



**DILLA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**HONEY MARKETING PERFORMANCE: THE CASE OF ANNA SORRA
DISTRICT OF GUJII ZONE, OROMIYA NATIONAL REGIONAL STATE,
ETHIOPIA**

M.Sc. THESIS

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**Honey Marketing Performance: The Case of Anna Sorra District of Gujii
Zone, Oromiya National Regional State, Ethiopia**

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DEDICATION

I dedicated this thesis to my beloved wife Birhane Dekama and my children Arditu, Zaziwe, Burkitu, Hayu, and my Mother Didu Gumi and my brothers and sisters for all their support during my academic study and research work.

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my solely work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for M.Sc. Degree at the Dilla University and is deposited at the University Library to be available to borrowers under rules of the library. I seriously declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate. Brief quotations from this thesis are allowable without special permission provided that accurate acknowledgement of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the School of Graduate Studies when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

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BIOGRAPHICAL SKETCH

The author was born on Oct 13, 1980 in Kilenso Babicho kebele, Ana Sora Woreda, Guji zone, Oromiya National Regional State, Ethiopia. He attended his elementary and secondary education in Badessa Chisa Katolic Cherch Elementary School, Bore and Adola High schools and preparatory school, respectively. After completing his secondary education, he joined Asella Agricultural Technique and Vocational Education and Training College in 2003 and graduated with Diploma in Plant Science in 2005. Then he served as FTC trainer until he joined Ambo University to pursue his further study in 2009 and graduated with B.Sc. degree in Plant Science in 2011. After graduation, he joined the school of Graduate Studies of the Dilla University in 2015 to pursue his M.Sc. study in the Department of Agricultural Economics.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
ASWADO	Ana Sora Woreda Agriculture Office
BCR	Benefit Cost Ratio
CSA	Central Statistical Authority
DA	Development Agent
DR	Discount Rate
EBA	Ethiopia Beekeepers Association
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
HBRC	Holeta Bee Research Center
ILRI	International Livestock Research Institute
IRR	Internal Rate of Return
ITC	International Trade Center
KTBH	Kenyan Top-Bar Hive
ME	Man-Equivalent
MEDaC	Ministry of Economic Development and Cooperation
MOARD	Ministry of Agriculture and Rural Development
MOTI	Ministry of Trade and Industry
NBE	National Bank of Ethiopia
NGO	Non Governmental Organization
NPV	Net Present Value
TLU	Total Livestock Unit

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ABSTRACT

Beekeeping is an appropriate and well-accepted farming activity that directly and indirectly contributes to smallholder income generation in Anna Sorra district. However, there are a number of problems in honey and beeswax value chains that can be faced from production up to consumption. Thus, this research attempted to analyze the honey marketing performance of Anna Sorra district of Oromya National Regional State, Ethiopia. Cross-sectional data were collected from 99 farmers, 21 traders and 4 consumers. Both descriptive statistics and econometric model had been used to analyses the date. Analysis of marketing margins revealed that retailers received the highest (20%/10%) marketing margin, rural collectors took (10.5%/10%) for unprocessed and semi-processed honey whereas processors and wholesalers received the least marketing margins which is 5% and 5.9% respectively for unprocessed and semi processed honey in study area. The two-stage least square regression model results showed that seven variables which are quantity of honey produced, family size, type of beehive used, beekeeping experience, distance to nearest market, frequency of extension contact and sex of the house hold head significantly affected the volume of honey supplied to the market. Policy implications drawn from the study findings include the need to improve the beekeepers knowledge, encouraging adult education, improving production and volume of sales of honey and expanding accessibility of market infrastructure.

Keywords: Anna Sorra, honey, marketing performance, 2SLS

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Beekeeping is one of the oldest agricultural activities in Ethiopia having been passed from generation to generation (Eugenia, 2016). It is not only an oldest but also an important economic activity which contributes around \$1.6m annually to the national economy (UNDP cited by OXFAM, 2011). Regardless of its long history, beekeeping in Ethiopia is still an undeveloped sector of agriculture. On the other hand, the ideal climatic conditions and diversity of floral resources makes Ethiopia the home of most diverse flora and fauna in Africa (Desalegn, 2004; Allafrika, 2009). Its forests and woodlands contain more than 7000 species of flowering plants that provide surplus nectar and pollen to foraging bees which accommodate 10 million honeybee colonies (Girma, 1998; Nuru, 2002). It has the largest bee population in Africa with over 10 million bee colonies, out of which about 5 to 7.5 million are estimated to be hived while the remaining exist in the wild (MoARD, 2007).

The apiculture products are one of the few products that had the most comprehensive ability to achieve transformation and growth across all categories of rural household. This is because of its large resource base and low barriers to entry. According to CSA (2012), among an estimated total of 5 million hives exist in Ethiopia of which 95% of honey production comes from traditional hives. Honey and beeswax production, processing and exporting are activities that fall into the top priority agricultural and industrial strategies of the country (MOARD, 2011).

Due to bimodal rains, honey can be harvested at least twice a year. The annual honey production of Ethiopia is estimated to be 45,300 metric tons which makes the country to rank first honey producing country in Africa and ninth in the world (FAO, 2015). The total beeswax production estimates about 3,800 tons per year. Such an amount puts the country 4th in beeswax production worldwide. Furthermore, Ethiopia has the potential to produce up to 500,000 tons of honey and 50,000 tons of beeswax per year (GDS, 2009).

However, its full potential has not been utilized (Patrson, 2000). Hence, it becomes imperative to undertake research on the honey marketing performance in Anna Sorra District of Gujii Zone of Oromiya National Regional State, Ethiopia.

1.2. Statement of the Problem

Marketing is a proactive process of identifying and meeting the needs of customers or buyers in a profitable way. Sellers/buyers need to decide what market best suits their needs (Ajabush Dafar and Motuma Turi, 2019). However, the market conditions are influenced by supply, demand, prices and tastes. Globally, there is large and growing demand for honey and other bee products SNV (2010 2011). Currently, worldwide honey demand was estimated at \$9.08 billion in 2019 and is expected to reach to USD 9.79 billion in 2020(Gran view Research, 2019). According to GHMR Report 2018, the Asia pacific projection of honey demand is estimated to reach 1,162.8 kt in terms of volume by 2023.

African honey has a unique flavor, which makes it comparable to some of the premium honey in the markets (ABM, 28 January 2014). Its price is five times more expensive than oil and demanded for this natural product is increasing in Africa in particular as well as in worldwide in general.

There are an estimated 5.15 million hives in Ethiopia, which are almost all entirely maintained according to traditional methods (Paulos, 2011). The countries annual production amount for the year 2012 was 53.7thousand tones (MoA and ILRI, 2013). As per USAID (2012) report, about 24% of Africa's and of 2% of the world's honey comes from Ethiopia. Honey is produced in almost all parts of Ethiopia. However, the most important honey regions are Oromia which accounts for over 51% of the bee colonies and 38% of the honey production (Kenesa, 2018). As stated on the annual report of 2019, the total productions of honey harvested in study area during 2019 were 7,850kg, 7,275kg, and 39,8048kg of modern beehives, transitional beehives, and traditional beehives respectively. This generates about 31,843,840 birr/year income for household Beekeepers (ASWLSO, 2019). The types of honey which have been marketed in the area are crude honey harvested from traditional hives mixed with unripe and brood honey/comb (Birhanu, 2016).

In Ethiopia high portion of honey is traded for income generation. The domestic honey market starts at the smallholder bee keeper's level, who majorly sells crude honey to collectors in the nearest town/village markets (Assefa, 2009). Beekeeping is relatively low labor requirements, when properly handled; beekeeping can coexist almost effortlessly with regular farming activities, such as growing crops, horticulture production, and animal husbandry. Honey business activity has the potential to provide a wide range of economic contributions like income generation from marketing honey and its byproducts, and the creation of non-gender biased employment opportunities (Miklyaev et al.)

Despite the available opportunities, Ethiopian apiculture production also faced serious challenges that hinder the sector. Lack of smallholders' access to finance is affecting the promotion and development of honey production and marketing. Besides that, absence of organized market channels and lack of information, dependence on traditional and low technology input, inadequate pre and post-harvest management, inadequate extension services and poor marketing infrastructure contributes to inhibiting the adoption of improved technologies for honey production and made Ethiopian honey uncompetitive in international market (SNV, 2009). Moreover, the share of the sub-sector in the GDP has never been matching with the huge numbers of honeybee colonies and the country's potentiality for beekeeping (Kerealem *et al.*, 2009). It has been low due to drought, over-expanding population pressure and associated vegetation changes and indiscriminate applications of chemicals. Thus, the beekeepers and the country are not benefiting from the subsector (Nuru, 2002; Chala *et al.*, 2012,).

Market access is the main part of restraint factor not only for beekeeping but also to any agricultural and industrial products (Birhanu, 2016). Tesfaye *et al.* (2017) reported that absence of market information, lack of transportation services, low price and price fluctuation at harvesting time, brokers (dallala), lack of cooperatives, and distance from market are hypothesized as the main problems of marketing bee products (ASWLSO,2008). , limited supply of honey due to poor quality production practice is another tricky factor in Guji and Borena (Brihanu, 2016). The share of chain actors, the honey market chain that is more profitable to the beekeeper isn't identified and the profit margins and cost- benefits were also not analyzed so far in Gujii Zone in general and in Ana Sorra Woreda in particular. This all

affects the marketing performances of honey; which in turn affect the attempts being made to bring about economic development at local and national levels which initiated the researcher to study the issue. Therefore, it is acceptable to study the honey marketing performance in Anna Sorra District of Gujii Zone of Oromiya National Regional State, Ethiopia.

1.3. Research Questions

In this regard, the current study attempted to answer the following research questions:

1. How is the share of marketing margins by honey marketing agents in the channel?
2. What are the major honey marketing constraints and opportunities existing in the study area?
3. What are the factors determining marketed surplus of honey?

1.4. Objectives of the Study

The general objective of this study is to assess honey marketing performance in Anna Sorra district of Gujii Zone, Oromiya National Regional State, Ethiopia.

The specific objectives of this study are:

1. To analyzing marketing costs and price margins at different levels in the honey marketing channel;
2. To identifying major honey marketing constraints and opportunities existing in the study area; and
3. To identify the determinants of households market supply of honey product in the study area.

1.5. Significance of the Study

In Ethiopia as well as other LDC in general, common assumptions of marketing systems inefficiency was that: traders were exploitative; their operations were inefficient because of an excess number of intermediaries; and it is unable to respond to new market opportunities and changes in consumer. Traders were seen as adding costs to the goods and services trade to the

customer without adding any value to it. Thus, it is important to undertake research and generate information to identify alternative mechanisms in which the honey producers and other actors can overcome the trade barriers, improve their products, and become stronger negotiators in local, regional, and international markets, thereby improving their income. The information generated from this research can be used by farmers (producers), traders, government and non-government organizations, that have an interest to intervene in honey marketing system. In addition it may also help researchers as an input for their further studies.

1.6. Scope and Limitations of the Study

First of all, this study was geographically delimited to Ana Sora district of Gujii zone of Oromya National Regional State with particular restriction to five potential Apiculture producers' kebeles. Hence, the generalizations of the finding are limited to the study area. The study uses a cross sectional data collected from sample households and other actors in the honey production to consumption system. Hence, the investigation is limited spatially as well as temporally to make the study more representative in terms of wider range of commodity, area and time horizon. So there was a limitation to deal with the issue using long time data that shows the dynamics in the production to consumption system.

Moreover, the researcher might face such problems as lack of sufficient time; shortage of finance to complete the study on time; up to date reference materials; low rate of return of questionnaire, and unwillingness of respondents to cooperate for time taking interviews. However, the major constraints could be managed through researchers preplanning.

1.7. Organization of the Thesis

The thesis is organized into five chapters. The first chapter presents introduction part of the thesis consisting of background, statement of the problem, research questions, objectives, scope and limitations, and significance of the study. In chapter two presents review of related literature. In chapter three deals with research methodology. In chapter four presents results and discussions. Summary, conclusions, and recommendations are set out in the last chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1. Definitions and Concepts

Market: A market is traditionally defined as a specific geographical area where buyers and sellers meet for exchange of goods and services. The most common way we obtain goods and services we do not produce ourselves is to buy them from others who specialize in producing them. To make such purchases, buyers seek out sellers in markets. Markets are ways in which buyers and sellers can conduct transactions resulting in mutual net gains that otherwise would not be possible (Hyman, 1989).

Modern definition considers market as an arena for organizing and facilitating business activities and for answering the basic economic questions (Kohls and Uhl, 1985) described market as how much to produce? What to produce? How to distribute production? A location, a product, a time, a group of consumers, or a level of the marketing system may define it. The choice as to which market definition to use depends on the problem to be analyzed. Bain and Howells (1988, cited in Andargachew, 1990) described market as simple arrangements to facilitate exchange of one thing for another.

The most observable features of a market are its pricing and exchange processes. This investigation adopts the product definition of market. A market is also defined to include people, money and willingness to buy (Stanton and Futrell, 1987). In this context, market is another name for demand (McNair and Hansen, 1956, cited in Andargachew, 1990).

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. As products definition it is the performance of all the transactions and services associated with the flow of good from the point of initial production

to the final consumer. As business firm marketing is as a complete management concept through which the company sells itself as well as its line of product. And from the view point of society, it is defined as all the process necessary to determine consumers' physical and societal needs and to conceptualize and affect their fulfillment (Barson and Norvell, 1983).

The term market has got a variety of meanings. In some cases the market may mean the place where buying and selling takes place, an area in which a good is sold, a group of people carrying on buying or selling, or the commodity traded, such as the corn market, or time market (Larson, 1957).

Marketing involves all activities involved in the production, flow of goods and services from point of production to consumers. Marketing includes all activities of exchange conducted by producers and middlemen in exchange for the purpose of satisfying consumer demand. It is defined as the set of human activities directed at facilitating and consummating exchange. All business activities facilitating the exchange are included in marketing (Kotler, 2003).

Marketing has an intrinsic productive value, in that it adds time, form, place and possession utilities to products and commodities. Through the technical functions of storage, processing and transportation, and through exchange, marketing increases consumer satisfaction from any given quantity of output (Mendoza, 1995).

Agricultural marketing: As expressed by FAO (1997) food and agricultural marketing not only means the movement of agricultural produce from the farm (where it is produced) to the consumer or manufacturer but also includes the marketing of production supplies to farmers like fertilizer, pesticide, chemicals, machinery, animal feed, tools and equipments.

