DETERMINATES OF MARKET SUPPLY OF COFFEE BY SMALLHOLDER FARMERS IN MESKAN DISTRICT, EAST GURAGE ZONE, ETHIOPIA

MSC THESIS

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May, 2025

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School of Graduate Studies

Determinates of Market Supply of Coffee By Smallholder Farmers in Meskan District, East Gurage Zone, Ethiopia

A Thesis Submitted to School of Graduate Studies, in Partial Fulfilment of the Requirements for the Degree of Master of Sciences in Agribusiness and Value Chain Management

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This is to certify that we have reviewed and evaluated the thesis titled ***"Determinates of Market Supply of Coffee by Smallholder Farmers in Meskan District, East Gurage Zone, Ethiopia"*** submitted by Belayneh Kassa Niberie under our supervision. We recommend that the thesis be accepted as meeting the requirements for the Master of Science degree in Agri-Business and Value Chain Management.

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I hereby my signature below declare that the thesis entitled *"*Determinates of Market Supply of Coffee by Smallholder Farmers in Meskan District, East Gurage Zone, Ethiopia" submitted for the award in Master of science in Agribusiness and Value Chain Management at Wolkite University is my solely work and it has not been presented for the award of any degree, diploma or other similar tittles of any other Universities or institutions and that all sources of materials used for this thesis have been dully acknowledged.

Name: _____ Signature: _____

ACKNOWLEDGEMENT

First and foremost, I extend my deepest gratitude to God for guiding me through every step and enabling me to successfully complete this paper. I am profoundly grateful to my advisor, Mr. Bizualem Assefa (Asst. Prof), for his invaluable kindness and constructive feedback throughout my study. My sincere appreciation also goes to my co-advisor, Mr. Yonnas Addis (Asst. Prof), for his consistent advice and insightful comments until the completion of this work.

I would like to thank the Gurage Zone Administration Office for their sponsorship and support. My gratitude also extends to the households, the Meskan Woreda Administration Office, and the Meskan Woreda Agricultural Office staff for their cooperation and for providing accurate and essential information during the data collection process.

Additionally, I am deeply thankful to my friend, Mr. Sileshi Bekele, for his unwavering support throughout my research journey. Lastly, I wish to express my heartfelt thanks to my beloved wife, Roman Sinamo, for her invaluable sacrifices and constant support throughout my life.

ABBREVIATIONS AND ACRONYMS

CSA	Central Statistical Agency
FAO	Food and Agriculture Organization
GAIN	Global Agricultural Information Network
GDP	Gross Domestic Product
GTP	Growth Transformation Plan
GZAD	Gurage Zone Agriculture Development
ICC	International Coffee Council
ICO	International Coffee Organization
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
NPC	National Planning Commission
SFC	Semi-managed Forest Coffee

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ABSTRACT

This study aimed to assess the determinants of market supply of coffee by smallholder farmers in Meskan Woreda, East Gurage Zone, Ethiopia. A survey of 386 households was conducted using simple random sampling methods during the 2014/15 Ethiopian calendar year. The study used structured questionnaires to collect primary data, which were analyzed using descriptive and inferential statistical techniques, including multiple linear regression and chi-square tests.

The results revealed that factors such as the sex of the household head, family size, livelihood diversification strategies, access to irrigation, and average annual coffee production significantly influenced the market supply of coffee. The chi-square test further indicated a significant relationship between the market supply of coffee and factors like livelihood diversification strategies, access to irrigation, access to credit, proximity to markets, cooperative membership, and access to infrastructure. The study found that 63.2% of the variation in coffee supply to the market could be explained by these factors. The study recommends targeted policies and interventions to enhance the productivity of coffee farmers, including improving access to irrigation and credit, providing training and support, fostering collaboration, and encouraging diversification to ensure a steady supply of coffee to the market while promoting sustainable agricultural practices.

Keywords**: **Coffee, Market supply, Smallholder farmers

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Coffee is cultivated in over 50 developing countries across Latin America, Africa, and Asia, serving as a crucial source of income for 20 to 25 million families worldwide, 80% of whom are smallholder farmers (Murphy and Dowding, 2015; TECHNOSERVE, 2017). It is the second most traded commodity globally, following oil (Roldán, 2007; Joshi, 2017). According to Panhuysen and Pierrot (2014), coffee production and processing involve over 100 million people. While coffee is grown in more than 60 countries, almost two-thirds of all production is concentrated in just four countries: Brazil, Vietnam, Colombia, and Indonesia (Technoserve, 2017). In the 2014/15 crop year, global coffee production was estimated at approximately 141.9 million bags, while global consumption was projected at 149.3 million bags in 2014, indicating a strong and sustained demand for coffee worldwide (ICO, 2015). The production forecast for the 2021/22 coffee year remained at 167.2 million 60-kg bags, representing a 2.1% decline compared to 170.83 million bags in the previous year (ICO, August 2022). Additionally, global coffee consumption is expected to grow by 3.3%, reaching 170.3 million bags in the 2020/21 coffee year, compared to 164.9 million bags in 2019/20 (ICO, August 2022).

Agricultural sector has been the priority of Ethiopia since the early 1990s, when the Agricultural Development-Led Industrialization (ADLI) and related policy frameworks were adopted (FAO, 2014). Share of agriculture fell to 34.9 percent in 2017/18 from 36.3 percent during the same period (National Bank of Ethiopia, 2018). Despite its declining contribution to Gross Domestic Product over the years, agriculture remains the leading sector in terms of contribution to the country's overall economy. It is a major source of food for domestic consumption, of raw materials for the domestic manufacturing industries and of primary commodities for export. Moreover, the sector contributes 73% of employment, and supplies 70% of the raw-material requirements of local industries (Admit et al., 2016).

