result

Tobit regression Number of obs = 147		LR chi2 (10) = 308.75		Prob > chi2 = 0.0000	
Log likelihood = 4.591073		Pseudo R2 = 1.0307			
Variables	Coef.	Std. Err.	dy/dx	Chang in probability	
Age of the HH head	-.652	-.225	-.602	-0.0012	
Perception of farmers towards price of value added honey	37.106***	11.154	37.197***	0.332***	
HH adult equivalent	4.455*	2.945	4.515*	0.0305*	
Extension service	32.568***	10.652	32.508***	0.319***	
Distance to the nearest market	-5.606***	3.951	5.686***	-0.0761***	
Membership in cooperative	49.896***	12.865	49.806	0.402***	
Information access	4.746	2.828	4.706	0.0276	
Credit access	17.830*	10.983	17.601*	0.162*	
Training access	-13.979	10.635	-12.970	-0.130	
Education level of the HH head	19.568**	10.565	18.592**	0.121**	
_cons	-99.527	18.506			

\*\*\* refers significance at 1%, \*\*, significance at 5% and \*significance at 10%

**Perception of farmers towards price of value added honey (priceatrv):** The perception of an individual towards the price of value added honey is factor, which affect the intensity of value added honey positively and significant at 1%. The positive perception of an individual towards the price of value added honey increase the intensity of value addition by 37.2kg. The positive perception of an individual towards the price of value added honey increase the probability of value addition participation by 33%.

**HH adult equivalent (adult):** HH adult equivalent affect the intensity of honey value addition positively and significant at 10%. If the HH adult equivalent increase by one the amount of value added honey increased by 4.5kg. An increase of HH adult equivalent by one increases the probability of value addition participation by 3%.

**Extension service (ext):** extension service affect the intensity of honey value addition positively and significant at 1%. If the HH got an extension, service the amount of value added honey increased by 32.5kg. Access to extension service increase the probability of value addition participation by 32%.

**Distance to the nearest market (dist):** distance to market is also another factor which affect the amount of value added honey negatively and significant at 1%. If the distance to the nearest market increased by one km the intensity of value added honey decreased by 5.7kg. An increase of distance to the nearest market by one km decreases the probability of value addition participation by 7.6%.

**Cooperative membership (coop):** Group membership positively contributes to the extent of value addition and significant at 1% and this can be explained by the fact that individuals in groups are easily influenced by their associates than those in isolation. They get to exchange ideas and learn about the benefits of value addition and are thus willing to take the extra step of adding value to more of their honey. Members of groups also receive training on diverse issues among them value addition and are therefore willing to take up value addition. The membership of an individual in the cooperative increase the intensity of value added honey by 49.8kg. Cooperative membership of household head increases the probability of value addition participation by 40%. This is in line with Risper (2009) who found the membership of cooperative increased the intensity of honey value addition.

**Credit access (credit):** access to credit affect the amount of value added honey positively and significant at 10%. If the HH had an access to credit, the intensity of value added honey increased by 17.6kg. Access to credit increase the probability of value addition participation by 16%.

**Education level (edu):** As hypothesized the marginal regression coefficient of education level of the household head affect the intensity of value addition positively and significant at 1% significance level. If the household head got the formal education, the amount of value added honey increased by 18.5kg. The education level of the household head increased the probability of value addition participation by 12%. This is explained by the fact that the literacy of an



individual determines the readiness to accept new ideas and innovations and enhances an individual willingness to produce more and participate in value addition.

#### 4.5.2. Determinants of market outlet choice

Table 15. Coefficient estimates of the multivariate probit model (standard errors in parenthesis).