Market chain: Market chain is the term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer (CIAT, 2004). Commodity chain is the chain that connects smallholder farmers to technologies that they need on one side of the chain and to the product markets of the commodity on the other side (Mazula, 2006).

Marketing system: Marketing system is another basic concept of marketing. Literature in the area defines the marketing system as the sequential set of kind's types of business firms through which a product passes during the marketing process (Branson and Norvel, 1983). The system comprises several, usually; stable, interrelated structures that, along with production, distribution, and consumption, underpin the economic process (Mendoza, 1995). A marketing system can be regarded as a multi-layered sequence of physical activities and of transfers of property rights from the farm-gate to the consumer (White, 1995). More concisely, marketing system is a collection of channels, middlemen and business activities, which facilitate the physical distribution, and economic exchange of goods (Kohls and Uhl, 1985). The efficiency with which a marketing system in an area or country operates can influence the living standards of people. Improvement in marketing efficiency, thus, attracts the utmost attention of any country.

Marketing Function: Marketing Function is defined as a fundamental physical process or service required to give a product the form, time, place and possession utility to meet consumers desire (Branson and Norvel, 1983). Identifying the different functions is important to determine the different activities required to transfer goods and services from points of production to consumption. There are a number of activities between two extreme points in a given marketing system of which the most important functions are assembling, storing, transporting, processing, grading, financing and risk bearing and market information.

Marketing channel: Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product or origin to the consumer with the purpose of moving products to their final consumption or destination (Kotler and Armstong, 2003). This channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al.*, 2001).

Marketing performance: Market performance can be evaluated by analyzing costs and margins of marketing agents in different channels. A commonly used measure of system performance is the marketing margin or price spread. Margin or spread can be useful

descriptive statistics if it used to show how the consumer's price is divided among participants at different levels of marketing system (Mendoza, 1995).

Marketing costs: Marketing costs are the embodiment of barriers to have access to market participation by resource poor smallholders. It refers to costs which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (labor, loading and unloading, costs of damage, transportation) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement (Holloway and Ehui, 2002).

Marketing margin: Marketing margin is the difference between the value of a product or a group of products at one stage in the marketing process and the value of an equivalent product or group of products at another stage. Measuring this margin indicates how much has been paid for the processing and marketing services applied to the product(s) at that particular stage in the marketing process (Smith, 1992). Therefore, market margin is the price variation at different segments with the comparison of the final price to the consumer percentage of final weighted average selling price taken by each stage of marketing chain. Comparing the total gross marketing margin is always related to the final price or the price paid by the end consumer and then expressed as a percentage. A wide margin usually means high prices to consumers and low prices to producers (Mendoza, 1995).

Marketable surplus: It is the quantity of produce left out after meeting farmers' consumption and utilization requirements for kind payments and other obligations (gifts, donation and charity) (Thakur *et al.*, 1997).

Marketed surplus: It shows quantity actually sold after accounting for losses and retention by farmers, if any and adding previous stock left out for sales. Thus, marketed surplus may be equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and farmers retain some stock and if losses are incurred at the farm or during transit (Thakur *et al.*, 1997).

2.2. Theoretical Background on Market Performance

Market performance can be defined as how well the agricultural marketing system performs what the society and the market participants expect of it (Kohl and Uhl, 1980). Evaluating marketing performance raises the question of “What do we expect of the agricultural marketing?” The marketing systems have multiple and often conflicting goals, where compromises and trade-offs will be necessary if the various participants such as consumers, farmers and the society in the marketing system are to be satisfied.

According to Kohl and Uhl (1980), one way to begin the study of agricultural marketing performance is to list some common concerns about the industry. For instance, consumers frequently complain about high and fluctuating food prices, deceptive labels and advertising. Producers voice other complaints such as declining number of farm product buyers, reduced competition for supplies, buyers of agricultural products with control over price, the failure of the retail and farm prices to move together, excessive marketing costs and prices, and below cost prices. The society on the other hand, might be more concerned with such issues as the agricultural marketing sector’s contribution to employment, investment, and economic growth; the standard of living and quality of life; resource use and conservation; and overall health and prosperity of the rural economy.

Rhodes (1983) indicated that the evaluation of market performance requires specific measures. Trends in retail prices, share of consumers’ income spent on food, the farm retail price spreads and the farmers’ share of the consumers’ food dollar are popular measures of market performance. Margins, profits and trends in food marketing costs also indicate something of the market performance. However, each of these has some value and limitations in the measurement of agricultural marketing performance, and no single one tells the whole story. Market performance is a complex notion, and using a single market characteristic in its evaluation may lead to misleading conclusion and recommendation. Therefore, care must be taken in their use and interpretation, and also compromises must be made in public policies that are designed to improve agricultural marketing performance. A balance need to be struck between the demands and dissatisfactions of each group in the marketing channel. Rhodes (1983) indicated that the balance of these criteria is frequently disturbed by a new technology,

a new marketing procedure, a change in markets, or a change in political power, thus, making the analysis of agricultural marketing performance an ever-changing and dynamic area.

2.3. Approaches to the Study of Agricultural Marketing Problems

Marketing studies adopt different viewpoints and approaches in order to study agricultural marketing problems (Mendoza, 1995). The functional, institutional (organizational) and the commodity approaches which combine the previous two approaches, and the mixed systems approach are a few examples of the different ways of analyzing (understanding) marketing (Mendoza, 1995).

2.3.1. Functional approach

One approach to study marketing is to break up the whole marketing process into functions - specialized activities performed in accomplishing the marketing process (Kohls and Uhl, 1985). Regardless of how the marketing system is organized, the economic functions necessary for the production of form, time, and place utilities must be performed. The efficiency with which the various economic functions are performed is important (Andargachew, 1990). The approach helps to evaluate marketing costs for similar marketing middlemen and/or different commodities and costs and benefits of marketing functions (Andargachew, 1990; Kohls and Uhl, 1985). The approach promotes careful identification of corrective measures as it pays special attention to particular functions. At the same time it has drawbacks as the improvement measures formulated in isolation may not necessarily fit very well into the rest of the marketing system (Kohls and Uhl, 1985; Purcell, 1979). Since the focus on the functions performed usually leads to consideration of institutions and a particular commodity, the functional approach provides the skeletal framework for a more encompassing approach to the study of marketing problems. Most contemporary marketing texts follow to varying degrees functional approach.

2.3.2. Institutional approach

The institutional approach to the studies on agricultural marketing problems pays attention to the nature and characteristics of the various middlemen and related agencies and organization of marketing machinery (Kohls and Uhl, 1985). The institutional analysis is based on the

identification of the major marketing channels and it considers the analysis of marketing costs and margins (Mendoza, 1995). The human element receives primary emphasis in this approach. There can be no change and no adjustment without action by the institutions. But emphasis on mere institutions is not sufficient. In the final analysis, it will be the interactions along the marketing continuum from producer to consumer that determines the degree of co-ordination and total system efficiency achieved. Neither detailed descriptions of the institutions involved, nor in-depth analysis of the actions of the institutions will contribute in any significant way toward increased efficiency in marketing unless the focus of attention is extended to include the inter-stage actions and interactions.

2.3.3. Commodity Approach

In a commodity approach, a specific commodity or groups of commodities are taken and the functions and institutions involved in the marketing process are analyzed (Kohls and Uhl, 1985). This approach is said to be the most practical as it helps to pin point the specific marketing problems of each commodity as well as improvement measures. The approach follows the commodity along the path between producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently. Therefore, Commodity approach will be utilized to conduct this research, because it combines the previous two approaches. According to Mendoza (1995), commodity approach is the most practical and pin point the specific marketing problems of each commodity as well as improvement measures.

2.4. Methods of Evaluating Efficiency of Agricultural Marketing System

Evaluation of the efficiency with which the agricultural marketing system operates forms the crux of analysis of marketing problems (Andagargachew, 1990; Kohls and Uhl, 1985; Abbott, 1958). At the same time, the analysis of market structure as well as behavior and quantitative evaluation of the efficiency of the marketing system requires concepts, theories, methods, data and workable frameworks and extremely difficult tasks (Branson and Norvell, 1983). One of the methods of evaluating the efficiency of marketing systems is the SCP model which will be utilized for this study.

2.4.1. Structure-Conduct-Performance Analysis (S-C-P)

Since the 1960s, the systematic nature of markets has increasingly been emphasized in defining means of analyzing their efficiency. The S-C-P approach or industrial organization school is then developed. The approach has been used in the study of markets in many countries such as in India by Level and Harris and in West Africa by Jones among others (Magrath, 1992). The S-C-P approach focuses on the behavior of groups rather than individual firms, and looks into the influence of the horizontal relationships among these firms on market performance. Thus, it is suggested that the S-C-P model is preferable to that model which analyze the productive efficiency of individual marketing enterprises (Magrath, 1992).

The most commonly used theoretical frame work (model) is the structure-conduct performance model. Social, political, economic and physical environment in different societies influence the operation of the marketing system (Kohls and Uhl, 1985). The interrelationship between the factors and their influence on firms' behavior within the society will change through time. The implicit goal of public policy has been to protect and promote setting that approaches the conditions of pure competition. Consistent performance model (SC-P), which appears to provide significant part of the theoretical support for the policy formulation (Kohls and Uhl, 1985; Abbot; 1958).

2.4.1.1. Market structure

Market structure shows trends in the number and size of firms relative each other and to the number of consumers and producers in particular time and place (Malhotra, 1996). It explains about Presence /absence, the levels and nature of entry barriers distribution of market information and its adequacy in sharpness of prices and quantity compositions and individual risk (Kohls and Uhl, 1985; abbot; 1958). Conduct explains price policy, advertising policy, output policy, legal tactics, etc (Abbot, 1958). Performances depend on conduct of sellers and buyers which intern is strongly influenced by structure of the relevant market. It also shows a locative efficiency, technical efficiency, equality, innovation etc. (Purcel, 1979).

A commonly used measure of the performance of a marketing system is the marketing margin or price spread (Abbot *et al.*, 1990). Margin or spread can be useful descriptive statistics it

used to show how the consumer's expenditure is divided among participants at different levels of the marketing system. Abbot *et al.* (1990) defined marketing margin as the difference between price consumers pay and product and then resell it together with specific charges for marketing services rendered. The relative share of the different market participants will be estimated using the marketing margin analysis. The total marketing margin in marketing system constitutes the marketing costs plus the profit earned. The price that is obtained by producers, or as the price of collection of marketing services, which the outcome of the demand for and supply of such services. Marketing services include such items as assembling, grading, storing, processing, packing, distribution, and transportation (Branso and Norvell, 1983). It is made of individual margins obtained by intermediaries who actually assume ownership of product and then resell it together with specific charges for marketing services rendered. The relative share of the different market participants will be estimated using the marketing margin analysis. The total marketing margin in marketing system constitutes the marketing costs plus the profit earned.

2.4.1.2. Market conduct

Marketing conduct refers to the patterns of behavior that enterprises follow in adopting or adjusting to the markets in which they sell or buy (Bain, 1968). Such a definition shows the analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable. Thus, in the absence of theoretical frame work for market analysis, there is a tendency to treat conduct variables in descriptive manner. The specified structure features of homogeneous product, and free entry and exit require a form of conduct such that each firm must operate as if in isolation. Market conduct is exceedingly complex, encompassing as it does virtually all human decision making within business organizations and, by extension, household, on top of the market structure, the legal environment and the internal organization of the business enterprise influence the market conduct (Wolday, 1994).

Bain (1968) names two closely interrelated aspects of market conduct: the manner in which, the devices and mechanisms by which, the different sellers coordinate their decision and action, to each other, or succeed in marketing them mutually consistent as they react to demand for their products in a common market, and the character of pricing policies and

related market policies that the sellers in the industry adopt; assessed in terms of individual or collective aims or goals that they pursue as they determine their selling prices, their sales promotion outlays, the designs and qualities of their products and so forth. By examining the relationship between the factors of the market structure and their setting practice; it may be possible to make some predictions about the consequences of these behavioral patterns for performance.

2.4.1.3. Market performance

Market performance according to Bain refers to the composite of results that firms in the market arrive at by pursuing whatever line of conduct they espouse—end results in the dimensions of price, output, production and selling cost, product design, and so forth (Wolday, 1994). For firms acting as sellers, these results measure the character of the firm's adjustment to the effective demands for their outputs; for firms buying goods, they measure the quantity of adjustments made by firms to the supply conditions of the goods, they purchase. There are two main indicators of market performance: Net return and marketing Margin.

Estimation of net returns and market margins provide indications of an exploitative nature when returns of buyers are much higher than the fair amount, that is including all marketing costs and return to management and risk, and when market margins increase not because of higher real marketing costs but because prices paid to producers are lower. The analysis of market performance using the industrial organization framework is as follows: Collusive pricing (market conduct) becomes possible if (i) market concentration is high (market structure); (ii) entry barriers are high (market structure); and (iii) market information is not available to all participants (market conduct).

This results in net returns and marketing margins that are much higher than the “fair” amount (Pomery, 1989). Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output (Bressler and King, 1970). By analyzing the level of marketing margins and their cost components, it is possible to evaluate the impact of the structure and conduct characteristics on market performance

(Bain, 1968). For most countries, it is generally acknowledged that a distribution system displaying acceptable performance is one that allows technological progress, has the ability to adopt, innovate, and utilize resources efficiently and to transmit prices that reflect costs (OECD, 1982). Prices are thus viewed as a stimulus for an efficient allocation of resources. Hence, desirable market performance is directly related to the competitiveness of an industry because distortions thereof tend to impede price efficiency.

2.5. Market Concentration

Market concentration refers to the number and size of distribution of buyers and sellers in a market. The greater, the degree of concentration, the higher, the possibility of non-competitive character such as, collusion existing in the market. It is generally believed that higher market concentration indicates non-competitive behavior and thus inefficiency. Devine *et al.* (1984) “buyer concentration is analogous to seller concentration, and in principle a range of absolute and relative measure of buyer concentration corresponding to those seller concentration could be Constructed. However, such measures have not been constructed, to the absence of product by purchasing firms. The relationship between concentration and market behavior, and performance must not, be interpreted in isolation. Other factors such as the firms’ objectives, barriers to entry and exit, economics of scale, and assumptions about rival firms behavior, will all relevant in determining the degree of concentration and the relationship between concentration and behavior and performance (Scherer, 1980).