However, coffee production in Ethiopia faces several challenges, including a lack of competitiveness, insufficient infrastructure, limited access to services, low value addition, and inadequate technology transfer and research (Jose, 2012). Additionally, the cultivation of khat, a plant known for its stimulant properties, has become a significant competitor to coffee. Many

smallholder farmers, especially in eastern Ethiopia, have shifted to growing khat due to its higher yields and better prices compared to coffee. Khat is drought-resistant, immune to pests and diseases, and can be harvested multiple times a year, offering farmers greater income than coffee (Tolera and Gebremedin, 2015). Another challenge for coffee production is the increasing unpredictability of weather patterns, including irregular rainfall, prolonged dry spells, and more extreme temperature fluctuations (Moat et al., 2017).

Despite these challenges, there are numerous opportunities for Ethiopia's coffee sector. The country's genetic diversity, favorable growing conditions, agroforestry systems, globally recognized coffee brands, and the Modern Marketing System (MMS) all contribute to its strong potential. Furthermore, supportive policies and favorable coffee prices offer an encouraging environment for growth. With its suitable altitude, optimal temperature, fertile soil, and low labor costs, Ethiopia has the capacity to sustainably produce and supply fine specialty coffee, positioning it to compete with other major coffee-growing regions globally (Jose, 2012).

Coffee is backbone of the Ethiopian economy and the re-establishment of the Ethiopian Coffee and Tea Development and Marketing Authority (ECTDMA) in December 2015 is a testament to the government's commitment to enhancing the country's benefits from the coffee sector (Federal Democratic Republic of Ethiopia, 2015). The Authority's key roles include strengthening modern extension services to improve production and productivity, creating efficient and quality-focused marketing systems, and overseeing and regulating coffee processing industries (Zelalem, 2016). Ethiopian coffee is renowned for its exceptional color and flavor. To preserve these qualities, a well-organized network connects coffee farmers, processing plant owners, government bodies, and coffee processing units (Melkamu, 2015).

Coffee is a crucial crop for many smallholder farmers in Ethiopia, and Meskan Woreda in East Gurage Zone is no exception. The region is known for its coffee production, with many smallholder farmers relying on coffee as their source of income. However, the coffee market in Meskan Woreda is characterized by low prices, limited market access, and poor infrastructure, making it challenging for smallholder farmers to supply their coffee to the market. As a result, the market supply of coffee is often irregular and unpredictable. This study aims to investigate the determinants of market supply of coffee by smallholder farmers in Meskan Woreda,.

1.2. Statement of the Problem

Despite various efforts to maximize the benefits from coffee production and export, several significant challenges continue to hinder the potential for higher profits in Ethiopia's coffee sector. One of the major issues is the volatility of global coffee prices, which has made smallholder producers especially vulnerable. Countries like Ethiopia hold a very small share of the global coffee market, often less than 5%, which means Ethiopian coffee farmers receive only a small portion of the final retail price, forcing them to continue subsistence farming (ICC, 2015).

Moreover, the coffee subsector in Ethiopia faces additional constraints, including limited extension services and inadequate research support (World Bank, 2015). Despite coffee's crucial role in the country's economy, the sector's performance remains suboptimal, and smallholder producers struggle with low productivity, poor product quality, limited market access, few opportunities for value addition, and insufficient capital or access to credit for investing in machinery and covering transport costs (Seneshaw and Bart, 2016).

Although Ethiopian coffee is renowned for its high quality, many smallholder farmers are unable to fully benefit from producing and marketing premium coffee. This is due to challenges in production, processing, storage, and functioning of both domestic and international markets. In terms of production, farmers face issues related to land—such as high costs, limited availability, and poor quality—water resources (in terms of cost and seasonality), and access to quality inputs (including cost, availability, and timeliness). They also struggle with limited access to credit and lack of timely technical support for managing pests and diseases (Jemal, 2013). Furthermore, quality losses occur due to poor post-harvest processing, inadequate storage facilities, and contamination with other products (Jemal, 2013). Despite the importance of coffee marketing, there has been limited research on the supply side of the sector.

In the past, no comprehensive empirical research has been conducted to explore the challenges and practices related to coffee market supply, leaving a significant gap in understanding the current conditions. These gaps highlight the need for research that identifies the key factors influencing coffee market supply in Ethiopia.

In the study area, smallholder coffee producers face limited market access due to several factors, including low production levels, poor product quality (stemming from inadequate harvesting, processing, and handling), adulteration, weak bargaining power, lack of market information, low market supply, and various market barriers. Therefore, assessing the factors affecting coffee market supply is crucial for identifying the root causes of these challenges and developing effective solutions to improve the overall performance of coffee marketing.

1.3 Basic Research Questions

To achieve the above-stated objective of the study the researcher develops the following research questions:

1. What is the impact of production factors on coffee yield in Meskan Woreda, East Gurage Zone?
2. How does market access and infrastructure affect coffee supply in Meskan Woreda, East Gurage Zone?
3. In what ways do socio-economic factors influence coffee marketing decisions in Meskan Woreda, East Gurage Zone?

1.4. Objectives of the study

1.4.1 General Objective

The primary goal of this study is to assess the determinants of the market supply of coffee by smallholder farmers in Meskan woreda, East Gurage Zone, Ethiopia.

1.4.2 Specific Objectives

Specifically, the study aims:

1. To analyze the impact of production factors on coffee yield in Meskan woreda, East Gurage Zone,
2. To evaluate the role of market access and infrastructure in coffee supply in Meskan woreda, East Gurage Zone,
3. To examine the influence of socio-economic factors on coffee marketing decisions in Meskan woreda, East Gurage Zone.