Variables	(1) tej makers	(2) cooperatives	(3) traders	(4) processor
age	0.00957*** (1.0208)	0.00704 (0.0172)	0.0109 (0.0159)	-0.00209 (0.0171)
adueqva	0.193 (0.116)	0.283** (0.130)	-0.0625 (0.102)	-0.0244 (0.101)
edleve	-0.390** (0.190)	0.264** (0.159)	0.115** (0.137)	0.160* (0.143)
ext	-0.808*** (0.642)	0.852*** (0.529)	0.356** (0.504)	0.255 (0.538)
dista	-0.133 (0.168)	0.0245 (0.143)	-0.142 (0.129)	-0.141** (0.137)
coop	-0.164 (0.619)	0.542*** (0.931)	0.00816 (0.552)	0.570 (0.537)
info	-0.0329** (0.681)	0.739*** (0.673)	0.0784** (0.631)	0.337** (0.645)
credit	-0.269 (0.559)	0.476** (0.634)	-0.230 (0.553)	0.144 (0.548)
training	-0.523 (0.599)	-0.416 (0.535)	0.316 (0.516)	-0.420 (0.569)
mode	0.0589** (0.205)	-0.387* (0.204)	0.0275* (0.185)	0.149** (0.187)
Constant	2.821** (1.333)	-1.462 (1.127)	-0.217 (0.968)	-0.838 (1.054)
Log pseudo likelihood= -286.313				
Correlation coefficient	$\rho_{21}= 0.0445^{***}$ $\rho_{31}= -0.165^{***}$ $\rho_{41}= 0.133$			
	$\rho_{32}= 0.295^{**}$ $\rho_{42}= -0.009^{**}$			
	$\rho_{43}=0.367$			

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Result showed that age of the HH head affect the tej maker outlet choice positively and significant at 1%. As the age of the household head increases, they tended to produce and sell more unprocessed (crude honey) to the tej makers.

HH adult equivalent affect the cooperative outlet choice positively and significant at 5%. Adults have an access to market information and knowledge about the use of cooperative through training and different social networks than old peoples.

The education level result indicates that, literate household's sale their honey to cooperatives, traders and processor outlets because literate HHs can get market information easily than illiterate HH and they can understand the market outlets needs regarding the type of their honey(processed or crude honey).

Extension access result indicate that those HHs who have an access of extension service sale their honey to cooperative and trader market outlets because they can get market information from the DAs. On the other hand the HHs, those who do not have an extension access sale their honey to the tej maker market outlet.

Membership in cooperative has positive effect on cooperative market outlet choice. The HHs who is cooperative membership is expected to get information and training through their cooperative and supposed to sell honey for cooperative rather than selling to other market outlets.

Information access affects the cooperative, trader and processor market outlets positively and the tej maker outlet negatively. Through their cooperatives, farmers get market information of different outlets such as the purchasing price and the kind of honey needs.

Credit access affects the cooperative outlet positively. Farmers who are a cooperative member can get credit from heir cooperative and they sale their honey to their cooperative to get dividend and price premium.

Mode of sale is another factor that affect the tej maker, trader and processor outlets positively and cooperative outlet negatively. In the study area farmers sale their honey both in cash and credit. Mostly cooperatives purchase honey in credit from their members and in cash from non-members. Some farmers choose other outlets than their cooperatives to sale honey for their argent needs.

Regarding the correlation coefficients, there was a significant correlation between cooperative and tej maker outlets, trader and tej maker outlets, trader and cooperative, processor and cooperative outlets.

## **5. SUMMARY, CONCLUSION AND RECOMMENDATION**

### **5.1. Summary and conclusion**

The study was conducted with the objective of analyzing the value chain of honey in Masha Woreda of SSNPR. Honey has been identified in the Woreda as a major cash income-generating commodity. Honey in the Woreda is important market-oriented commodity. Masha Woreda has high potential for honey production. The specific objective of the study include analyzing honey value chain and profit margin distribution along the value chain; analyzing the factors that affect farmers value addition decision and level of participation; analyzing the role of gender in honey value chain and identifying factors determining the market outlet choices of honey producers. The data were gathered from both primary and secondary sources. The primary data were collected from individual interview using pre- tested semi- structured questionnaires. This was supplemented by secondary data collected from different published sources. A total of 147- beekeeper farmer respondent's were selected randomly from 3 Pas in the district. In addition, 15 honey traders, 13cooperatives, 15 tej makers and 20 consumers were also interviewed. The analysis was made with the help of descriptive and econometric model using software. From the 147 households 145 were male headed and 2 were female-headed households. The average age of the sample, respondents were 44.6 years. The average experience was 16 years and the average adult equivalent was 4.8.