There are a number of measures of market concentration and the most commonly used is the market index, which measures the percent of traded volume accounted for by a given number of participants. Empirical studies in the field of industrial organization suggested certain level of at which non- competitive behavior of market participant begins in different industries. For example, Kohls and Uhl (1985) suggests that a four firms concentration ratio (CR4), that is, the market share of the larger four firms, of less than or equal to 33% is generally indicator of a competitive market structure, while a concentration ratio of 33% to 50% and above 50% may indicate a weak and strongly oligopolistic market structure, respectively. However, the concentration ratio of four firms is best regarded as a “rule of thumb,” and there are reasons

why high concentration levels may be reasonable in light of small potential volumes of trade (Gebremeskel *et al.*, 1998).

Social, political, economic, and physical environments in different societies influence the operation of the marketing system. The interrelationship between these factors and their influence on firm's behavior vary within the society and will change through time. Thus an implicit goal of public policy has been to protect and promote a setting that approaches the conditions of pure competition. Consistent with this position is the structure-conduct-performance model (S-C-P), which appears to provide significant part of the theoretical support for the policy formulation.

2.5.1. Marketing margin as a measure of market efficiency

A common means of measuring market efficiency is to examine marketing margins. This is an attempt to evaluate economic or price efficiency. The overall marketing margin is simply the difference between the farm-gate price and the price received on retail sale. That difference can then be considered to be the cost of marketing and all that is entailed in getting the product from the producer to the consumer in the desired form. The question to be evaluated is whether the marketing services being provided are "worth" the cost of this margin. Marketing margins can be calculated for different levels of the market, so that:

$$\text{Marketing margin} = P_1 - P_2$$

Where:

P_1 = the price at one level or stage in the market

P_2 = the price at another level

A marketing margin is the difference between the primary and derived demand curves. Primary demand is based on consumer preferences and their response to retail prices. Derived demand is based on the relationship between price and quantity at the farm gate or intermediate points. Derived demand can thus be thought of as consumer demand as experienced by producers or other intermediaries. Primary and derived supply curves are analogous. The retail price is established where the primary demand curve and the derived supply curve intersect. The farm-

gate price, on the other hand, occurs at the point where derived demand and primary supply curves intersect.

2.6. Agricultural Policy and the Honey Market in Ethiopia

2.6.1. Policy

Since the adoption of the new economic policy in 1991, agricultural markets have been reformed and prices of commodities are determined through market mechanisms. However, due to the weak bargaining power of producers and harvest fluctuations, the “price free” notion of markets have been found to affect producers (EEA, 2004). Agricultural product markets in Ethiopia are characterized by seasonal gluts and shortages which in turn affect the marketing behavior of producers, traders, and consumers. A year of bumper harvest might be followed by a year of severe drought, for example in the years 2002 and 2003 (EEA, 2004). Most previous studies argue that the fate of Ethiopia’s economy is at the mercy of the whim of weather conditions. Due to widespread market failures and imperfections in the marketing chain, donor agencies and government experts have realized that the idea of sole reliance on market forces does not work, and recommend institutional intervention in the price formation of agricultural products (EEA, 2004).

Therefore, The Ethiopian government’s agricultural policy also defines agricultural marketing as a key element of rural growth, poverty reduction, enhanced food security, and addressing the needs of a growing population in both rural and urban areas. Previous studies on the marketing of agricultural products, especially grain (Gabremadhin, 2003; Negassa, Myers and Gabremadhin, 2004; Osborne, 2005) have found evidence of imperfect competition in the marketing of these produce. According to Mulat (2000), the Ethiopian agricultural output markets are characterized by an inadequate transportation network, limited number of traders with inadequate capital and facilities, high handling costs, inadequate market information system, weak bargaining power of farmers, and underdeveloped agro-industrial sectors.

Furthermore , Government of Ethiopia has established a conducive policy environment for the apiculture sector under the agriculture Growth and Transformation Plan (GTP) (MoFED 2010), among which proclamation 660/2009 provides for Apiculture Resources Development

and Protection, Draft Regulation of Apiculture Resources Development and Protection, establishment of a new Apiculture Research Division at a national level, direct involvement of honey exporting enterprises in the current Residue Monitoring Plan (RMP) and establishment of the Animal and Plant Health Regulatory Directorate are the major policies (MOA, 2013)

2.6.2. Honey Marketing

2.6.2.1. International honey and bees wax markets

The world market for honey is considerable, and demand is on the increase. Global honey production is over 1250 metric tons, worth US\$1.5 billion (Bell 2009). China, Argentina and Mexico together produce about 60 percent of world-traded honey. The EU, USA and Japan account for about 70 percent of world honey imports (Bradbear, 2009: 143). A “significant shortage” of white honey in particular has emerged due to adverse weather conditions in North and South America, diseases among bee colonies, but also due to increasing demand of honey as a ‘green’ natural health product (Phipps, 2010). The 2003 world market of bees wax is relatively small with an estimated 10 metric tons. The majority of this is imported by the European Union, particularly by pharmaceutical companies in Germany, France and the UK (Bradbear, 2009).

Despite the global market opportunities a recent FAO report on apiculture concludes that in developing countries production is fragmented without lobbying power. Producers are often amongst the most remote and poor people who work under adverse conditions. They lack appropriate extension material, marketing information, skilled trainers, strong organizations representing the interests of beekeepers, and the linkages between producers and buyers are hardly developed. Few developing countries have beekeeping policies for protection of the industry (Bradbear, 2009).

2.6.2.2. Ethiopian honey marketing

Ethiopia, having surplus honey sources of flora and the highest number of bee colonies, is the leading producer of honey and beeswax in Africa (MOARD, 2005). In 2010/11 there are about five million traditional, half a million transitional and 0.2 million frame hives in

Ethiopia. Ninety-five percent of honey production comes from traditional hives. Furthermore, honey was harvested on average 1.55, 1.65, and 1.52 times during the reference period from traditional, intermediate and modern hives (CSA. 2011).

With regarding export of beeswax, Ethiopia is one of the biggest wax exporters to the world market. An average of 270 tones was exported per year over the period 1984-1994 which in turn generated over ETB 2 million per annum to the national economy. Currently, the annual turn-over of the apicultural industry varies between 185 and 450 million ETB, of which only 5 million Birr worth beeswax exported (EEPD, 2006).

Although the annual production of both honey and wax is large compared to other African countries, the system of production commonly exercised in the country is traditional. Productivity of honey bees is very low and only on average of 5-6 Kg of honey could be cropped per hive per year. However, in areas where improved technology has been introduced, an average of 15-20 Kg per hive per year has been recorded. The major constraints that affect apiculture in Ethiopia are lack of beekeeping knowledge, shortage of trained manpower, shortage of beekeeping equipment, pests and predators and inadequate research works to support development programs (FAO, 2006).

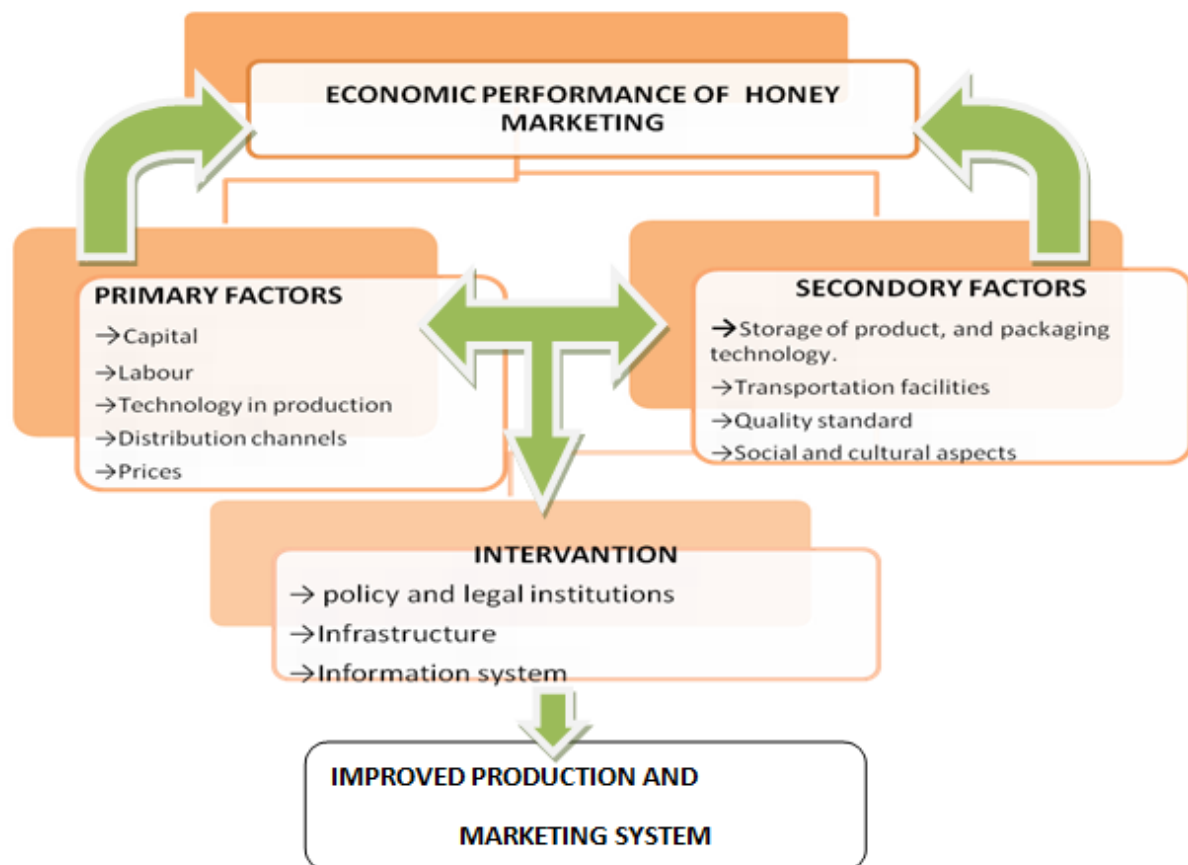
The national average honey production of Ethiopia was increased from 28.5 thousand tons in year 2001 to 42.1 thousand tons in 2007/8 respectively. Honey bee colony population of the country also increase from 0.3 million in year 2001 to 4.6 million in 2007/8, respectively. This accounts over 23 percent of the total African production and about 2 percent of the world honey production (MOARD, 2006; CSA, 2008; Beyene and Phillips, 2007).

Ethiopia is one of few countries in the world with a long tradition of beekeeping that gave an opportunity of supplying honey and honey products to the international markets. The country is estimated to have ten million bee colonies, which is the largest in Africa. The most important honey and beeswax producing regions in Ethiopia are Oromiya (contributing 36% of total production), SNNPR (31percent), Amhara (19 percent), Tigray (5 percent) and other regions (9 percent) (EPPA, 2003).

2.7. Conceptual Framework of the Study

Conceptual framework (figure 2) shows factors affecting marketing supply of honey which includes primary and secondary factors. Primary factors forms the basic set of instrument used in production and marketing of product. Secondary factors on other hand facilitate primary factors. Both primary and secondary factors can lead to poor marketing of honey. However through interventions such as appropriate policy, legal institution, good infrastructure, well established information system and improved environment could improve production and marketing of honey.

Figure 1 conceptual framework of the study



Source: Adopted from (FAO).

2.8. Empirical Literature Review on Determinants of Honey Market Supply

The study of marketed surplus turned out to be very vital for agricultural based countries because the transition of smallholder farmers towards commercial production is determined by it. Getachew (2009) has noted that the transition of the small-scale sector towards commercial production will ultimately be determined by the ability and willingness of producers to provide a commodity. Similarly, Mamo (2009) argued that the development of markets, trade and the subsequent market supply that characterize commercialization are fundamental to economic growth.

There are a number of empirical studies on factors affecting the market supply of agricultural commodities. Assefa (2009) used robust OLS Regression analysis to identify factors affecting market supply of honey in Atsbi Wemberta District and found that education level of the household, quantity of honey output and one year lag market price of honey were the significant determinant factors of the quantity of honey supplied positively.

According to Getachew (2009), the honey market supply analysis revealed that beekeeping experience, income from farm and off farm activities, access to different services like apiary visit, beekeeping training and improved beekeeping inputs supply are directly related to the amount of marketed surplus of honey. From this there is a need to get income, experience and services which stimulate beekeepers in order to promote quality and quantity of honey production and marketed surplus.

The result of Heckman's procedure in Embaye (2010), on analysis of butter supply chain the case of Atsbiwemberta and Alamata Districts, clearly indicates that a marginal increase in butter output increases both market participation and level of supply. This is because farmer's decision to participate in the market and to increase their level of participation is normally driven by the availability of surplus produce.

Betselot (2012) used Heckman's procedure to identify factors affecting farmer's market participation and volume of honey marketed. The result indicated that sex of the household head; number of beehives owned and type of beehive used positively related with both market participation decision and volume of market supply.

The result of multiple linear regression model in Samuel (2015) on analysis of Honey market chain the case of Sodo Zuria indicate that age of the household head and family size of the household head negatively, beekeeping training, number of modern bee hive used, educational status of the household head, price, total livestock holding and agro ecology positively were related with volume of honey supplied to market.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Location and Description of the Study Area

Anna Sorraa district in which the study was conducted is located about 410 km to South of Addis-Ababa and 180 km to north of the capital city of Guji zone (Negelle). Anna Sorra is one of the districts found in Guji zone of Oromiya National Regional State. There are about 6763 household beekeepers in which their livelihoods depend on it. Among these beekeepers 895 are females, having about 49756 traditional beehives, 485 transitional beehives and 314 frame beehives (ASWLO, 2016).

The district has diverse agro-ecological zone which is direct cause of experiencing complex climatic condition. Attitudinally, the district ranges between 1200-2800 meter above sea level. It encompasses Kola, Dega and Woina dega agro-ecological zones. It receives an estimated amount of 350-1830mm of rainfall annually and with annual average temperature of 11.2-21.0c, Anna Sorra district agricultural office (ASDAO, 2016).

The district has two main rainy seasons, spring and autumn that are locally known as *Ganna* and *Hagayya* rains respectively. Most of the area receives its maximum rainfall in spring and small rainfall in autumn. Expected to be 78% of the of the total annual rain fall is received during spring season which comes at the end of February to the May and autumn is the minor rainy season of the area where rains begins in September and ends in November.

Due to diverse agro ecology of the district, it has midland and highland. In the midland area maize and teff was the most potential crop while barley, wheat, potato and enset were the most crops grown in the highland parts. In addition to these crops, livestock rearing is also observed in the district.