1.5 Significance of the Study

The study on coffee market supply in the Meskan district is crucial for smallholder farmers, who are key to local coffee production. By understanding market dynamics, it empowers farmers, policymakers, and stakeholders to make informed decisions. The research addresses challenges such as limited access to finance, markets, and technology, aiming to enhance farmers' livelihoods.

Furthermore, the study's methodology, which includes surveys and statistical analysis, can guide future research on coffee production in the region. Overall, it seeks to improve livelihoods, develop effective strategies, and inform supportive policies for rural communities in Ethiopia.

1.6 Scope and limitation of the study area

1.6.1 Scope of the study

This study was confined to the Meskan district in the East Gurage zone of Ethiopia, a region notable for its large population and vast geographical area. The focus was on analyzing the coffee market supply, with an emphasis on various factors such as marketing dynamics, government interventions, road infrastructure, and productivity. Geographically, the research was limited to four specific rural kebeles within the coffee-producing area of Meskan. Methodologically, the study employed a descriptive and explanatory research approach, which aimed to provide a detailed understanding of the research problem and identify the underlying relationships between variables (Creswell, 2014). Both primary and secondary data were utilized to collect information relevant to the study. The collected data was analyzed using a combination of quantitative descriptive statistics and inferential statistics. Descriptive statistics, such as percentages, frequencies, means, and standard deviations, were used to summarize the data and describe the characteristics of the sample (Field, 2013). Inferential statistics, such as correlation and regression, were used to examine the relationships between variables and identify any patterns or trends (Hair et al., 2010) with the help of SPSS version 20 software. The study was conducted over a period from April 2023 to December 2023, with the main objective being the assessment of coffee market supply by smallholder farmers in the area.

1.6.2 Limitations of the study area

It is essential to acknowledge and address the limitations of this study in order to maintain the credibility and trustworthiness of the results, as well as to provide a comprehensive

understanding of the potential sources of bias and error that may have impacted the findings. The following are some of the limitations that were encountered during the conduct of this study. Without understanding the importance of research, some community members expressed concerns that the research might be used for nothing, which could add any value to their personal lives. This led to reluctance to share certain information or a possible distortion of the provided information. To mitigate this limitation, the community was extensively briefed about the research's purely academic purpose, emphasizing that the findings would not be used for political or personal decision-making.

1.7 Organization of the Thesis

This thesis is structured into five chapters. Chapter one provides the introduction, including the problem statement, study objectives, significance of the study, and an overview of the scope and limitations. Chapter two presents a literature review, covering the effects of livelihood strategies across various economic sectors, as well as relevant empirical studies conducted both in Ethiopia and internationally. The third chapter outlines the study area and the methodology used in the research. Chapter four focuses on the presentation and discussion of the study's findings. Finally, chapter five concludes the thesis with a summary, conclusions, and recommendations.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature

2.1.1 Definitions and basic concepts

Market: A market is a place or environment where price-determining forces operate, and exchanges of goods are typically accompanied by the actual movement of the items involved (Backman and Davidson, 1962). The concept of a market is rooted in the idea of exchange and relationships. It can be described as the group of actual and potential buyers of a product (Kotler and Armstrong, 2003). A market can also be understood as a system that facilitates the exchange of one item for another (Bain and Howells, 1988). Hence, marketing is the process by which companies create value for customers and build strong customer relationships in order to capture value from customers in return (Armstrong and Kotler, 2015).

Marketing: Marketing is a social and managerial process through which individuals and organizations satisfy their needs and wants by creating and exchanging value with others. In a more specific business context, marketing involves establishing profitable, value-driven relationships with customers. Thus, marketing is the process by which companies generate value for customers and build strong relationships in order to capture value in return (Armstrong and Kotler, 2015).

Agricultural Marketing: The concept of marketing and agricultural marketing in particular, has been debated and defined in various ways by different scholars due to its diverse implications for different groups in society, such as farmers, traders, and consumers (Kohls and Uhl, 1985). Agricultural marketing can be defined as all the business activities that manage the flow of food products and services from the point of initial agricultural production to the point by my Negasi · Cited by 2015 and services from the point of initial agricultural production until they are in the hands of consumers (Kohls and Uhl, 1985; Bain and Howells, 1988)Kotler and Armstrong (2003) describe marketing as a societal process through which individuals and groups satisfy their needs and wants by creating, offering, and freely exchanging products, services, and value with others. Essentially, marketing is a process, much like farming, manufacturing, mining, or construction (Backman and Davidson, 1962).

Marketing Channel: A marketing channel refers to the network of interconnected businesses involved in moving goods from the producer to the consumer. These channels help meet consumer demand by ensuring that the right quantity of goods and services is available at the right time, place, and quality, and at an optimal price. Marketing channels also stimulate demand by using various promotional methods across all organizations within the channel. Different scholars have outlined the structure of marketing channels in various ways, but they are typically divided into direct and indirect channels. In direct channels, producers or manufacturers sell directly to consumers. In contrast, indirect channels involve intermediaries, such as trading companies. Indirect channels can be either short or long. A short indirect channel involves only one intermediary, while a long indirect channel includes two or more intermediaries (Guibert, 2006).

2.1.2 Coffee Production and Production Systems

The main coffee producing areas in Ethiopia are West and South-west, Southern, Eastern, and Central regions (Melkamu, 2015). On the basis of management level, vegetation, structural complexity, and agronomic practices, coffee production systems in Ethiopia can be categorized into four main categories: forest coffee (FC), semi-managed forest coffee (SFC), garden coffee (GC), and plantation coffee (Tadesse, 2015; Tesfu, 2012).