As a result, the main value chain actors are input suppliers, honey producer beekeepers, cooperatives, retailers, tej makers and processor. There were governmental and nongovernmental supportive actors who support the honey value chain in the study area directly and indirectly. The main supporters of the honey value chain in the study areas are office of agricultural and rural development (OoARD), Office of trade and industry (OoTI), office of marketing and cooperative (OoMC), Woreda administrations, Omo micro-finance, MELCA Ethiopia, NTFP project and Beza mar honey processing company.

There are different constraints in the honey value chain both at the farm level and at the marketing side. In the farm level beekeepers, face different constraints including Very low adoption of improved technologies, lack of beekeeping equipments, Honeybee enemies, lack of training and credit access, absence of diversification of bee and lack of market information. On

the marketing side, the constraints include limited access to market, low price of product, lack of storage, lack of transport and lack of market information.

Both women and men in Masha district participate in beekeeping. The result showed that the women participation is less in productive activities and decision making than men and women participation is high in reproductive activities than men. The major challenges of women's participation in honey production and marketing include cultural influences, low economic capacity, cumbersome nature of honey production and workload.

The main factors that affect the participation of honey value addition and the intensity of participation were analyzed by using Tobit model. Perception of beekeepers towards the price of value added honey, HH adult equivalent, extension service, Cooperative membership of the household head, credit access and education level of the household head are the most important and significant variables influencing the intensity of value added honey positively. However, distance to the nearest market affect the intensity of honey value addition negatively.

The main factors that affect the beekeepers market outlet choice were analyzed by using multivariate probit (MVP) model. The results suggest that farmers' personal characteristics influence their choice, and that more educated and skilled farmers are less likely to choose tej maker outlet and more likely to choose cooperative, trader and processor market outlet. The other personal factor is the age of the HH head the older the HH head choose the tej maker outlet than the other outlets. In addition, the higher in terms of adult equivalent in the HH choose the cooperative outlet. The other determinant of the choice is the access of extension service, the HHs who has an extension service are more likely to choose the cooperative and trader market outlet and less likely to choose the tej maker outlet. If the farmers are far from the market, the likelihood of choosing the processor market outlet is less. Cooperative members HHs are more likely to choose the cooperative outlet. Access to information is other determinant of the market outlet choice, the HHs who has an information access are more likely to choose the cooperative, trader and processor outlets and less likely to choose the tej maker outlet. The HHs who has credit access is more likely to choose the cooperative outlet. Mode of honey sale is the other determinant of market outlet choice, if the mode of sale is in cash base the HHs are more likely to choose the tej maker, trader and processor outlet and less likely to choose cooperative outlet.

## **5.2. Recommendation**

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

The intervention of both governmental and non-governmental organizations is needed to improve honey value chain in the study area. To increase the production as well as the honey value addition and women's participation in the honey sector modern beekeeping technologies 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, market and market information access is needed to improve the existing honey value chain in the study area.

The results of econometric analysis (Tobit model) indicate that honey value addition and extent of participation is significantly affected by membership in cooperative (positively), the perception of beekeepers towards price of value added honey (positively), and extension service (positively), credit access (positively), education level of the household head (positively) and distance to the nearest market (negatively). Therefore, these factors must be promoted in order to increase the participation of farmers in honey value addition as well as the level of participation.

In order to improve the beekeepers value addition participation cooperatives play an important role. The beekeepers in the cooperatives have a collective effort to produce more and participate in value addition largely, they have an access to credit, market information and training on honey value addition through their cooperative and they have better access to modern technologies. Therefore, policies that would improve farmer's cooperatives are needed. The Woreda marketing and cooperative office is the major institution working at the Kebele level. To obtain this advantage there is a need to improve the Kebele level cooperative DAs system, and technical supervision and follow up must be strong. Strengthening of cooperatives is necessary. In addition, it is necessary to provide information and enhance the knowledge and skills of farmer's cooperatives and other institutional changes ought to be made.