The district has highest potential in having huge native honeybee colony. This is due to the presence of high vegetation coverage which observed by the honey bees throughout the whole year with attractive flowers. Those plants and woody plants are contains different types of

flora which is very important and suitable for the Honey bees. Among known bee forage Baddessa, Saraji, Gatame, Mokkonisa, Reejji, Dargu (Xeenii),... (personal Observation) are dominant ones in locality. For that reason Beekeepers sing together saying each one to another “Yooyyaa, Yooyyaa tiyya dhageetta. Haa..., Baddeessaa bara misaa, Bulchaa bara Xeennii. Haa...; Bara Saaraajjiin baxxe siif bulbulaa deebi’i. haaa...”. Meaning, “I will provoke you when those forage plants have been flourished” (Gujii Oromo Elders). The total productions of honey harvested in district during 2019 are 7850kg, 7275kg, and 398048kg from modern, from transitional beehives, and from traditional beehives respectively. This generates about 31,843,840 ETB per annum for Beekeepers household.

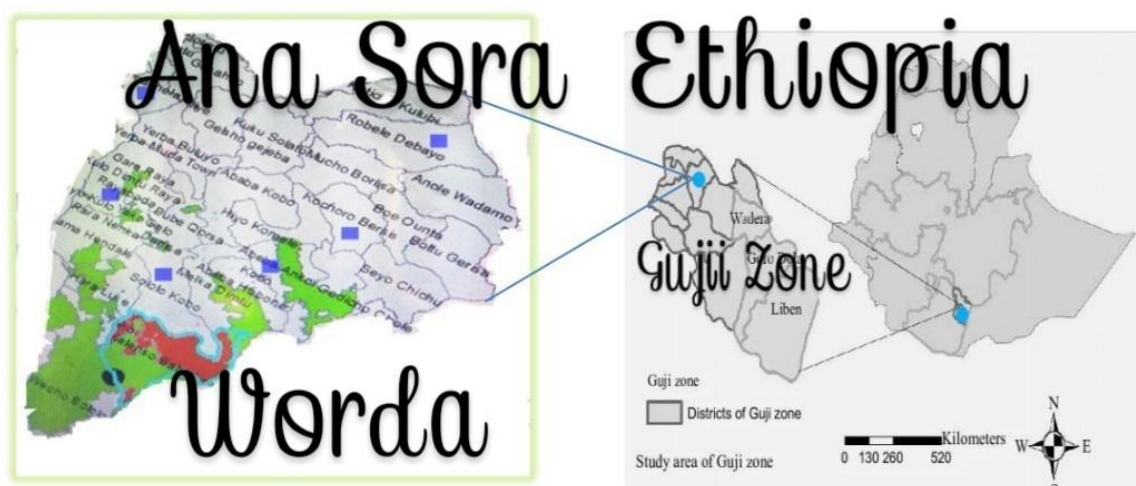


Figure 2: Study area Map

3.2. Types, Sources and Methods of Data Collection

The data used to answer the overall research question of this study consists of both quantitative and qualitative data. It includes volume of honey supplied to the market, age, sex, size of output, access to market, market information, and annual income from non farming activities, livestock ownership, land holding, extension service contact, credit received, family size and so on. Data source for this study was both primary and secondary data.

Primary source were smallholder farmers randomly selected from rural *kebeles*; and traders and consumers at different levels in the District. To collect primary data, a semi structured questionnaire was prepared and used. Questionnaire pretest was conducted and modifications

were made based on the feedback of the pretest. The questionnaire was administered by enumerators, who were selected based on their experience and educational background. In addition to the questionnaire, personal observation and informal discussions with farmers, kebele leaders and traders were held to generate additional information on the overall performance of honey marketing.

Secondary data was also extracted from secondary sources namely, both zonal and District's office of livestock and fishery resource development, office of District trade and industry, published and unpublished thesis.

3.3. Sample Size and Sampling Technique

Anna Sorra Woreda was purposively selected out of the four woredas found in the highlands of Gujii Zone because of its highest potential for beekeeping activity. Two stages random sampling procedure was applied to generate the required primary data. In the first stage, considering the total number of kebeles and access to market, 5 honey producer kebele's were selected randomly. In the second stage using probability proportional to size technique, producers of honey were selected from each selected *kebeles*.

The sample size for the study was determined following Yemane's (1967).

$$n = \frac{N}{1 + N(e^2)} \quad \text{Where, } n = \text{the Sample size}$$

N= the size of population

E=the error of 0.1 points (Yemane, 1967)

$$n = \frac{6763}{1 + 6763(0.1)^2} = \frac{6763}{68.63} = 99 \text{ House hold beekeepers were selected}$$

Table 1: Sample size by kebeles

No	Sample kebele	Total of Beekeepers households	Sample beekeeper households
1	Ko/Barsiisa	1685	25
2	Wo/Sheella	1205	18
3	Ra/Boodda	1352	20
4	A/Onkoora	1202	18
5	M/Bokko	1319	19
Total		6763	99

Source: Anna Sora Livestock Office, 2020

The sites for the trader surveys were market towns in which a good sample of honey traders exists. There are four major town markets in the study areas (Me'e Boko, Irba Muda, Robale and Bore town) of which two of them such as Irba Muda and Bore town are selected randomly. Data from traders was collected from Irba Muda and Bore town markets.

The objective of the research is to empirically capture the actual practice and behavior of the honey traders. Due to the absence of reliable census information on the population of traders in two of the areas, random sampling of 25 respondents was conducted. An attempt was made to incorporate licensed and un-licensed traders, and to include respondents from each of the following categories: seven collectors, eight wholesalers, four urban retailers, four Tej brewery processors, four consumers were interviewed in the study area. A checklist was used to guide the discussions conducted at different places with producers and key informant in the study area.

3.4. Methods of Data Analysis

In this study both descriptive statistics and econometric models were used.

3.4.1. Descriptive statistics analysis

This method of data analysis refers to the use of ratios, percentages, means, variances and standard deviations in the process of examining and describing marketing functions, farm household characteristics, resource ownership, role of intermediaries, market and traders characteristics. The indicators to be used in this part of the analysis are as follows.

3.3.1.1. Structure conduct and performance (S-C-P) model

The model examines the causal relationships between market structure, conduct, and performance, and is usually referred to as the structure, conduct, performance (S-C-P) model. In agricultural economics, the most frequently used model for evaluating market performance is based on the industrial organization model. Wolday (1994) also used this model to evaluate food grain market in Alaba Siraro district. The study will use S-C-P model to evaluate honey market.

3.3.1.2. Concentration ratio (CR)

The concentration ratio is expressed in the terms CR_x, which stands for the percentage of the market sector controlled by the biggest x firms. Four firms (CR₄) concentration ratio is the most typical concentration ratio for judging the market structure (Kohls and Uhl, 1985). A CR₄ of over 50% is generally considered a tight oligopoly; CR₄ between 25 and 50 is generally considered a loose oligopoly. A CR₄ of fewer than 25 is no oligopoly at all.

$$CR = \frac{\text{Sum of Market Share of leading Firm}}{\text{Total Market Size}} * 100\%$$
$$CR = \sum_{i=1}^r Si ; i = 1, 2, 3, \dots, r$$

Where:

CR= is concentration ratio,

Si= Percentage market share of ith Firm and,

r= the number of largest firms for which the ratio is going to be calculated.

Kohs and Uhl (1985) suggest that as a rule of thumb, a four enterprise concentration ratio of 50% or more is indicative of a strong Oligopolistic industry of 33-50% ratio denotes a weak oligopoly, and less than that an un concentrated industry.

3.3.1.3. Marketing margin, a measure of market efficiency

A common means of measuring market efficiency is to examine marketing margins. This is an attempt to evaluate economic or price efficiency. The overall marketing margin is simply the difference between the farm-gate price and the price received on retail sale. That difference can then be considered to be the cost of marketing and all that is entailed in getting the product from the producer to the consumer in the desired form. The question to be evaluated is whether the marketing services being provided are "worth" the cost of this margin. Marketing margins can be calculated for different levels of the market.

Mathematically, can be expressed as:

$$TGMM = \frac{Cp - Pp}{Cp} \times 100$$

Where: TGMM= Total gross marketing margin;

Pp = Producer's price (first seller price) and

Cp= Consumer price (end buyer price)

It is useful to introduce the idea of farmer's portion or producer's gross marketing margin (GMMP). Which is the portion of the price paid by the consumer that goes to the producer and it also provides an indication of welfare distribution among production and marketing agents. The producers' margin is calculated as?

$$GMM_p = \frac{P_c - TGMM}{P_c} \times 100$$

Furthermore, marketing margin of each actor at a given stage (GMM) was computed as:

$$GMM = \frac{Sp - Bp}{Cp} \times 100$$

Where, GMM = Gross Marketing Margin for each actor other than producers

Sp = Selling price

Bp = Buying price

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

$$NMM = GMM - \frac{MC}{Cp} \times 100$$

Where: NMM = Net Marketing Margin

GMM = Gross Marketing Margin

MC = Marketing Cost

Cp = Consumer price

3.4.2. Model specification of econometrics analysis

Multiple linear regression model (OLS) was appropriate to analyze factors affecting volume of sales because all sampled households producing honey participated in marketing. However, when some of the assumptions of the Classical Linear Regression (CLR) model are violated, the parameter estimates of the above model may not be Best Linear Unbiased Estimator (BLUE). Thus, it is important to check the presence of heteroscedasticity, multicollinearity and endogeneity problem before fitting important variables into the regression models for analysis.

The problem of endogeneity occurs when an explanatory variable is correlated with the error term in the population data generating process, which causes, the ordinary least squares estimators of the relevant model parameters to be biased and inconsistent. The source of endogeneity could be omitted variables, measurement error and simultaneity (Maddala, 2001). Both Hausman test and Durbin-Wu-Hausman (DWH) test were applied to check the presence of endogeneity. In case of this study, there is a potentially endogenous variable, which is quantity produced of honey, included in the explanatory variables that could cause endogeneity bias if OLS is applied. Therefore, in identifying the determinants of marketed surplus of honey, a two-stage least square (2SLS) model was used.

Econometric model specification of supply function in matrix notation is as follows: -

$$\text{structural equation: } Y = \beta_0 + X_k' \beta_1 + \delta Y_1 + U \quad (1)$$

where; Y is a vector of quantity of honey supplied to market, X' is exogenous variable that is assumed to affect honey marketed surplus, Y_1 is a vector of endogenous variables which are quantity produced of honey, β_0, β_1 and δ are a vector of parameters to be estimated, and U is a vector of disturbance terms.

As the name suggests 2SLS involves using OLS regression in two stages, in the first stage a reduced form of the structural equations is estimated where the endogenous variable quantity produced of honey is regressed on all the exogenous variables in the system separately.

$$\text{Reduced form: } Y_{1i} + \pi_0 + \pi_1 x_i + \pi_2 z_i + v \quad (2)$$

Where, Y_{1i} is endogenous variable (quantity produced of honey, x_i is vector of exogenous variables (market price, family size of the household head, sex of the household head, cash income other than beekeeping, years in beekeeping, type of beehive used, frequency of extension contact, access to market information, educational level of the household head, access to credit, number of beehives, distance to nearest market, and tropical livestock unit), z_i is a vector of excluded instruments; π is the coefficients to be estimated; and v is the errors terms, symmetrically distributed around zero.

In order to obtain consistent estimators in this case, we need some additional information. The instruments (in this case Z) must satisfy two conditions; uncorrelated with U , also called orthogonal to the error process (exogeneity condition i.e. $\text{Cov}(Z, U) = 0$) and correlated with Y_1 the endogenous variable (relevance condition i.e. $\text{Cov}(Y_1, Z) \neq 0$) (Wooldridge, 2002). This means Z is a variable directly affecting the endogenous variable and may not directly be related to the dependent variable Y .

By subtracting the residual of the regression of equation (2) from the actual value of quantity produced of honey, a fitted value $\hat{Y}$ of the quantity produced variable is obtained that is uncorrelated with the error term. In the second stage, by substituting the quantity produced variable in structural equations (1) with the fitted value of quantity produced, the right-hand side of the equations no longer contains any endogenous variables. It is vital to make different tests before 2SLS estimations.

Detection of multicollinearity

Multicollinearity problem among explanatory variables had been checked using the Variance Inflation Factor (VIF). As a rule of thumb, if the VIF is greater than 10 the variable is said to be highly collinear (Gujarati, 2004). In this study to detect multicollinearity problem variance inflation factor (VIF), for each coefficient in a regression as a diagnostic statistic was used. A measure of multicollinearity associated with the variance inflation factors is computed as:

$$VIF = \frac{1}{1-R_j^2} \quad (3)$$

R_j^2 represents a coefficient for determining the subsidiary or auxiliary regression of each independent continuous variable X.

Detection of Heteroscedasticity

Test for heteroscedasticity had been undertaken for this study. There are a number of test statistics to detect heteroscedasticity. For this study, robust method was employed for correcting the problem.

3.5. Definition of Variables and Hypothesis

In the course of identifying factors influencing honey market supply, the main task is to analyze which factor influences and how? Therefore, potential variables, which are supposed to influence quantity of honey supply, need to be explained. Accordingly, the major variables expected to have influence on quantity supplied are explained as follows.

The Dependent Variables

Quantity of honey market Supplied (Y_i): It is a continuous variable which represents dependent variable; the actual supply of honey by Beekeepers to the market which is measured in terms of kilogram (kg).

The Independent Variables

Yield (X_1): It is a continuous variable measured in kilograms. The variable is expected to have positive contribution to the amount of honey supplied to market. Farmers who produce more output are supposed to supply more honey to the market than those who produce less. Abraham (2013) also found positive relation between quantity produced and quantity supplied to market.

Education (X_2): This is a continuous variable which is measured in educational grade level of the household head and hypothesized to increase quantity of honey supplied to market.

This is due to the fact that a farmer with good knowledge can adopt better practices that could increase both yield and market supply. Tewodros (2014) and Samuel (2014) support that education has significant and positive effect on market supply of agricultural products. It was also hypothesized that education to have influence on market outlet choice decisions. Addisu (2016) indicated that education level of households has negative and significant effect on choosing of consumer outlet. Abraham (2013) found that education of the household head is negatively and significantly related with retailer outlet choice in vegetable marketing.

Family size (X₃): This variable is a continuous explanatory variable and refers to the total number of family in the household. A study conducted by Samuel (2014) on market chain analysis of honey in Sodo Zuria District, Southern Ethiopia, indicated that households with more number of family members were assumed to supply less amount of honey to market than those households with relatively less number of family members because of the increase in consumption. Therefore, it was hypothesized to be negatively related to honey supplied to market.