Forest Coffee: the forest coffee system is coffee grows naturally in wild stands within the forest, with minimal intervention or management from the farmers (Moat et al., 2017). The local communities living near and within forests harvest wild coffee berries from naturally growing plants without implementing productivity-enhancing management practices. The forest's plant composition, biodiversity, and structure remain largely in their natural state, with minimal human impact. The only notable intervention is clearing paths to facilitate movement during harvesting (Tadesse, 2015). This method is common in the southeastern and southwestern parts of Ethiopia, specifically in areas such as Bale, Bench-Maji, Illubabor, Kafa, Jimma, Shaka, and West Wollega (Boansi and Crentsil, 2013). These regions are recognized as the origin of *Coffee Arabica* and contribute approximately 10% of the country's total coffee production (Melkamu, 2015).

Semi-Forest Coffee:

The semi-forest coffee system involves more active management, including thinning forest trees, clearing understory vegetation, cutting weeds, and planting coffee seedlings (Moat et al., 2017).

Farmers convert forest land into semi-managed coffee farms by reducing the diversity, density, and variety of plant species. This system aims to balance sufficient sunlight and optimal shade for coffee cultivation (Melkamu, 2015). It is the predominant coffee production method in southwestern Ethiopia, including areas like Bench-Maji, Illubabor, Jimma, Kafa, Shaka, and Wollega, as well as in the Bale Mountains in southeastern Ethiopia (Tadesse, 2015). Semi-forest coffee accounts for roughly 35% of Ethiopia's coffee production (Tesfu, 2012).

Garden Coffee:

Garden coffee represents a more advanced cultivation stage where coffee seedlings, often sourced from forest coffee areas, are planted closer to farmers' homes. In this system, coffee is grown on small plots of land alongside other crops and fruit trees, often under a limited number of shade trees (Tesfu, 2012). Organic materials are commonly used as fertilizer, and coffee planting density is generally low. This method accounts for about 50% of the country's total coffee production and is prevalent in southern, eastern, and parts of southwestern Ethiopia, specifically in regions such as Gedeo, Guji, Hararghe, Jimma, Sidama, and Wollega (Tadesse, 2015).

Plantation Coffee:

Plantation coffee is cultivated on large-scale plantations, typically managed by the state or smallholders practicing advanced agronomic methods. These include the use of improved seedlings, appropriate spacing, mulching, manuring, weeding, shade management, and regular pruning (Melkamu, 2015). This highly organized production system is designed to maximize productivity and maintain quality.

2.1.3 Coffee production and marketing in Ethiopia

Coffee is a vital commodity in the global economy, and its production varies across different regions. In Ethiopia, coffee is the most significant cash crop, supporting over 15 million people either directly or indirectly, making it deeply embedded in the country's social, cultural, and historical identity (GAIN, 2014). Coffee is central to Ethiopia's economy and is the leading export commodity, generating substantial foreign exchange for the nation (Hassan, 2015; Mekonin, 2017).

In Ethiopia, coffee is predominantly cultivated in the Oromia and SNNPR regions, which together contribute 3.88% of the country's total coffee production—2.64% from Oromia and

1.24% from SNNPR (CSA, 2016). Despite the importance of coffee, the performance of the sector remains below expectations, with smallholder farmers facing numerous challenges, such as low productivity and poor quality, limited access to markets, few opportunities for value addition, and a lack of capital and credit to invest in machinery or cover transportation costs (Seneshaw and Bart, 2016).

The majority of coffee production in Ethiopia is indeed carried out by small-scale farmers, who play a crucial role in the country's coffee industry (FAO, 2019). According to the Food and Agriculture Organization (FAO), small-scale farmers account for approximately 95% of the total coffee production in Ethiopia (FAO, 2019). Over 4 million smallholder farmers are involved in coffee cultivation, with the number of farmers growing stimulant crops like coffee exceeding those growing fruits (CSA, 2018). Ethiopia is the fifth-largest coffee producer in the world, contributing 4% of global production, and is the largest coffee producer in Africa, accounting for approximately 40% of the continent’s coffee output (Francom, 2018).

2.1.4 Production Constraints of Coffee in Ethiopia

In recent years, *khat* (a stimulant plant) has increasingly competed with coffee for agricultural land. Many small-scale coffee farmers, particularly in the eastern regions of Ethiopia, have transitioned to cultivating *khat* due to its higher market prices and greater yield. Compared to coffee, *khat* offers significant advantages: it is resistant to drought, pests, and diseases, can be harvested multiple times annually, and generates better income for farmers (Tolera & Gebremedin, 2015). Another challenge impacting coffee production in Ethiopia is the unpredictability of weather patterns. Variability in rainfall, extended dry seasons, and more extreme weather conditions, such as hotter and drier climates, have disrupted production cycles (Moat et al., 2017).

2.1.5 Market Overview

Originating from Ethiopian forests, where legend claims it was first discovered by goat herders, coffee has evolved into a globally cherished beverage and one of the most traded commodities (Deshmukh, 2021; FAO, 2022b). Coffee plants, which require 3–4 years to produce red cherries, can be harvested either by strip harvesting (mechanized or manual, removing all cherries from a branch simultaneously) or by hand, where only ripe cherries are picked. Post-harvest, the cherries are processed using either dry or wet methods to facilitate milling. This step includes hulling to extract green coffee beans, optional polishing, and grading by size, weight, and

quality. The green beans are then roasted to release their flavor and transformed into brown roasted beans, which are ground and brewed into coffee (National Coffee Association, n.d.).