The price of value added (semi-processed) honey in Mash Woreda is also one factor that affects the honey value addition positively. To improve farmers participation in honey value addition the price setting strategy of value added honey need intervention by both governmental and non-governmental institutions. Beza mar honey processing company is the only processor company in the study area. To obtain this advantage there is a need to improve the price setting strategy for value added honey by the company.

Access to extension service is another factor that affects the intensity of honey vale addition positively. To improve farmer's participation in honey value addition government must give special attention to honey value addition extension services by strengthening the existing extension service system.

The result of the MVP model indicates that the farmer's market outlet choice was affected by different factors such as membership in cooperative, extension service, credit access and information access. Therefore, these factors must be promoted by developing beekeepers awareness about the use of cooperative membership. In addition, government must give special attention to financial institutions and extension service access.

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## **7. APPENDICES**

## Appendix A. Tables

Appendix table 1. The contribution of different sources to total annual household cash inflow (ETB).

Means of income	Beto	Keja	Uwa
Honey	5760	5440	5504
Animal production	1500	2800	2000
Crop production	850	1500	1000

Appendix table 2. Marketing costs for different actors along the value chain (ETB/kg)

Cost items	Producers		Tej makers	Cooperatives	Retailers		Processor
	Crude	Semi processed			Crude	Semi processed	
Labor cost	3.94	8.8	0.7	0.1	0.1	0.6	0.1
Material cost	3.76	5.2	6	0.1	0.3	2.8	0.3
Retail shop rent					1.5	1.5	
Transport expense	0.9	0.9		0.2			1.2
Tax			0.02		0.15	0.15	0.1
Over head cost							
Total cost	8.6	14.9	6.72	0.4	2.05	5.05	1.7

Appendix table 3. Mfx result for Tobit estimation

	dy/dx	Std. Err.	z	P>z	[95% Conf.Interval]	
age	-.9020155	.4068779	-2.22	0.027	-1.699481	-.1045495
priceatrv	32.19631	8.00178	4.02	0.000	16.51311	47.87951
adueqva	2.013641	1.602777	1.26	0.209	-1.127744	5.155025
exp	.1827488	.6072495	0.30	0.763	-1.007438	1.372936
ext	2.092025	8.881036	0.24	0.814	-15.31449	19.49854
quaharv	.4384304	.0482568	9.09	0.000	.3438488	.5330119
dista	1.290371	2.120492	0.61	0.543	-2.865718	5.44646
coop	64.19434	11.83809	5.42	0.000	40.99212	87.39657
info	11.41315	11.22423	1.02	0.309	-10.58593	33.41223
credit	13.60146	9.262256	1.47	0.142	-4.552228	31.75515
training	-12.27007	9.67535	-1.27	0.205	-31.23341	6.693267
edu	18.29267	10.01823	1.83	0.046	-1.342709	37.92804

Appendix table 4. Heteroscedasticity test

Cameron & Trivedi's decomposition of IM-test (estatimtest)

Source	chi2	df	p
Heteroscedasticity	108.29	106	0.4200
Skewness	15.43	15	0.4212
Kurtosis	9.99	1	0.0016
Total	133.70	122	0.2210



Appendix table 5. Variance inflation factor

VIF when all explanatory variables are together			VIF for all continuous variables only		
Variable	VIF	1/VIF	Variable	VIF	1/VIF
age	7.18	0.139315	age	5.12	0.195446
priceatrv	6.33	0.157886	adueqva	4.92	0.203081
ext	5.26	0.189968	dista	2.49	0.400937
dista	4.72	0.211815			
coop	4.57	0.218618			
info	4.38	0.228475			
credit	4.01	0.249202			
training	3.86	0.258825			
edu	3.51	0.285003			