Age of the household head (X₄): It is a continuous variable and measured in years. Age is a proxy measure of farming experience of household head. A study conducted by Betselot (2012) reveals that age of the household's was negatively related to honey supplied to market. The more beekeeping experience could be associated with older farmers who are less inclined to be engaged in honey business and their risk averts behavior which results in less flexible in adopting new technologies and thereby boosts production for marketable surplus. Therefore, age of the household is hypothesized to be negatively related.

Sex of the household head (X₅): This is dummy variable that takes a value of **1** if the household head is male and **0** otherwise. Both men and women participate in beekeeping and production of honey. Male households have been observed to have a better tendency than female household in beekeeping and production and supply of honey due to obstacles such as lack of capital, and access to credit and extension services. A study conducted by Betselot (2012) on honey value chain in the case of Ada'a District reveals that sex of the household head was positively related to honey supplied to market. Therefore, sex of the household head was hypothesized to be positively related to honey supplied to market.

Experience in beekeeping (X_6): This is a continuous variable, it refers to the number of years the farmer engaged in beekeeping activity and is expected to influence supply of honey to the market positively. As farmers got more experience in beekeeping, the probability of increasing production and hence supply would be higher. Moreover, farmers with longer farm experience will have a cumulative knowledge of the entire farming environment. This in turn enables them to adopt the use of improved box beehives earlier than farmers with short beekeeping farm experience.

Number of livestock owned (X_7): This is a continuous variable defined in terms of tropical livestock unit (TLU), which excludes oxen. Farmer could sell more honey when he/she produces more. On the other hand, when the household has less production, it must either borrow money or sell his livestock to meet household needs. Farmers who have low production need to specialize in livestock production. Therefore it is expected to have negative relationship with market surplus of honey.

Use of modern beehives (X_8): This is a dummy variable taking a value of 1 if the farmer uses modern beehives and 0 otherwise. This variable was affected the household marketable supply of honey positively due to the fact that if a producer uses modern beehives, this was increased production and productivity thus, increase the marketable supply. According to Betselot (2012) study ownership of modern beehive was positively associated with increased probability of household's participation in honey market.

Frequency of extension contact (X_9): This is a continuous variable which is the number of days that farmer has contact with extension agent for honey production work supervision in a year. Samuel (2014) conducted a research on market chain analysis of honey in Sodo Zuria district. Indicated that beekeepers that get more knowledge during training concern beekeeping system particularly about modern honey production, harvesting, storing and handling methods increasing honey market supply. Therefore, extension visits is hypothesized to affect honey supplied to market positively.

Price of honey (X_{10}): This is a continuous variable that measures annual average price of honey in the reference market in 2018/19 i.e. the one year lagged price. Higher lagged prices in the year

2018/19 can stimulate production and market supply of honey for 2016/17. On the other hand, lower lagged price of honey in 2018/19 can reduce amount produced and hence market supply for the year 2016/17. A study conducted by Samuel (2014) on market chain analysis of honey found that increase in previous year price by 1 percent increases the amount of honey supplied by 16 percent. Therefore this variable was hypothesized to positively related with marketed surplus.

Market Distance (X_{11}): It is a continuous variable that was measured in kilometers from the household residence to the market centre. As stated in Embaye (2010), if the households found in near vicinity to the market, they get market inputs (information) easily and therefore, they can produce and supply more. The closer to the market the lesser would be the transportation cost and time spent and the more is the quantity of market supply. Therefore, in this study, distance from nearest honey market is hypothesized to be negatively related to honey supplied to market.

Access to credit (X_{12}): Access to credit is measured as a dummy variable taking value of 1 if the farmer has access to credit and 0 otherwise. This variable was influenced the market supply of honey positively on the assumption that access to credit improves the financial capacity of farmers to buy modern hives, thereby increasing production which is reflected in the marketable supply of honey.

Access to Market information (X_{13}): It is a dummy variable taking value of 1 if the producer had access to market information and zero otherwise. It has been hypothesized that to affect positively marketable honey supply of beekeeping household. The better information farmers had out is likely to supply more honey to the market. The general idea is that maintaining a competitive advantage requires a sound business plan. Again, business decisions are based on dynamic information such as consumer needs and market trends. This requires that an enterprise is managed with due attention to new market opportunities, changing needs of the consumer and how market trends influence buying (CIAT, 2004). Access to information, provided through mass media, from extension agents, or mobile phone reduces risk perceptions of farmers (Siziba *et al.*, 2011). Therefore, it is hypothesized that access to current and updated market information is positively related to honey supplied to market.

Non-farm income (X₁₄): It is a continuous variable which refers to part of the total amount of income measured in birr that is earned from non-farm activities which are not related to agriculture. Income from non agricultural source is hypothesized to affect honey supplied to market positively. According to Getachew (2009), income from nonfarm activities, are indirectly related to the amount of honey supplied to market. Therefore, in this study it is hypothesized that non-farm income affects honey supply to the market negatively.

Membership in a cooperative (X₁₅): This is a dummy variable which can take the value of 1 if the farmer is a member of a cooperative and 0 otherwise. This variable was affected the quantity supply of honey to the market positively. Because, producers who are members of cooperatives are likely to get inputs and market information and thus could supply more honey to the market than non- cooperative members.

Table 2: Description of the dependent and independent variables used in the model

#	Variables	Explanation	Category	Value
Y	QTSUPP	Quantity supplied	Continuous	Kilograms
X ₁	QTYHP	Quantity of honey produced	Continuous	Kilograms
X ₂	EDLHH	Education level of the household head	Continuous	Years of schooling
X ₃	Fnsze	Family size	Continuous	Numbers of family
X ₄	AGE	Age of the household head	Continuous	Number of years
X ₅	SEX	Sex of the household head	Dummy	0=female, 1=male
X ₆	NOFLS	Tropical Livestock Unit	Continuous	TLU
X ₇	UsofMo BH	Use of Modern bee hives	Continuous	1=if Use , 0=Otherwise
X ₈	EXACC	Frequency of Extension contact	Continuous	Number of contact
X ₉	PRICE2008	Price of honey in2018/19 E.C.	Continuous	Birr
X ₁₀	DSNMKT	Distance to nearest market	Continuous	Kilometers
X ₁₁	CACC	Credit Received	Dummy	0=no, 1=yes
X ₁₂	ACCMIF	Access to market information	Dummy	0=no, 1=yes
X ₁₃	NFICOME	Nonfarm income	Continuous	Birr
X ₁₄	MBERSHP	Membership in Cooperative	Dummy	1=if Member 0=Otherwise
X ₁₅	EXP	Experience in beekeeping	Continuous	Number of years

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter discusses the analytical results of the study. The first section of this chapter presents the descriptive results of the study. This is followed by the discussion of the econometric model results.

4.1. Demographic Characteristics of Sample Households

Regarding age of the respondents it ranges from 23 to 80 years. The overall mean age of the respondents was 42.57 years with standard deviation of 13.149. From this result, we can see that most honey producers were adult. Youngest might have been engaged in off/non-farm activities than production and managing bee colonies.

From the subjects engaged on beekeeping many of them were didn't attend school. As depicted in the table 3, about 38.4% of the sample households were illiterates. And about 18.2% of the sample respondents were attained secondary school. Among the sampled respondents 19.2% and 24.2% were attending Elementary and Primary school respectively. This high number of illiteracy leads to lack of initiation to get Extension service and any awareness creation of technology which helps to increase the production and market supply of honey.

The level of beekeeping experience is taken to be the number of years that an individual was continuously engaged in beekeeping activity. Majority (65.7%) of the respondents had about 10 years and above of beekeeping experience. The statistics illustrates that among the sampled kebeleles of study area around 75% of much experienced Beekeepers are found in Ko/Barsisa kebele with the minimum of 10 years and above. This shows that the activity was introduce or started in the area about many years ago. Having cumulative knowledge of how to keep bees is a prerequisite to the ability to obtain process and use information related to the practice.

The average family size of the sample farmers during the survey period was 5.99 persons, with standard deviation, maximum and minimum family size of 2.845, 13 and 1 persons respectively. Farmers with large family size might scantily supply honey to the market; because they consume more amount of honey at home.

Concerning gender of the household head, out of the total sampled households in the study area, 90.9% were male headed while the remaining 9.1% were female headed households. This conforms to the common thinking that honey production is men's job due to biting and absconding or swarming nature of honeybee colonies.

Table 3: Demographic Characteristics of Sample Households by Kebele

Variables	Sampled kebeles										Total	
	I/Muda		Ko/Barsisa		M/Boko		Ro/Dabaye		Wo/Shella		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%		
Age category												
23-45	11	61.1	18	75.0	14	73.7	17	85	10	55.6	70	70.7
46-65	7	38.9	3	12.5	3	15.8	2	10	8	44.4	23	23.2
66-80	0	0.0	3	12.5	2	10.5	1	5	0	0.0	6	6.1
Education level												
Illiterate	8	44.4	5	20.8	11	57.9	8	40	6	33.3	38	38.4
Elementary	3	16.7	9	37.5	2	10.5	1	5	4	22.2	19	19.2
Primary	4	22.2	6	25.0	3	15.8	5	25	6	33.3	24	24.2
Secondary	3	16.7	4	16.7	3	15.8	6	30	2	11.1	18	18.2
Beekeeping experience												
1-5 years	2	11.1	2	8.3	4	21.1	2	10.0	0	0.0	10	10.1
6-10 years	5	27.8	4	16.7	5	26.3	4	20.0	6	33.3	24	24.2
>= 10 years	11	61.1	18	75.0	10	52.6	14	70.0	12	66.7	65	65.7
Family size	No.		Minimum		Maximum		Mean		STD			
	99		1		13		5.99		2.845			
Gender of the household head						No.			%			
Male						90			90.9			
Female						9			9.1			

Source: Survey result, 2020

4.2. Access to Services

Membership to cooperative was assessed and the result shows that about 29.3% of the sampled households are not participated in the cooperative whereas 71.7% of them are participated in cooperative.

From the survey result access to market information shows that there is no system in place for systematically collecting, analyzing and disseminating information relevant to the needs of different actors. However, only 8.1% of sampled farmers had access to market information from different sources and 91.9% had no access to market information.

Finance is the crucial element starting from purchase of input up to the marketing of the product. The survey result showed that 28.3% of the sample households reported as they have received credit for honey production in the study area. The main objectives of the credit were to purchase honey production input.

Out of the total respondents of honey producing sample households, about 96% have contacted extension services providers. Only 4% of the farmers reported that they had no extension contact regarding honey production. The extension services providers were office of agriculture and rural development experts, DAs, NGO and innovative farmers. The extension services provided were about honey production, input use, harvesting and post-harvest handling.

Table 4: Cooperative membership and access to services

Description	No.	%
Cooperative membership		
Yes	29	29.3
No	70	70.7
Credit received		
Yes	28	28.3
No	71	71.7
Access to market information		
Yes	8	8.1
No	91	91.9
Frequency to Extension contact		
No extension contact	4	4.0
Ones in month	20	20.2
Twice in month	25	25.3
Four times in month	50	50.5

Source: Survey result, 2020

4.3. Inputs and Honey Production

Honey is harvested in the study area from August to December in each year. Among those who use traditional beehive, 56.2% of them harvest honey once in a year. Similarly, 24.2% of sampled households use modern hive and harvest once per year. As table 5 indicated that 43.8% and 75.8% of sample households who use traditional beehive and improved beehive responded that they harvest two times in a year. It was reported that any production obtained in the remaining periods of the year would be left as food for the colony to strengthen it for the next harvest.

Table 5: Frequency of harvest and number of beehives

Frequency of harvest	Type of beehive	
	Traditional beehive % N= 3739	Improved beehive % N=1462
1	56.2	24.2
2	43.8	75.8

N = number of beehives; Source: Survey result, 2020

As indicated in table 6 below the total annual honey production obtained from sample respondents using improved box hives and traditional beehives during the survey period was estimated at 22343kg and 19909Kg, respectively.

Table 6: Quantity of harvest per annum and number of beehives

Total number of beehives	N	Mini mum	Maximum	Sum	Mean	STD
Traditional Hive	99	4	130	3739	37.77	26.938
Modern Hive	99	0	30	1462	14.77	6.878
Annual production in Kg						
Traditional Hive	99	24	910	19909	225.69	119.907
Modern Hive	99	10	600	22343	209.57	153.564

Source: Survey result, 2020

Honey yield was markedly different for the traditional and modern hives. On average, it was about 6.34 kg/hive and 13.58 kg/hive from the traditional and modern hives, respectively (Table 7). As compared to the national average yield of honey per hive (kg/hive), 7.3, 25.2, and 13.3 for traditional, transitional and modern beehives, respectively (CSA, 2017), the District has almost comparable potential of honey production to the country.

Table 7: Volume of honey production per beehive

Type of beehive	Mean(kg/hive)	STD	Minimum	Maximum
Traditional	6.34	1.546	4	12
Modern	13.58	4.165	5	25

Source: Survey result, 2020

As depicted in table 8, on average cost of a single traditional beehive is 322.6 ETB. The costs of beehives are different from kebele to kebele of the sampled study area. One traditional beehive is 110 ETB in M/Boko, 100 ETB in three kebeles like I/Muda, Ro/Dabayee and W/Sheella and 120 ETB in Ko/Barsiisa. Beehive maintenance cost is 10% with a range of 30 ETB to 40 ETB. The rental value of land per hive is 3 ETB for all sampled kebeles.

Table 8: Cost of traditional Beekeeping in Anna Sorra district across sample kebeles

Expenditures	Me'e Boko	I/ Muda	Ro/Dabayee	Ko/Barsiisa	Wo/Sheella
Traditional beehives	110	100	100	120	100
Bee colonies	83	100	100	100	100
Beehive maintenance (10%)	30	35	30	40	35
Rent for harvesting tools per hive	0	0	0	0	0
Labor	83	83	83	83	83
Rental value of land per hive	3	3	3	3	3
Total	309	321	316	346	321
Average cost	322.6				

Source: Secondary data from ASWLDO (2018 E.C)

With regard to cost of items for the sampled household as shown in Table 9, the highest and the least cost associated for modern hives labor with a mean of 100 ETB and rental value of land per hives with a mean of 4 ETB. This study also shows that the maximum value of the total cost is 889 ETB registered in R/Dabayee whereas the minimum total costs of 839 ETB were recorded in the rest kebeles. This high total cost in R/Dabayee related with lack of

infrastructure facility which add transportation cost the producer. Thus the average cost spent to operate with one modern hives in the study area was 849ETB.