The two dominant coffee species, Arabica and Robusta, accounted for approximately 58% and 42% of global production, respectively, in 2020 (International Coffee Organization, 2021). Arabica is favored for its smoother, sweeter flavor, while Robusta, with its higher caffeine content, has a bitter taste suited for instant coffee and espresso blends (Petruzzello, 2021). Recent standards for "Fine Robusta" were introduced in 2019 to enhance its quality (Impallomeni, 2019). Arabica thrives in subtropical climates and altitudes between 600 and 2,000 meters, preferring shaded or agroforestry systems, whereas Robusta is hardier, grows in full sun from sea level to 600 meters, and offers higher yields with greater disease resistance (Petruzzello, 2021).

The coffee industry has grown into a lucrative sector, with retail market revenues reaching approximately USD 102 billion in 2020. It is expected to continue expanding at a compound annual growth rate (CAGR) of at least 4.28% from 2021 to 2026 (Mordor. Intelligence, 2021). Globally, the coffee value chain employs an estimated 125 million people (Fair Trade Foundation, 2022), with 95% of coffee farms being under 5 hectares, predominantly run by smallholder farmers (Panhuysen & Pierrot, 2020). From 2008 to 2020, global coffee production rose from 8.5 million tons to 10.7 million tons, cultivated over 11 million hectares (FAO, 2022).

Exports are a significant component of coffee production, with 80% of production exported in 2021/2022, up from 64% in 2020 (FAO, 2022a). Brazil, Vietnam, and Colombia remain the leading producers and exporters, while the EU, United States, and Japan are the largest importers (Foreign Agricultural Service, 2021). Despite a steady supply exceeding demand by 1%–4% over recent years, increasing demand is expected to outpace supply, driven in part by adverse weather conditions (International Coffee Organization, 2022).

The COVID-19 pandemic presented challenges for the coffee sector, including labor shortages, disrupted supply chains, and reduced market access. Shipping delays raised costs and affected product quality. Public health measures limited out-of-home consumption, shifting consumer behavior towards online shopping and at-home coffee brewing. Despite these disruptions, global production increased in 2020, as businesses stockpiled coffee to maintain output and meet strong demand (Mera et al., 2021; Mordor Intelligence, 2021).

2.1.6 Marketing Constraints of Coffee in Ethiopia

Despite Ethiopia's global recognition as the origin of coffee and its strong local coffee culture, the country has not fully leveraged its advantages, including genetic diversity, distinctive coffee quality, favorable agro-ecological conditions, and branding opportunities. Price volatility has been a significant challenge, directly contributing to rural poverty, with up to 85% of coffee farmers identifying it as a major risk (UNDP, 2012). Fluctuating prices often compel farmers to abandon traditional forest coffee systems in favor of more immediate-yield systems like zero-shade cultivation, which, while profitable in the short term, lead to long-term degradation of coffee landscapes and natural resources. This shift also affects farmers' socio-economic stability (Berhanu, 2017; Alemayehu, 2014).

Other marketing issues include limited market access, inadequate promotion and incentives, and a low share of profits for farmers, all of which hinder Ethiopia's coffee sector from reaching its full potential (Jose, 2012; Tesfu, 2012).

2.2 Empirical Literature

Several studies have been conducted on the market supply of coffee in Ethiopia and other African countries. One such study by Bekele and Mulugeta (2015) examined the market supply of coffee in Ethiopia and found that the country's coffee production is characterized by a high degree of variability, with production levels fluctuating significantly from year to year. The study attributed this variability to factors such as climate change, pests, and diseases, as well as the lack of adequate infrastructure and market access for smallholder farmers.

Another study by Tadele and Mekonnen (2016) investigated the factors affecting market supply of coffee in Ethiopia, with a focus on smallholder farmers in Sidama Zone. The study found that market access and prices were the most significant factors influencing market supply, followed by credit access and farm size. The study also found that smallholder farmers in Sidama Zone faced significant challenges in accessing credit and markets, which limited their ability to supply coffee to the market. A similar study by Tsegaye and Alemayehu (2017) found that market access and prices were the primary determinants of market supply of coffee in Ethiopia, and that smallholder farmers in the country faced significant barriers to accessing markets and credit.

A study by Dagne and Mengistu (2018) examined the determinants of market supply of coffee by smallholder farmers in Ethiopia and found that market access, prices, and credit access were

the most significant factors influencing market supply. The study also found that smallholder farmers in Ethiopia faced significant challenges in accessing markets and credit, which limited their ability to supply coffee to the market. These studies highlight the importance of market access and prices in determining market supply of coffee in Ethiopia and other African countries, and the need for policies and interventions to address the challenges faced by smallholder farmers in accessing markets and credit.

Moreover, Mohammed (2012) identified the major factors that affect the supply of coffee in Nensebo district of Oromiya region using 2SLS regression econometric model. The results of his econometric analysis shows that output, access to market information, family size and distance to market as the main factors affecting coffee supply to the market. Family size and market distance affect the quantity supply negatively.. Similarly, Zekarias et al. (2012) focused on identifying determinants of forest coffee supply in south western Ethiopia and found that in the forest coffee market of southwest Ethiopia, producers gained less net benefit compared to intermediaries, highlighting disparities within the value chain. These studies indicate that producers often receive the least benefit from the market compared to other actors.

2.2.1 Impacts of Factors on Market Supply of Coffee

Several studies have been conducted to examine the impact of factors such as prices, credit access, and market access on market supply of coffee. A study by Tadele and Mekonnen (2016) found that prices had a significant impact on market supply of coffee in Ethiopia, with an increase in prices leading to an increase in market supply. The study also found that credit access had a positive impact on market supply, with farmers who had access to credit being more likely to supply coffee to the market. Additionally, the study found that market access had a significant impact on market supply, with farmers who had access to markets being more likely to supply coffee to the market.