Appendix table 6. Contingency coefficients for the discrete variables in the Tobit model

	edu	priceatrv	ext	info	coop	credit	Training
edu	1.0000						
priceatrv	0.5291	1.0000					
ext	0.6204	0.6363	1.0000				
info	0.5934	0.6022	0.6320	1.0000			
coop	0.6251	0.5227	0.6088	0.6412	1.0000		
credit	0.5679	0.6332	0.5702	0.5580	0.6121	1.0000	
training	0.6382	0.6500	0.6243	0.6487	0.6190	0.5528	1.0000

## Appendix B. Interview schedules

### Instructions for Enumerators:

- Introduce yourself before starting the interview. Tell the respondents politely from where you came and the purpose of the study.
- Please fill the interview schedule according to the farmers reply (do not put your own feeling).
- Write answers on the space provided.

#### 1. GENERAL

1.1. Name of respondent.....

1.2. Region..... 1.3. Zone

.....1.4wereda.....

1.5. PA/kebele.....1.6. Village.....1.7.

Sex.....Age.....

House hold characteristics

1.1. Name of the house hold head.....

1.2. Number of years lived in the area.....

1.3. Religion of household 1.orthodox 2. Muslim 3.Protestant 4.Catholic 5. Others specify

1.4. Age of the house hold.....

1.5. Marital status: 1. Married 2. Single 3.Widowed 4. Divorced

1.6. Education level of house hold:

1. Illiterate 2. Literate

1.7. Position of house hold head in the community

1. Political leader 2. Spiritual leader 3. Elder 4 other specify

1.8. Family size and educational level of the family members

No	name	relation	sex		age	level of education
			female	male		
1						
2						
3						
4						

1. Illiterate, 2. Literate

1.9. Do you / your family involve in any off-farm activities? 1. Yes \_\_\_ 2. No\_\_\_

1.9.1. If yes, what type of off-farm activities you/ your family involved?

NO	types of off-farm activities	family member	contribution to the livelihood		
			ETB	grains	others
1					
2					
3					
4					
5					

**2. Beekeeping Activities and Potentials**

**2.1. Honeybee ownership**

2.1.1. Do you keep honeybees? 1. Yes \_\_\_\_\_ 2. No\_\_\_\_\_

2.1.2. If yes, when did you start beekeeping? \_\_\_\_\_year (s).

2.1.3. How many honeybee colonies you owned?

No	year	Traditional		intermediate		movable-frame	
		No	Product	No	product	No	product
1	2002						
2	2003						
3	2004						
4	2005						
5	2006						

Total production of honey (kilograms)

2.1.4. Which type of hive you owned?

2.1.4.1. How much the productivity of each hives?

1. Traditional

2. Transitional

3. Modern

2.1.5. Where did you keep your bee colonies?

No	Site or placement of hive	traditional	intermediate	movable-frame
1	Backyard			
2	Under the eaves of the house			
4	Hanging on trees near homestead			
5	Hanging on trees in forests			
	Others (specify)			

2.1.6. Do you have empty beehives? 1. Yes 2. No

2.1.7. If yes, list the number of empty hives you have.

	Types of beehives	Numbers	Reasons
1	Traditional		
2	Intermediate		
3	Movable-frame		

2.1.8. What is the trend of your colony number and honey yield?

	Types of beehives	Numbers of harvest	increase	decrease	stable
1	Traditional				
2	Intermediate				
3	Movable-frame				

2.1.9. Do you use agrochemicals/chemicals in your locality? 1. Yes \_\_\_\_ 2. No\_\_

2.1.10. If yes, why do you apply agrochemicals/chemicals?

1. Crop pest's control 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

2. Weeds control 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

3. Malaria control 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

5. Others (specify):

2.1.11. What are the major advantages of your beehives?

	Variables	Traditional		Intermediate		Movable-frame	
		Yes	No	Yes	No	Yes	No
1	Material availability						
2	Suitability to harvest						
3	Quality of honey						
4	Temperature maintenance						
5	More swarming frequency						
6	Convenience to construct						
7	Durability						
8	Cost effective						
9	To get more colony through colony split						
10	Less dependent on external input /accessories/ Others (specify)						