Table 9: Cost of production for Modern Hives

Expenditures (Cost in ETB)	Me'e Boko	I/MMuda	Ro/Dabaye	Ko/Barsiisa	Wo/Sheella
Modern beehives	350	350	400	350	350
Bee colonies for modern beehives	300	300	300	300	300
Rent for harvesting tools per hive	85	85	85	85	85
Labor for modern beehives	100	100	100	100	100
Rental value of land per hive	4	4	4	4	4
Total Cost	839	839	889	839	839
Average Cost	849				

Source: Survey result, 2020

4.4. Honey Marketing in Ana Sora District

According to the table below 86.9% of respondents were sold their honey product at I/Muda market whereas 13.1% of respondents were sold at Bore market. This figure shows that most respondents prefer the closest market to their living location.

Table 10: Market places of the study area

Market Place	No.	%
Irba market	86	86.9
Bore Market	13	13.1
Total	99	100

Source: Survey result, 2020

4.5. Pricing Strategy of Honey Market

With regard to the pricing strategy most respondents determine the prices of honey through negotiation. Table 11 depicted that, 88.9% of respondents used negotiation as a marketing strategy. Whereas, the rest 11.1% of the sample households were determined price based on supply and demand of the honey market.

Table 11: Pricing strategy of honey market

Pricing Strategy	No.	%
Through negotiation	88	88.9
Market (Demand and Supply)	11	11.1
Total	99	100

Source: Survey result, 2020

The survey result illustrated that the change in farm gate price of honey from 2018 and 2019 E.C. were expressed interims of semi-processed honey and unprocessed honey. The farm get price of the semi-processed honey in the year 2018 had a mean of 159.09 ETB with standard deviation of 5.169; whereas farm get price of unprocessed honey in 2018 had a mean of 91.98 ETB with standard deviation 8.497. In 2019 also the farm get price of semi-processed honey had a mean of 191.39 ETB with standard deviation of 12.543; whereas farm get price of unprocessed honey had a mean of 118.13 ETB with standard deviation 4.823. The comparison of change in price in two consecutive years reveals that the price of semi-processed honey was increased by 32.3 ETB whereas unprocessed honey price was inflated by 26.15 ETB. This revealed that the price of honey is in increasing trend (table 12).

Table 12: Change in price from 2018 to 2019

Change in Farm get price through two consecutive years						
	2018		2019		Change in %	
	Semi-Processed Honey in ETB	Un processed Honey in ETB	Semi-Processed Honey in ETB	Un processed Honey in ETB	Semi-Processed Honey in ETB	Un processed Honey in ETB
Mean	159.09	91.98	191.39	118.13	32.30	26.15
STD	5.169	8.497	12.543	4.823	11.242	6.618

Source: Survey result, 2020

4.5.1. Demographic characteristics of the sampled traders

The demographic characteristics of honey traders discussed in terms of age, sex, education level and average experience. The age of traders ranged from 28 to 42 with an average age of 33 years old. The survey result indicates that, all the sample honey traders are males and about 97% of them were married. About 64% and 24% of the sample traders were within the level of Primary and Secondary School education, respectively, and only 12% of the traders

have some kind of tertiary education. And also traders had 8.3 years of experience on honey trading on the average.

Table 13: Demographic characteristics of sampled traders

Variable		No.	%
Sex			
Male		25	100
Female		0	
Education Level			
Elementary		16	64
Secondary		6	24
Diploma		3	12
Age	Mean	Minimum	Maximum
	33	28	42
Experience	Mean	Minimum	Maximum
	8.3	6	25

Source: Survey result, 2020

4.5.2. Financial capital of sample honey traders

Table 14 shows that average initial and current working capital of honey traders during the survey period was estimated to be Birr 1778.2 and Birr 5610.7, respectively. Moreover, as it was indicated in table below, the current working capital of honey traders was about 2 times greater than their initial working capital and the initial and current working capital of the honey trades varies from Birr 516.7 to 3250 and Birr 3766.7 to 21400, respectively. With regard to the sources of working capital, 85.7% of the honey traders reported that their source of current working capital were own saving and credit while the rest 14.3% of honey traders obtain their working capital from their relatives.

Table 14: Financial capital of sampled honey traders

Variables	Mean	Minimum	Maximum
Initial working capital (Birr)	1778.2	516.7	3250
Current Working Capital (Birr)	5610.7	3766.7	21400
Source of current working capital	No.	%	
Own saving and Credit	18	85.7	
Relatives	3	14.3	

Source: Survey result, 2020

4.5.3. Production and marketing problems and opportunities

Beekeepers confronted with several problems related to production and marketing. Major problems in beekeeping arise from bee characteristics and environmental factors that are beyond the control of the farmers. A questionnaire was designed as part of the study with the objective of identifying the existing problems limiting development of the apiculture sector in the study district. Table below summarized major constraints identified and prioritized by the respondents.

Table 15: Beekeeping problems encountered by sample respondents

Constraints	%
Marketing problems	18
Credit	17
Lack of beekeeping equipment	16
Absconding honeybee	15
Shortage of bee forage (drought)	11
Disease and pests	9
Death of colony	7
Reduction of honey bee colony	3
Lack of adequate beekeeping skill	3

Source: Survey result, 2020

It can be seen from Table above that the most serious problem faced by respondents in order of their importance were marketing problem followed by credit, lack of beekeeping equipment, lack of beekeeping equipment's, absconding honeybee, shortage of bee forage (drought), disease and pests, death of colony, reduction of honey bee colony and lack of adequate beekeeping skill. Marketing problem is the primary constraint whereas lacks of equipment were identified by farmers as secondary in beekeeping development in the study area during the survey. The incidence of drought was predicted as extra treats in beekeeping which later forces the colonies to abscond to areas where resources are available for their survival. The prevalence of disease and pests also recognized as another challenges for beekeepers in study area. Therefore, in order to overcome such challenges supply of alternative feed during dearth period, provision of protective materials, technical support in filling skill gap and distribution of improved box beehives was encouraging for the beekeepers.

Honey is produced mainly for marketing in the district. Households sell about 90% of the honey produced. The increased honey production during the harvest period was found to coincide with high supply in the study area. Beekeepers generally supply to markets in nearby towns like Bore and M/Boko, through traveling on foot. The farmers sell the honey they produce on individual basis mainly to consumers and private traders twice a year. They are price takers and have low bargaining power. Despite the high supply of honey production in the district, the market is not efficient to attract and benefit farmers.

4.5.3.1. Traders marketing problems

As shown in the Table below, the basic problems faced by honey traders' during the survey period was product quality, problem on competition with unlicensed traders, and shortage of finance, demand and unfair tax fee. Competitions with unlicensed rural assemblers were the priority problem identified by honey traders in study area followed by shortage of finance and quality of honey marketed.

Improving the quality of honey has to do with production, harvesting and storing by farmers. As farmers reported one of the reasons for quality problem could be low beekeeping skills.

The other problem for the poor quality of honey that traders noted is that there are unlicensed traders/honey collectors who might be mixing honey with sugar.

Table 16: Marketing problems of honey traders

Type of problem	% (n=21)
Competition with unlicensed traders	33
Shortage of finance	30
Quality	28
Tax	6
Demand	4

Source: Survey result, 2020

About 33% of the honey traders confirmed that they faced competition with unlicensed traders; about 30% of them indicated that they face financial shortage to run and expand their business. Survey also indicated that 6% of the sample traders complain that they were forced to pay unfair tax and about 4% of the sample traders reported that they faced demand problems due to limited number of buyers, high supply of honey.

4.5.3.2. Opportunities

In Ethiopia, beekeeping is an integral part of the life style of the farming communities, and except for a few extreme areas, it is a common practice in every place where humankind has settled. The direct contribution of beekeeping includes the value of the outputs produced such as honey, bee wax, queen and bee colonies, and other products such as pollen, royal jelly, bee venom, and propolis in cosmetics and medicine (ARSD, 2000 and Gezahegn, 2001).

In study area, there were important honey production opportunities. Among these opportunities; infrastructure development could facilitate honey production and marketing, diverse agro ecology is also an opportunity for honey production, accordingly 89% of the district agro-ecology were midland (Woynadega) and Dega which encompasses different honey floras was favorable for honey production and the existence of nectar plants of the

district were among the best chance that producer had. There is also SLM(Sustainable Land Management program) and **ASPIRE** (Apiculture scaling up program for income and rural employment) non-governmental organizations that aims at alleviating poverty through increasing income of beekeepers by providing improved beehives and technical assistance in district for last five years.

4.6. Honey Marketing System in Ana Sorra District

In this section of the study, honey market participants, their roles and linkages, the marketing channel, the conduct and as well as the performance of honey market are presented one after the other.

4.6.1. Honey marketing participants, their roles and linkages

In this study, different honey marketing participants were identified. Honey marketing participants in the study area includes producers/beekeepers, honey collectors/assemblers, retailers, whole sellers, processors and final consumers of the product.

Producers: Producers/beekeepers sell their honey to different buyers involved in honey in the market at village or district market center. The market place that is the closest to the residence of the farmers is the first chosen with regard to minimization of transportation costs. According to the survey results, in 2018/2019 production year, 20.5%, 12%, 31.8%, 19.8% and 15.9% of their annual sale of honey was sold to consumers, honey collectors, whole sellers, retailers and processor respectively.

Table 17: Amount of honey supplied (in kg) to different market participants by farmers

Market participants	Volume (Kg)	%
Consumers	7,795.5	20.5
Honey collectors	4,563.2	12
Whole sellers	12,092.5	31.8
Retailers	7,529.3	19.8
Processor	6,046.26	15.9
Total	38,026.8	100

Source: Survey result, 2020

Wholesalers: They have license from District Trade and Market Development Office for honey trade. Wholesalers are market participants who buy large quantities of honey and resale to other traders. They purchase honey from collectors and producers in a larger volume than any other marketing actor does. They relatively spend their full time in wholesale buying during harvest time in the district. Each wholesaler cover transportation cost of the product in addition to product price. They purchase 100 percent from Ana Sorra and Bore and sell at Ana Sorra and Bore. They have better storage that store honey at least for one year, transport and communication access than other traders.

Honey collector/assembler: They perform double tasks in the market chain as producers and collectors. They are part time trader who played important role in collecting produce from smallholder producers at farm gate and delivering to traders and they do know areas of surplus well. They are engaged in buying of honey from farmers and resale it to wholesalers and retailers who are in the district at the harvesting season. Collectors play important roles of bulking, grading (color based) and sending the products to the various market outlets.

Retailers: Retailers comprise some of the integrated suppliers who sell honey to local consumers. These include small shops in rural villages and urban centers. Their function was storing, grading, packing and selling honey to consumers in small volumes after receiving large volumes from collectors, wholesalers and producers.

Processor: are retailers in the areas who supply honey to consumers. They buy honey from wholesalers and sell in the form of tej or berz to the consumer.

Consumers: From the consumers' point of view, the shorter the marketing chain, the more likely is the retail price going to be affordable. Consumers for this particular study are those households who bought and consume honey. They are individual households; they bought the commodity for their own consumption only.

4.6.2. Honey marketing channels and marketing margin

The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumer).

Honey passes through several stages before it reaches the ultimate consumers. Accordingly, seven main alternative channels identified during the survey were:-

Channel I: Producers - Whole sellers - Honey Collector-Retailer-Consumer =5,513.8Kg (14.5%)

Channel II: Producers-Honey Collector-Whole Sellers-Retailer-Consumer=9,696.9kg (25.5%)

Channel III: Producers -Honey Collectors-Consumers=2,813.9Kg (7.4%)

Channel IV: Producers -Retailers-Consumers =5,247.6Kg (13.8%)

Channel V: Producers -Consumers =7,034.9Kg (18.5%)

Channel VI: Producers -Processor- Consumers =4,144.9Kg (10.9%)

Channel VII: Producers-Honey Collector-Whole Sellers-Processor–Consumer=3,574.8Kg (9.4%)

As can be understood from channel identified in study area, the main actors in honey trade were whole seller, honey collectors, consumers, retailers and processors. Based on volume of honey marketed passed through each channels,

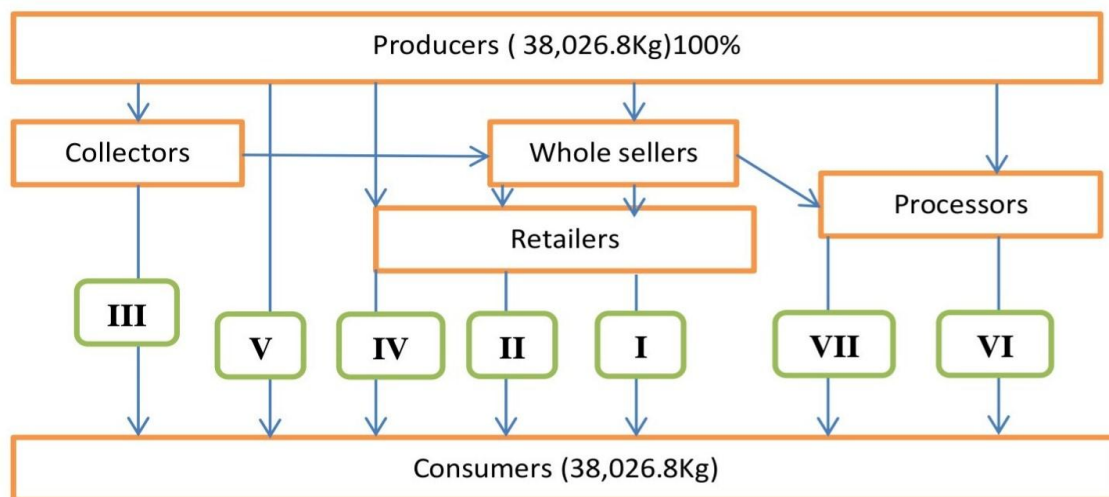


Figure 3: Honey marketing channel

Source: Survey result, 2020

Lines of marketing channels are identified for honey production of the study area. They are very few honey processors in the study area that employ solely in honey processing activities.

The channel comparisons was conducted based on volume that passed through each channel detects that, market channel II carried the largest volume i.e. 9,696.9kg of honey marketed, which was 25.5% of the total volume followed by market channel V, Channel I, and Channel IV which take the value of 7,034.9Kg (18.5%), 5,513.8Kg (14.5%) and 5,247.6Kg (13.8%) respectively (Figure 2).