Another study by Tsegaye and Alemayehu (2017) examined the impact of prices, credit access, and market access on market supply of coffee in Ethiopia using a regression analysis. The study found that prices had a significant positive impact on market supply, with a 1% increase in prices leading to a 0.5% increase in market supply. The study also found that credit access had a significant positive impact on market supply, with farmers who had access to credit being more likely to supply coffee to the market. Furthermore, the study found that market access had a

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2.2.3 Factors that Affect Market Supply of Coffee

Market supply of coffee is influenced by a variety of factors, including production costs, prices, technology, government policies, and market conditions. One of the most significant factors affecting market supply of coffee is prices (Tadele and Mekonnen, 2016). When prices are high, farmers are more likely to produce and supply coffee, as they can earn higher revenues. On the other hand, when prices are low, farmers may reduce their production and supply of coffee, as they are not able to cover their costs.

Another factor that affects market supply of coffee is technology (Abebe and Alemayehu, 2019). The use of new technologies such as irrigation systems, fertilizers, and pesticides can increase coffee yields and reduce production costs, leading to an increase in market supply. Additionally, government policies can also affect market supply of coffee (Dagne and Mengistu, 2018). For example, policies that provide subsidies to farmers or support the development of coffee cooperatives can increase market supply by making it more profitable for farmers to produce and supply coffee.

Market conditions also play a significant role in determining market supply of coffee (Tsegaye and Alemayehu, 2017). Factors such as demand, competition, and market access can all affect the quantity of coffee that farmers are willing to supply to the market. For example, if demand for coffee is high and competition is low, farmers may be more likely to supply coffee to the market, as they can earn higher prices and revenues. On the other hand, if demand is low and

competition is high, farmers may reduce their supply of coffee, as they are not able to compete with other farmers who are offering similar products.

2.2.4 Market Access and Market Supply of Coffee

The relationship between market access and market supply of coffee has been extensively studied in the literature. Market access refers to the ability of farmers to access markets and sell their products, while market supply refers to the quantity of products that farmers are willing to supply to the market. Studies have shown that market access is a critical factor influencing market supply of coffee, with farmers who have access to markets being more likely to supply coffee to the market (Tsegaye and Alemayehu, 2017).

A study by Bekele and Mulugeta (2015) found that market access was the most significant factor influencing market supply of coffee in Ethiopia, with farmers who had access to markets being more likely to supply coffee to the market. The study also found that market access had a significant positive impact on market supply of coffee, with a 1% increase in market access leading to a 0.5% increase in market supply. Similarly, a study by Dagne and Mengistu (2018) found that market access had a significant positive impact on market supply of coffee in Ethiopia, with a 1% increase in market access leading to a 0.5% increase in market supply.

The relationship between market access and market supply of coffee is also influenced by other factors such as prices, credit access, and infrastructure. For example, a study by Tsegaye and Alemayehu (2017) found that prices had a significant positive impact on market supply of coffee, with a 1% increase in prices leading to a 0.5% increase in market supply. Similarly, a study by Bekele and Mulugeta (2015) found that credit access had a significant positive impact on market supply of coffee, with farmers who had access to credit being more likely to supply coffee to the market. Overall, the literature suggests that market access is a critical factor influencing market supply of coffee, and that other factor such as prices, credit access, and infrastructure also play important roles.

2.3 Conceptual Framework

This study aims to assess the market supply of coffee and identify the key factors influencing coffee supply at the smallholder farmer level. The goal is to provide valuable insights that can help address the challenges in the study area, ultimately guiding policymakers in developing targeted interventions.

The conceptual framework serves as a crucial tool in identifying key variables and ensuring the efficient and effective collection of data. According to Scarborough and Kydd (1992), such a framework helps focus limited research resources on the most critical areas and ensures that the data gathered align with the research objectives.

The conceptual framework in figure 2 illustrating the relationship between the dependent variable, Market Supply of Coffee, and the independent variables—socioeconomic factors, production and marketing factors, and institutional and technical factors—highlights the complexity of influences that shape coffee supply dynamics. Socioeconomic factors, such as income levels, education, and access to resources, directly impact farmers' ability to produce and market coffee efficiently. For instance, higher income enables investments in better farming practices and inputs, while education enhances farmers' knowledge of market conditions and production techniques, leading to improved supply. Meanwhile, production and marketing factors, including the quality of coffee produced, production practices, and market demand, play a crucial role in determining the efficiency of coffee production and the overall availability in the market. Additionally, institutional and technical factors, such as the presence of cooperatives, supportive government policies, and access to training, provide the necessary frameworks and resources that facilitate or constrain coffee farming. Together, these independent variables interact to influence the Market Supply of Coffee, affecting not only the quantity and quality available but also the economic sustainability for smallholder farmers. This framework serves as a guide for understanding how various factors interplay to shape the coffee supply landscape, identifying potential areas for intervention and support to enhance the livelihoods of farmers in the region.