2.1.11.1. Based on the above comparisons parameter which hive is the best of you?

1. Traditional      2. Transitional      3. Modern

2.1.12. What are the major limitations of the beehives?

1. Traditional      2. Transitional      3. Modern

2.1.13. What are the sources and costs of the beehives you used?

No	Items	Traditional	Intermediate	Movable-frame
1	Constructed by himself/herself			
2	Constructed locally and bought			
3	Bought from market			
4	Supplied by governments			
	On credit basis <input type="checkbox"/>			
	Free of charge <input type="checkbox"/>			
5	Supplied by NGO's			
	On credit basis <input type="checkbox"/>			
	Free of charge <input type="checkbox"/>			
6	Price of one hive (ETB)			
7	Service time (years)			

2.1.14. What are the labor requirements for honeybee production systems?

No	Activities	performed by	No of days required/hive	estimated cost
1	Hive construction			
2	Harvesting			
3	Processing of products			
4	Sale of bee products			
5	Others			

### 3. Beekeeping equipments and protective materials

3.1. Which of the following beekeeping equipments and protective materials you have or available to you when ever required?

NO	Materials	Home Made	Locally made and purchased	Provide on credit (Purchased)	Donated by GO or NGO's	Price(ETB)		Service period (Years)
						Rent	Purchase	
1	Hives							
2	Smoker							
3	Gloves							
4	Boots							
5	Knife							
6	Honey presser							
7	Honey extractor							
8	Honey strainer							
9	Honey container							
	Others							

3.2. What kind of beehive products you produce?

No	Attractant Materials	Traditional	Intermediate	Movable-Frame	Honey Hunting
1	Honey				
2	Crude beeswax				
3	Propolis				
4	Others, specify				



3.3. List the amount of your beehive products and frequency of harvest per annum.

No	Types of beehives	Honey production		Crude beeswax		Propolis	
		Kg	frequency	kg	frequency	kg	frequency
1	Traditional						
2	Intermediate						
3	Movable-frame						
4	Honey hunting						

3.4. List the home use of honey.

1. as a food
2. as a medicine
3. for beverages
4. for cultural and ritual ceremonies
5. Others (specify):

3.5. Do you strain (semi process) your honey? 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

3.5.1. If yes, what materials do you use for straining?

1. Honey extractor
2. Honey presser
3. Cloth
4. Sieve
5. Decantation
6. Using hand

3.6. If you strain, what is the advantage and price of 1 kg strained honey?

3.14.1. Advantage: \_\_\_\_\_

3.14.2. Price of 1 kg strained honey: \_\_\_\_\_ ETB

3.7. If you don't strain your honey why? (Circle one or more).

1. Lack of materials

2. Lack of knowledge how to strain
3. Consumer do not prefer strained honey
4. The amount of honey will be reduced if strained
5. Others specify: \_\_\_\_\_

3.8. For how long do you store your honey? (Circle one or more).

1. I don't store, I will sale / it will be consumed during harvesting
2. One to six months
3. Seven to twelve months
4. One year to two years
5. More than two years

3.9. For what reason do you store honey? \_\_\_\_\_

3.10. What is the maximum storage year of your honey? \_\_\_\_\_ Years.

3.11. List the container you have been used to store your honey, price, service years

In addition, problems you have been encounter.

No	Types of container used	Price(Birr)	Service(years)	Problems observed by using it
1	Gourd			
2	Earthen pots			
3	Tin			
4	Plastic container			
5	Animal skin and hide			

#### 4. Marketing Condition

4.1. Do you sale your honey? 1. Yes 2. No

Year	Type of product	Amount produced	Amount consumed	Amount sold	To whom do you sell 1.trader 2.cooperative 3.Tej houses 4.processor 5.consumers 6.other	Reason for the preferred seller 1.better price 2.better scale (purchase in large quantity) 3.Proximity 4.Other	Place of sale 1.in your home 2.nearby market place 3.Beekeepers cooperatives 4.Other (specify)	Market distance from your home
	Honey							
2002								
2003								
2004								
2005								
2006								