4.6.3. Market conduct

Market conduct refers to the patterns of behavior of firms. This implies analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable (Pomeroy and Trinidad, 1995). There are no agreed upon procedures for analyzing the elements of market conduct. Rather, some points are put to detect unfair price setting practices and the conditions under which such practices prevail.

Producers' Market Conduct

Honey is the most important cash income generating commodity in the study district. During the survey, farmers pointed out that supply of honey to the market occurs mainly from August to December. According to the report, about 37%, 23% and 15% of the total yearly sale of honey was made in September, October and November respectively. The remaining portion of the output 8%, 11% and 6% was sold in May, June and July respectively. Respondents also reported that there were no significant sales in the months of April to June. During the study, it was observed that, the frequency of honey supplied to the market by farmers was twice a year and almost all (100%) beekeepers' term of sale was on cash basis.

In the study area, farmers organized in terms of rural villages. Starting from production up to marketing, every farmer produces and sells on individual basis. This affects their bargaining power during the sale of honey. Accordingly, all sampled households reported that, for the last seven years, price of honey showed an increasing trend. One of the reasons for the increase in price was mainly the quality of honey produce due to the introduction of improved box beehives according to farmers.

Traders' Market Conduct

The survey result indicated that the transactions made on honey marketing of the study area takes place with direct contact between sellers and buyers. There were no observed operational brokers in the honey marketing channel during the survey period. The honey retailers were found to purchase honey either directly from farmers at the local/district market or from honey collectors. The method of price setting is crucial importance in honey trading activity. About 28% of the sample traders reported that their purchase price was set by market (Demand and supply), whereas about 72% of traders was set purchase price through negotiation with suppliers.

Table 18: Traders price setting strategy

Pricing Strategy	No.	%
Through negotiation	18	72
Market (Demand and Supply)	7	28
Total	25	100

Source: Survey result, 2020

4.6.4. Performance of the market and Marketing margin

Methods employed for the analysis of honey market performance were marketing margins by taking into account associated marketing costs for key marketing channels. Hence, on the consideration of 2018/19 production year, costs and purchase prices of the channel actors, margin at producers, whole sellers, retailers' and honey collectors' level was conducted.

Cost and profitability analysis of honey production for producers

Cost and profitability analysis of honey production for 2018/19 production year in the study area was promising regarding its cost-effectiveness. The average sales per beekeeper were 225.69kg, 201.1kg per traditional and improved hives respectively. The beekeepers average farm gate price of honey was 120 ETB, 150ETB per traditional hives and box beehives respectively. The computation data shows that beekeepers would generate annual returns of 15,161.11 ETB and 17,618.4 ETB per traditional and box beehives respectively. Computation

of B:C ratios were 1.27% and 1.4% per Traditional hives and improved hive respectively. Analysis shows that cost and benefit of beekeeping was promising in study area (Table 19).

Table 19: Cost and profitability analysis of honey production for producers

Items		Revenue From total Sales of Honey	
		Traditional	Modern Hive
Average number of Hive	A	37.77	14.77
Average Yield in kg per Beekeepers	B	225.69	201.10
Average yield in Kg per Hive types	$C=B/A$	5.97	13.615
Average Price ETB per Kg	D	120	150
Total Sales/Revenue ETB	$E=B*D$	27082.8	30165
Average cost	F	322.2084	849.46
Total Cost	$G=A*F$	11,921.69	12,546.52
Profit/Loss	$H=E-G$	15,161.11	17,618.4
B:C Ratio	$I=H/G$	1.27	1.4

Source: Survey result, 2020

Cost and profitability analysis for honey collectors

The result of in table 20 shows that honey collectors obtained a profit of 8.05 ETB per kg of semi-processed honey whereas 12.1 ETB per kg from crude honey. This indicates that the performance of marketing of honey collectors for the specified year 2018/19 was showing encouraging (Table 20).

Table 20: Cost and profitability analysis of honey collectors

Cost items	Crude Honey	Semi-processed Honey
Honey collectors' purchase Price in ETB/kg	120	150
Production cost	0	0
Processing cost	0	0
Market cost	4.45	6.5
Labor cost	0.5	0.5
Loading/unloading	0.5	0.5
Transport	0.5	0.5
Packing material	0	0
Store rent	0.5	0.5
Shop rent	0	0
Tax	0	0
Others	1.45	3.45
Total cost	127.9	161.95
Gross Sales	140	170
Profit/Loss	12.1	8.05

Source: Survey result, 2020

Cost and profitability analysis of honey for wholesalers

The cost and profitability analysis of the sample honey wholesalers found in the sample markets, as the bellow result table 21 clearly shows wholesalers were found to be profitable. This indicates that wholesalers can obtain a profit of ETB 5 per kg from sales of semi processed honey and 5 ETB per Kg of crude honey.

Table 21 Cost and profitability analysis of honey wholesalers

Cost items	Crude Honey	Semi-processed Honey
Whole sellers purchase Price in ETB/kg	140	170
Production cost	0	0
Processing cost	0	0
Market cost	3	3
Labor cost	0.3	0.3
Loading/unloading	0.5	0.5
Transport	0.5	0.5
Packing material	0	0
Store rent	0.1	0.1
Shop rent	0	0
Tax	0.1	0.1
Others	0.5	0.5
Total cost	145	175
Gross Sales	150	180
Profit/Loss	5	5

Source: Survey result, 2020

Cost and profitability analysis of honey for retailers

The cost and profitability analysis of the sample honey retailer's found in the sample markets, as the above result table clearly shows retailers were found to be profitable. This indicates that a retailer can obtain a profit of ETB 55.27 per kg from sales of semi processed honey and 17.08 ETB per Kg of crude honey at retail level which was a little beat higher than profit of rural assemblers.

Table 22: Cost and profitability analysis of honey retailers

Cost items	Crude Honey	Semi processed Honey
Retailers purchase Price in ETB/kg	150	180
Production cost	0	0
Processing cost	0.1	0.1
Market cost	0.13	0.5
Labor cost	0.5	0.5
Loading/unloading	0.5	0.5
Transport	0.1	0.1
Packing material	1.63	1.86
Store rent	0.69	0.69
Shop rent	0.1	0.1
Tax	0.14	0.14
Others	0.3	0.3
Total cost	152.92	184.73
Gross Sales	170	200
Profit/Loss	17.08	15.27

Source: Survey result, 2020

4.6.5. Marketing margin

Table 23 depicts different types of marketing cost related to the transaction of honey by producers, rural collectors, wholesalers, processors and retailers; and the benefit share of each marketing actors.

Table 23: Average marketing costs and benefit shares of the marketing actors

Item (birr/kg)	Producer		Rural Collector		Wholesaler		Processor	Retailer	
	Unpr	Spro.	Unpr	Spro.	Unpr	Spro.	Unpr	Unpr	Spro.
Purchase price	0	0	120	150	140	170	170	150	180
Production cost	53.9	62.39	0	0	0	0	0	0	0
Processing cost	0	0	0	0	0	0	3	0.1	0.1
Market cost	9	9	4.45	6.5	3	3	2	0.13	0.5
Labor cost	0.5	0.5	0.5	0.5	0.3	0.3	1	0.5	0.5
Loading/unloading	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5
Transport	1	1	0.5	0.5	0.5	0.5	1	0.1	0.1
Packing material	0	0	0	0	0	0	1	1.63	1.86
Store rent	0	0	0.5	0.5	0.1	0.1	0	0.69	0.69
Shop rent	0	0	0	0	0	0	0.1	0.1	0.1
Tax	0	0	0	0	0.1	0.1	0.5	0.14	0.14
Others	1	1	1.45	3.45	0.5	0.5	1	0.3	0.3
Total cost	65.9	74.39	127.9	161.95	145	175	180	152.92	184.73
Selling price	120	150	140	170	150	180	150	170	200
Profit/Loss	54.1	75.61	12.1	8.05	5	5	10	17.08	15.27
	1.27	1.4							

Source: Survey result, 2020

Marketing costs are estimated to compute the share of profit captured by key actors in the marketing chain. Table 23 shows the average marketing costs incurred by every actor during transaction. The highest marketing cost was incurred by the retailer (184.73 birr/kg) followed by processor (180 birr/kg). This is because retailers' packing costs is higher and specialized labor for the packing and processing relatively expensive.

Average production cost of producers was (53.9 birr/kg, 62.39 birr/kg) for unprocessed and semi processed honey respectively. On average, farmers' selling price to retailers and wholesalers at District town markets are 120/150Birr/kg and 170/200 Birr/kg for unprocessed and semi processed honey respectively. It appears to be 120/150 Birr/kg at farm-gates in remote rural areas where rural collectors operate. Therefore, the gross profit of farmers obtained by selling their honey to these markets is found to be 54.1 and 75.61 Birr/kg for unprocessed and semi processed honey respectively.

4.6.6. Marketing margin for different channels

Marketing margins of honey in the seven channels for each group of market players are presented here. TGMM, GMM, GMMp, GMMc, GMMw, GMMr, and GMMps are total

gross marketing margin, gross marketing margin, and gross marketing margins of producers, collectors, wholesaler, retailer and processor, respectively. The total gross marketing margins in the seven channels for unprocessed and Semi processed honey are 40.0%/31.8%, 40.0%,/31.8%, 40.0%/31.8%, 40.0%/31.8%, 30.0%/27.3%, 40.0% /31.8%, and 40.0%/36.4% respectively. The producers' shares in channel for Un processed honey are I, II, III, IV, V, VI, VII, are 80.0% , 80.0% , 80.0% , 80.0%, 85.0%, 80.0% and 80.0% whereas; producers' shares in channel for processed honey are 85.5%, 85.5%, 85.5%, 85.5%, 87.6%, 85.5% and 83.5% respectively.

Table 24: Honey marketing margin for different channels (Birr/kg)

Agents		Honey market channels													
		I.		II.		III.		IV.		V.		VI.		VII.	
		Unp	Sp	Unp	Sp	Unp	Sp	Un	Sp	Unp	Sp	Unp	Sp	Unp	Sp
Producer	P price														
	S/ price	120	150	120	150	120	150	120	150	120	150	120	150	120	150
	GMMp(%)	80	85.5	80	85.5	80.0	85.5	80	85	85	87.6	80	85.5	80.0	83.5
Collector	P/ price	120	150	120	150	120	150	-	-	-	-	-	-	120	150
	S/ price	140	170	140	170	150	180	-	-	-	-	-	-	140	170
	GMMc (%)	10.5	10	10.5	10.0	15.8	15.0	-	-	-	-	-	-	10.5	15
Wholesaler	P/ price	120	150	120	150	-	-	-	-	-	-	-	-	120	150
	S/price	150	180	150	180	-	-	-	-	-	-	-	-	150	180
	GMMw (%)	5.0	5.0	5.0	5.0	-	-	-	-	-	-	-	-	5.0	5.0
Retailer	P/ price	150	170	150	170	-	-	150	170	-	-	-	-	-	-
	S/price	190	200	190	200	-	-	190	200	-	-	-	-	-	-
	GMMr (%)	20.0	10.0	20.0	10.0	-	-	20.0	10.0	-	-	-	-	-	-
Processor	P/ price	-	-	-	-	-	-	-	-	-	-	150	170	150	170
	S/price	-	-	-	-	-	-	-	-	-	-	200	220	200	220
	GMMps (%)	5.0	9.1	5.0	9.1	5.0	9.1	5.0	9.1	5.0	9.1	5.0	9.1	5.0	9.1
TGMM		40.0	31.8	40.0	31.8	40.0	31.8	40.0	31.8	30.0	27.3	40.0	31.8	40.0	36.4

Source: Survey result, 2020

As indicated in Table 24, total gross marketing margin (TGMM) is highest in channel I , II, III, IV and VII which was 40%/31.8 and 40%/36%% for unprocessed and semi processed honey respectively and lowest in channel V which was 30% /27.3% unprocessed and semi processed honey respectively. Producers share (GMMp) was highest in V which accounts 85%/87.6% and lowest in channel VII which is 80% and 83.5% respectively. This difference might support the theory that as the number of marketing agents increases the producers share decreases. The reason being, the higher number of middle men in the commodity market, the more profit they retain for their services whether they add value to the item or not.

The total gross marketing margin (TGMM) is highest in channel I, II, III, IV and VII which was 40%/31.8% and 40%/36% for unprocessed and semi processed honey respectively. This implies share of market intermediaries in the consumer's price was substantial and there was a need to reduce market intermediaries to minimize the marketing margins and thereby enhance the producers' income. The minimum gross margin is taken by processor and wholesalers operating in the area which was 5% and 9.1% in channel I, II and V for unprocessed and semi processed honey respectively.

4.6.7. Concentration Ratio (CR)

The economic analysis was made to determine the level of Concentration ratio of honey industry in the study area. As shown in the table 25, the total volume honey production, production of four leading producers and other total production volume were 38,026.80 kg, 3,875.40kg and 34,151.40kg respectively. The calculated value of concentration ratio was 10.19% lies in the range of low concentration which depicts the fact that the structure of the market in the study area was monopolistic in competition.

Table 25: Market concentration ratio of beekeepers

Beekeepers(Firms)	Total production per firms in (Kg)
A	1,359.00
B	864.00
C	832.50
D	819.90
Others (Total)	34,151.40
<i>Industry total</i>	38,026.80
Total of 4 leading Beekeepers	3,875.40
Concentration ratio in (%)	10.19

Source: Survey result, 2020

4.7. Determinants of Volume Supplied to Market

In this section, the selected explanatory variables were used to identify the determinants of volume of honey supplied to market.

Analyses of determinants affecting volume of honey supply were found to be important to identify factors constraining honey supply to market. Prior to fitting multiple linear regressions, the hypothesized explanatory variables were checked for existence of multicollinearity, heteroscedasticity and endogeneity problem.

Test of heteroscedasticity: Since there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated.

Test of multicollinearity: All VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent variables (Appendix Table 1). If there is presence of multicollinearity between independent variables, it is impossible to separate the effect of each parameter estimate in the dependent variables. It is thus, important to test multicollinearity between explanatory variables.

Test of endogeneity: When a variable is endogenous, it will be correlated with the disturbance term, hence violating the OLS assumptions and making our OLS estimates

biased. Testing for endogeneity of quantity produced of honey was carried out in the model using both Hausman test and Durbin-Wu-Hausman (DWH) test and endogeneity problem was found.

Hausman test result indicated that, the predicted quantity produced of honey was statistically significant with ($p= 0.0000$) when included as additional explanatory variable in structural model which implies hypothesized quantity produced of honey variable is endogenous due to the fact that it is correlated with error term. Durbin Wu-Hausman test results also shows that the null hypothesis of exogeneity of the quantity produced honey was rejected at 1% probability level ($\chi^2=50.2636$ and $P\text{-value} = 0.0000$) using estat endogenous STATA command after ivregress. Therefore, two stages least square (2SLS) method was used to address the endogeneity problem.