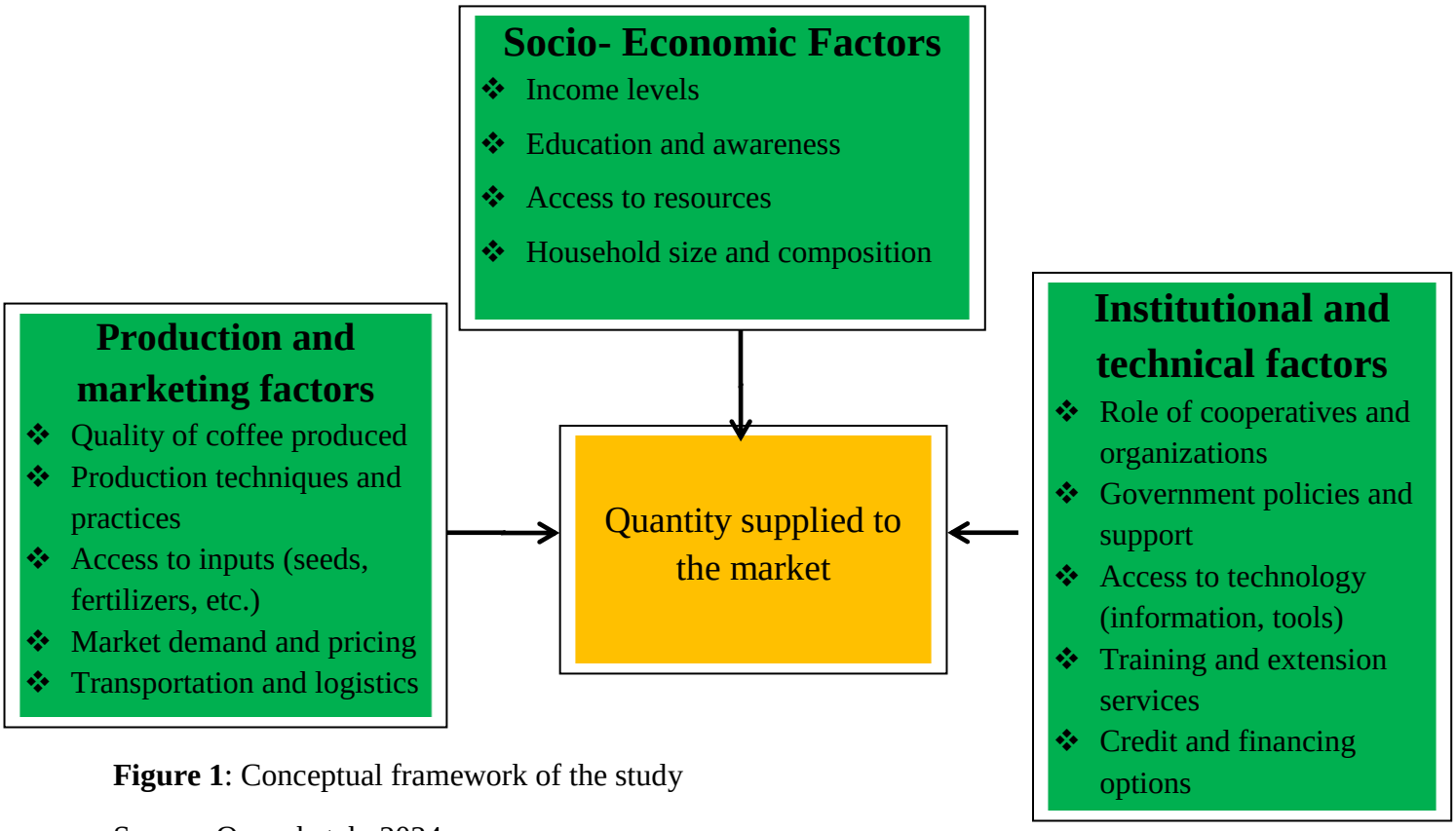

Figure 1: Conceptual framework of the study

Source: Own sketch, 2024

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Description of the study area

3.1.1 Location and area

Meskan Woreda is situated in the East Gurage Zone, located approximately between 7°59'15" - 8°27'01" North latitude and 38°26'31" - 38°57'56" East longitude. It lies 135 kilometers to the south of Addis Ababa and 100 kilometers to the northeast of the regional capital, Hosana.

The total area of the woreda spans 447.77 square kilometers (or 44,777 hectares). Of this, about 15,270 hectares are used for annual crops, 15,408 hectares are devoted to permanent crops, 4,053 hectares are designated as grazing land, 9,282 hectares are covered by natural forests, and 4,664 hectares are categorized under other land uses. The total area under cultivation is approximately 30,678 hectares, while 1,500 hectares are considered arable land.

Meskan Woreda is bordered to the north by Sodo Woreda, to the south by the Silti Zone, to the east by East Meskan and Sodo Woreda, and to the west by Silti Zone, Mehur Aklil, Gedebano Gutazer, and Wolene Woreda.