4.2. What are the factors that govern the price of the honey in your locality?

- |                                  |                          |
|----------------------------------|--------------------------|
| 1. Seasons of the year           | 1. Yes _____ 2. No _____ |
| 2. Colour and taste of the honey | 1. Yes _____ 2. No _____ |
| 3. Distance from market          | 1. Yes _____ 2. No _____ |
| 4. Traditional ceremonies        | 1. Yes _____ 2. No _____ |
| 5. Others (specify): _____       |                          |

4.3. During this harvesting season what is the price of 1 kg of honey and beeswax?

No	Colour of honey	Price of honey (Birr/kg) produced from:		
		Traditional hive	Intermediate hive	Movable-frame hive
1	White			
3	Red			
5	Mixed			

4.4. Who are your customers?

1. 'Tej' houses
2. Middlemen
3. Retailers
4. Wholesalers
5. Consumers
6. Processers
7. Beekeepers co-operative
8. Others /specify/ .....

4.5. How do you evaluate the local market price? 1. High\_\_\_2. Medium\_\_\_3. Low\_

4.6. How is the price trend of honey in your locality?

No	Price trend	Reason
1	Increase	
2	Stable	
3	Decrease	
4	Fluctuate	

4.7. How did you fix the price of honey?

1. Consideration labour and other cost incurred
2. Market force (supply and demand)
3. Colour of honey
4. Table honey and crude honey
5. Customs and Traditional ceremonies
6. Others (specify\_\_\_\_\_)

4.8. Who set the price of the products?

1. by seller will only
2. by buyers will only
3. by the existing market
4. Contractual agreement
5. Other

4.9. Did you get information on time? A/ yes B/ no

4.9.1. What type of information did you get? A/ Price information B/ Market place information  
C/ Buyers' information D/ Other (specify)

4.9.2. At what time interval do you get the information?

A/ Daily B/Weekly C/ Monthly D/ Other (specify)

4.9.3. Was the information you get is valuable? A/ Yes B/ No

4.10. What is the demand of honey in the market?

1. Very high 2. High 3. Medium 4. Low 5. Very low

4.11. What is the supply of honey in the market?

1. Excess 2. Enough 3. Not enough

4.12. Who participates more in the activities listed below?

No	Activities	Women	Men	Both
1	Hive construction			
2	Harvesting			
3	Processing			
4	Packaging			
5	Selling			

4.12.1. Out of your family members, who is responsible for honey marketing?

4.12.2. Who is controlling the many? Why?

4.13. How did you transport the honey if you are selling in the market?

1. Containers a. same

4.14. What is the level of marketing costs incurred?

Type of products	Transport cost	Processing cost	Storage cost	Loading and unloading cost
honey				
beeswax				

## 5. Constraints of beekeeping

5.1. What are the major constraints of beekeeping in the area? (Rank them)

No	Constraints	Rank
1	Bee hives	
2	Beekeeping equipments / materials	
3	Honeybee colony	
4	Absconding	
5	Pests and predators	
6	Diseases	
7	Pesticides and herbicides application	
8	Death of colony	
9	Migration	
10	Storage facilities	
11	Marketing	
12	Others (specify)	