Two-stage least squares is a **poor strategy** for estimation and hypothesis testing when instruments are weak and the model is over-identified. To overcome the endogeneity issue that two stage least square technique requires valid instrumentals variables. The instrumental variable should fulfill **two requirements** to be used as instrument. One the instrument must be **uncorrelated with error term** and second requires the **linear projection of endogenous variable onto all the exogenous variables**.

Accordingly, tropical livestock unit and number of beehives were selected as instrumental variables. So the instrumental variables were selected by checking its correlation with the endogenous and exogenous variables. Therefore, for this study **relevance tests** of excluded variables were made using F statistic from the first stage regression using e stat first stage STATA command. The F test result **for quantity produced of honey was 366.954** (a general rule of thumb is that if F test is less than 10 there is cause for concern). So we should reject the null hypothesis presence of weak instruments hence our statistics greatly exceeded the critical values (Appendix Tables 3).

Over identifying restrictions test was also tested using HansenSargan test and Basmann test using estat overid command. The results of Basmann test show a P-value of 0.635 and which indicated the model is correctly specified and the instruments are valid (Appendix Table 3).

Two stages least square (2SLS) method was used to identify factors affecting the volume of honey sold to the market by honey producers in the study area. In the first stage of 2SLS method, regressions was run and analyzed using fifteen explanatory variables including tropical livestock unit and number of beehive and the result shows that, Beekeeping experience, market distance tropical livestock unit and number of beehive affected significantly quantity produced of honey (Appendix Table 2). Amount of tropical livestock unit and number of beehive were used as instruments for honey supplied to market.

In second stage of 2SLS from hypothesized thirteen explanatory variables, seven variables i.e. Quantity produced, years in beekeeping, distance to nearest market, education levels, extension contact, cash income other than beekeeping and lag-price significantly influenced volume of sales of honey. As depicted in Table 26, the model was statistically significant at 1% probability level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R^2) was used to check goodness of fit for the regression model. Hence, R^2 indicates that 83.15% of the variation in the quantity of honey supplied to market was explained by the variables included in the model. The explanation on the effect of the significant explanatory variables is discussed below.

Table 26: Determinants of amount of honey supplied to market (2SLS estimates)

Variables	Coef.	Robust Std. Err.	Z	P>z
Quantity produced of honey	0.919***	0.095	9.68	0.000
Sex of the house hold head	0.638	17.393	0.04	0.971
Year in beekeeping	19.361*	10.728	1.80	0.071
Family size of the household	-0.551	2.156	-0.26	0.798
Educational level of the household head	15.542**	6.113	2.54	0.011
Access to honey market information	17.786	14.265	1.25	0.212
Distance to nearest market	-1.412*	0.748	-1.89	0.059
Access to credit received	22.973	19.321	1.19	0.234
Extension contact for honey production	81.098***	18.763	4.32	0.000
Cash income other than beekeeping	-0.001*	0.0003	-1.89	0.059
Membership to cooperative	-14.553	10.580	-1.37	0.320
Type of beehive used	-12.378	25.253	-0.49	0.624
Lag-price	2.950***	0.620	4.75	0.000
_cons	-151.756	117.447	-1.29	0.196
Number of obs	99			
Wald chi2(13)	1292.96			
Prob > chi2	0.0000			
R-squared	0.8315			
Root MSE	61.617			

Note: ***, ** and * significant at 1%, 5% and 10% respectively

Source: Survey result, 2020

Quantity of honey produced in kilogram in 2018/19 production season in the study area. As hypothesized the regression coefficient of quantity of honey produced was positively related with honey quantity supplied and significantly at 1% probability level. The value of the coefficient for quantity of honey produced implies that an increase in quantity of honey produced by one kilogram resulted in an increase in volume of sales honey by 0.919 kilograms, keeping other factors constant. The higher the quantity of honey produced the greater the tendency for the farmers to supply honey to market. Sultan (2016) also found that the amount produced of wheat significantly affected quantity supplied to market positively.

Distance to the nearest market affected honey marketed surplus negatively and significantly at 10% significance level as expected. The result showed that as the distance from the nearest market increased by one kilometer, the quantity of honey supplied to market decreased by 1.412 kilogram, holding all other variables constant. This is because as the distance from the

market increases, transportation cost also increase to transport honey which in turn may decreases the marketed surplus. The longer distance of the market, the higher would be the transportation charges, increased walking kilometer, and increased other marketing costs. This is in line with finding of Berhanu and Moti (2010).

Beekeeping experience of households affected honey marketed surplus positively and significantly at less than 10% significance level. Thus, the result implied that, as producers experience increase by one year, the honey supplied to market increased by 19.361 kilogram, keeping others factors constant. This means that the producers with more experience in honey production and marketing have higher ability to sell more honey produces in the market than less experienced because they have more marketing network and information. This is in line with finding of Addisu (2016) who found that vegetable farming experience significantly affected quantity of onion supplied to market positively.

Frequency of extension contact affected supply of honey to market positively and significantly at 1% level of significance. The positive and significant effect may be due to the reason that beekeepers who get more knowledge during contact with extension agent for honey production particularly about modern honey production, harvesting, storing and handling methods contribute to increasing the amount of honey production. As increases in Extension contact by one day resulted in an increase in volume of sales of honey by 81.098 kilogram, keeping other factors constant. This is in line with finding of Getachew (2009).

Education level of the beekeeping household has a positive effect on honey sale quantity per household per year. It is statistically significance at 5% significance level. The model output verifies that one additional formal year education level leads to the beekeeping household to increase yearly honey production by 15.542 Kilograms. The positive and significant relationship indicates that education improves the beekeeping household ability to acquire new idea production related and market information, which in turn improves productivity and thereby increase marketable supply of honey.

Previous year price of honey which shows a positive relation to the quantity of honey sold or supplied to market. Producers checked the price of honey for their best benefit and this directs

to the determinant to be the significance at 1% level. The positive and significant relationship between the variables indicates that as the price of honey at market rises, the quantity of honey sold at the market also rises, which in turn increases quantity of honey sold per household per year. The coefficient of the variable also confirms that a unit price increase in the honey market directs to the beekeeping household to raise yearly honey sales by 2.950 kilograms per box beehives. The study of Wolelaw (2005), on determinants marketable supply of rice found a significant positive relationship between rice sold and previous year price.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study was aimed at analyzing market chain of honey with special emphasis to Anna Sorra district of Guji zone of Oromya National Regional State, Ethiopia. To address the objectives of the study, both quantitative and qualitative methodologies were used. The data were generated from both primary and secondary sources. The primary data were collected through personal interviews from a total of 124 respondents (99 producers, 21 traders and, 4 consumers) using semi-structured questionnaires. Qualitative data were also collected through focus group discussions, key informants interviews and observations.

Descriptive statistics and econometric model were used to analyze the collected data. Two stage least square regression (2SLS) model was adopted to understand the determinants of volume of honey supplied to market by farmers. The findings of this study are summarized as follows.

Out of the total household heads, above 90% were male headed. The average age of the sample respondents was 42.57 years. The average family size was 5.99, and the overall educational status of the sampled households was composed of 28.3%, illiterate and 71.7% literate.

The study area revealed that, the main actors in the chain were honey producers, rural assemblers, wholesalers, processors (tej-makers) and retailers. The structure of the market was analyzed by taking the share of the four large firms from the total volume of trade mobilized by the sampling traders in 2019. Suggesting that, the structure of the honey market in the study area was somewhat monopolistic feature.

However, absence of organized institutions and system group marketing has made traders in a better position to dominate the settle in pricing. The research result also indicated the existence of seven honey market channels in the study area. Producers-rural assembler-

consumer channel was important to producers and consumers to get acceptable prices; while producer processor-consumer channel and producer-rural assembler-wholesaler-processor-consumer channel was the most important channels in terms of total volume marketed for honey.

The total gross marketing margin for unprocessed and semi-processed honey was highest in Channel VII which is (40%/36.4%) and lowest in Channel V (30%/27.3%) respectively. Producers have receive a best advantages of gross marketing margin which is more than 80% along almost all channels for both unprocessed and semi processed honey. Retailers and rural collectors have got better gross marketing margin which is 20%/10% through channel I, II, IV and 10.5%/10% in channel I, II and 15.8%/15% in channel III over the wholesalers and processors have got the lowest marketing margin. The reason that beekeepers have got best opportunity of gross marketing margin was because of relatively low cost of production, surplus honey production and high price of honey in their locality.

The econometric model results revealed that previous Quantity produced, years in beekeeping, distance to nearest market, education levels, extension contact, cash income other than beekeeping and lag-price affect the volume of honey marketed.

In the district, the existing situations to exploit the potential regarding honey production and marketing were not encouraging. Extension service in line with improving honey production and marketing, credit service, producers and traders' cooperatives, and formal market information were very weak. These problems can be addressed via formation of honey producer unions and cooperatives and through intervention of governmental or nongovernmental organizations in terms of improving possibilities for strong and successful collective marketing of honey.

5.2. Recommendations

On the basis of the results of this study, the following recommendations are drawn so as to suggest the future intervention strategies aimed at the promotion of honey production and marketing in the study area in particular, and other similar places in general.

It is highly recommended to improve the input supply system through encouraging private supplier in the District so that farmers receive the right type of production inputs with full accessory and quality needed approved by governmental bodies at the right time from District market. Improving the supply system will protect beekeepers from unnecessary cost incurred for the purchasing of inputs from different areas with high inputs and transportation cost. In addition these problems can be addressed via formation of beekeeper unions and cooperatives and through governmental or non-governmental organizations intervention. This will also improve possibilities for strong and successful collective marketing of their hive products.

In order to overcome seasonal shortage of feed, absconding, lack of beekeeping skill, diseases, pest and death of bee colony government should give attention to train beekeepers in the District on how to manage bee colony at different seasons. The role of research institutes and universities are crucial in identifying diseases, pest and causes for death of colony and prevention mechanism to improve production and productivity of honey.

The enhancement of honey producers bargaining power through honey producers cooperative is the best measure that should target at reducing the imperfect nature of honey market. The support services to be provided by government like credit access, extension service and train on beekeeping improves honey marketed volume. Hence, improve current services can enhance income generated from honey marketing through increasing production, minimizing after harvest losses and improving transport accessibility.

Econometric analysis results of the study suggested that increasing quantity produced of honey in the area by improving infrastructure facilities and sharing the beekeepers experience is crucial. The concerned body should focus on increasing quantity produced of honey through promoting experience sharing on improved honey production skill, technical support

to beekeepers in beekeeping, increasing follow up starting from production to supply that would increase quantity produced of honey.

Based on 2SLS model results, education levels, extension contact, cash income other than beekeeping and lag-price affect volume of honey market supply. Hence, strengthen area specific extension system on beekeeping supporting by giving continuous capacity building trainings and separating DAs extension work from other administrative activities, introduce modernized beekeeping system and motivation farmers by giving uncultivated land for beekeeping activities to increase beekeeping technology participation to increase honey market supply.

Distance to the market places and family size become important determinants of beekeepers in the marketing of honey. As a result, improving rural infrastructure and developing market infrastructure in the form of establishing produce collection points across rural areas would assist poor beekeepers for faster delivery of beehive produces.

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7. APPENDICES

Appendix table 1: VIF for factors affecting volume of honey supplied to market

Variable	VIF	1/VIF
Mrktdist	1.29	0.775035
Lagprice	1.27	0.788592
Nfincome	1.21	0.829519
Msincoop	1.18	0.845711
Yieldt	1.16	0.860395
Acctomkt	1.16	0.864106
Eductstd	1.15	0.866424
Famlysiz	1.12	0.890554
Credtac	1.12	0.892661
Extetion	1.11	0.898023
Exper	1.09	0.914000
Sex	1.08	0.926982
Training	1.04	0.961023
Mean VIF	1.15	

Appendix table 2: Factors affecting quantity produced of honey

Supply	Coef.	Std. Err.	t	P>t
Yieldt	-0.0727	0.1008	-0.72	0.472
Sex	4.6280	16.7637	0.28	0.783
Exper	-14.387**	7.2273	-1.99	0.050
Famlysiz	-0.2819	1.8186	-0.15	0.877
Eductstd	-3.7940	4.5425	-0.84	0.406
Acctomkt	17.2906	18.4165	0.94	0.351
Mrktdist	-1.9930***	0.4744	-4.20	0.000
Credtac	1.4167	11.1328	0.13	0.899
Extetion	38.5892	25.4034	1.52	0.133
Nfincome	-0.0001	0.0003	-0.33	0.743
Msincoop	-9.0115	11.1821	-0.81	0.423
Training	-8.2706	20.0629	-0.41	0.681
Number of hives	5.4710***	0.5833	9.38	0.000
Livestock	0.2638***	1.0080	3.24	0.002
pr2011sp	-0.0409	1.0270	-0.04	0.968
_cons	-196.5126	174.745	-1.12	0.264

Source: Own survey result, 2020

Appendix table 3: First-stage regression summary statistics, endogeneity and overidentification test for quantity of honey produced

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	F(2, 84)	Prob > F
QP	0.9116	0.8969	0.8973	366.954	0.0000
Minimum eigenvalue statistic = 366.954					
Critical Values # of endogenous regressors: 1					
Ho: Instruments are weak # of excluded instruments: 2					
			10%	15%	20% 25%
2SLS Size of nominal 5% Wald test	19.93			11.59	8.75 7.25
LIML Size of nominal 5% Wald test	8.68			5.33	4.42 3.92
Endogeneity test for quantity of honey produced					
Durbin (score) chi2 (1) = 50.2636 (p= 0.0000)					
Wu-Hausman F (1,125) = 86.6321 (p=0.0000)					
Over identification restrictions test					
Sargan (score) chi2 (1) = 0.742282 (p = 0.3889))					
Basman chi2 (1)	0.634573				(p = 0.4257)

Appendix table 4: Conversion factors used to compute tropical livestock units (TLU)

Livestock Category	Conversion factor
Calf	0.25
Weaned calf	0.34
Heifer	0.75
Cow or ox	1.00
Horse/mule	1.10
Donkey (adult)	0.70
Donkey (young)	0.35
Camel	1.25
Sheep or goat (adult)	0.13
Sheep or goat (young)	0.06
Chicken	0.013
Bull	0.75

Source: (Storck *et al.*, 1991)