5.2. Is beekeeping profitable to the area? 1. Yes 2. No

5.3. Do you participate in beekeeping extension packages? 1. Yes 2.No

5.4. Do you get beekeeping training? 1. Yes 2. No

5.4.1. If your response is yes:

No	place of the training	duration	organized by
1			
2			

5.4.2. If your response for question 8.4 is no, do you need beekeeping training?

1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

**6. Credit Sources and Availability**

6.1. Do you ever-obtained credit for your farming operations? 1. Yes \_\_\_ 2. No \_\_\_

6.1.1. If yes, for what purposes you get credit? \_\_\_\_\_

6.2. Who are / were your sources of credits? (Circle one or more).

1. Micro finance institutions (name it): \_\_\_\_\_

2. Service cooperatives      5. Relatives

3. Ministry of Agriculture      6. Individual lenders

4. NGO      7. Others, specify: \_\_\_\_\_

6.3. Do you receive credits for your farming activities during this cropping season?

1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

6.3.1. If yes, for what activities you are using the credit?

6.4. What are the major problems you face to get input on credit?

1. Inaccessibility of credit agents      1. Yes \_\_\_\_\_      2. No. \_\_\_\_\_

2. Debit collection problem      1. Yes \_\_\_\_\_      2. No. \_\_\_\_\_

3. High interest rate      1. Yes \_\_\_\_\_      2. No. \_\_\_\_\_

4. Unavailability of credit      1. Yes \_\_\_\_\_      2. No. \_\_\_\_\_

5. Others specify:



## 7. Trader information

7.1. What is your role?

A/Retailer      B/ wholesaler      C/ processor

7.2. To which market you participate? A/village      c/local      B/ central      d / export

7.3. Who is your supplier? A/farmer      b/ collector      c/ own farm      d/other (specify).

7.3.1. Why have you preferred the mentioned supplier? A/better quality, B/high supply      C/ shortest distance D/ other specify\_\_\_\_\_

7.4. Is obtaining sufficient volume is a problem?      A/ Yes      B/ No

7.5. Have you ever stopped purchasing due to lack of supply? A/ Yes      B/ No

7.6. To whom do you sell most of your honey and beeswax? A/Retailer      b/ wholesaler

C/ consumer      d/ processor e/ export

7.7. What is your source of working capital?

A/ Own      B/ Loan      C/ Gift      D/Share      E/Others      6.7.1.

7.7.1. If it was loan, from whom did you borrow? A/Relative/family B/ Private Money

lenders/ NGO (specify)      D/Friend      E/Other

F/ Micro finance institution      G/Bank      H/Others

7.7.2. How much was the rate of interest? \_\_\_\_\_ Birr for formal, birr for informal

7.7.3. How was the repayment schedule? A/Monthly B/Quarterly C/ Semi-annually D/ when you get money      E/ other specify

7.8. Do you carry out any physical treatment to maintain product quality? A/ Yes      B/ No

7.8.1. If your answer yes, mention

7.8.2. Do you add any value before sealing the product?

## **8. Cooperative information**

- 8.1. May you produce; honey on behave of your organization or bought from other?
- 8.2. From whom you have collected honey?
- 8.3. At what price you bought per kg?
- 8.4. Have you mostly buy honey and beeswax in contractual agreement or not?
- 8.8. What type of honey you collected?
- 8.9. After you collect honey what value adding activities you have done on it?
- 8.10. To whom you sell the honey? At what price per kg?

## **9. Consumer information**

- 9.1. Do you consume honey? A. Yes B. No
  - 9.1.1. If your answer is “Yes”, how much do you spent for consumption? .....Birr
  - 9.1.2. If your answer is “No”, what are the reasons...?
- 9.2. Is honey product available for you in the market at any time?
  - A. Yes B. No
  - 9.2.1. If your answer “Yes”, what about the price and the quality of the product...
  - 9.2.2. If your answer is “No”, what are the reasons...?
- 9.3. From whom did you buy the honey?
  - 1. Farmer 2. Wholesaler 3. Retailer 4. Collector 5.Cooperatives

**10. Checklist for Key Informants Interview**

- 1. Name of the organization: \_\_\_\_\_
- 2. Role of the interviewee in the organization:
- 3. Location and contact information: Region/Zone/Woreda/ Kebele/ P.O.Box/telephone
- 4. Type of the organization: public/private/NGO.
- 5. Organizational mission, vision and objectives
- 6. What is the role of your organization in honey value chain in the study area?
- 7. What are the challenges and opportunities you faced in undertaking those roles assigned to your organization?

Linkage /interaction/ partnership/ coordination between actors

Complier name

.....signature.....date.....

Duration time starting time..... Ending time.....