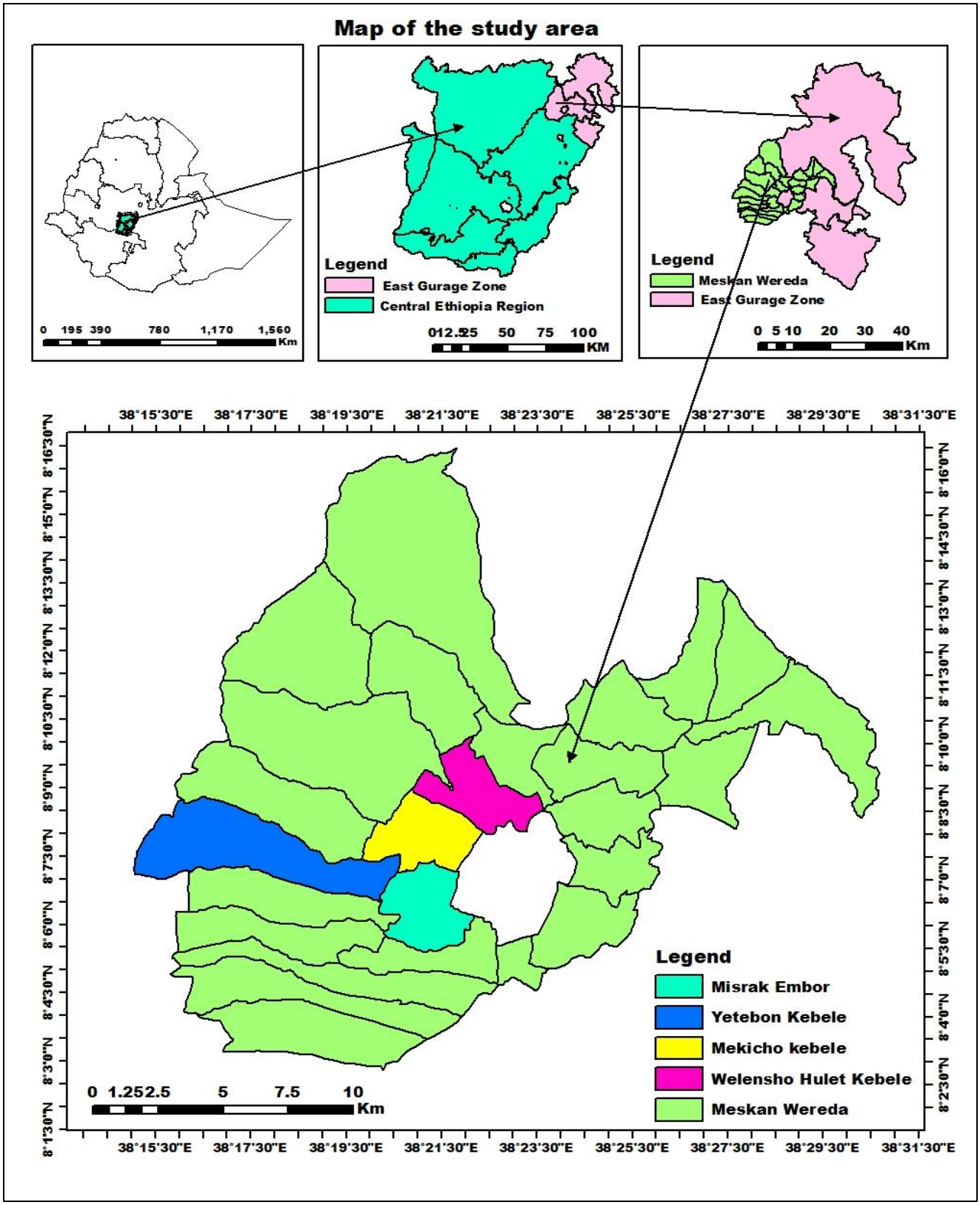

Figure 2: Location map of the Study Area

Source: Extracted from-Ethio-GIS-(CSA, 2016E.c)

Generally, the woreda has an elevation of 1500-3500 m Amsl. The highest elevation is found in the western part of the study area (Mesikan woreda) it runs from Meserte Wogeram to Wurib kebele. The woreda is generally characterized by a high mountain chain from the western side of the woreda bordered by the Silti zone (AlichoWuriro woreda) and west Guraghe zone woreda (Mehur aklil, Gedebano, Gutazer Wolene) extended up to Sodo woreda of Guraghe zone. The chain of this mountain is named Zebidar Mountain. The height of this mountain reaches up to 3500m Amsl.

The district was divided into two main agro-climatic zones, which are characterized by distinct climate and altitude conditions. The western and northern part of the district was predominantly characterized by a cool altitude (Dega) climate, while the eastern part of the district was dominated by a moist mid-altitude (Woyna-dega) agro-climatic zone (MWARDO, 2021)

The climate of the district is characterized by a moderate temperature range, with an average temperature of 13°c-22.5°c (MWARDO, 2021). The temperature varies across the district, with the highest elevation of the western part being significantly cooler than the eastern part.

Meskan Woreda has wet and adequate rainfall. The woreda has two rainy seasons, summer (kiremet) and spring (belg). Spring (belg) is one of the rainy seasons in the district mainly lasting from the month of March to the end of May. Summer (kiremet) is the main rainy season that lasts from June to the end of August and is sometimes extended to the months of September and October due to climatic problems. Winter (Bega) is the dry season, which lasts from the months of December to February. The mean annual rainfall of the district from 2011 to 2021 ranged between 150mm to 1200mm (MWARDO, 2021).

The most common forest types in the area as locally named include" Tid"," Zigba"," Kerrero", Kosso"," Woira", and highland Bamboo(Kerkeha) in the western portion and "Wanza", Sholla", and "Acacia" towards the eastern portion of the woreda under study.

Many rivers in the district drain from the western parts of the highland area towards the moist mid-land area of the eastern part of the district. Some of the rivers were used for small-scale irrigation purposes at the second and third stages of the river course. The river includes Eresha, Erinzaf, Dobena, Derk-wonez, Akemuja, Meserte-wogeram, and Meki rivers, etc.... was drained from the source of the western highland area (Gurage range of mountains) towards the eastern lowland and finally mixed with Ziway lake (MWARDO, 2022).

The Woreda was characterized by various types of agricultural production such as cereals, vegetables, such as Cabbage, Potatoes, Carrots etc. and different fruits (Mango, Avocado, Orange, and Banana). The land use pattern of Meskan Woreda was dominated by small-scale farming and the practice sedentary mixed agriculture system. Perennial crops such as inset, stimulants (coffee, chat) timber (eucalyptus) were also grown in a considerable amount. Livestock were a very important agricultural activity in the woreda (MWARDO, 2021).

3.2 Research Design

This study employed a descriptive survey design, which is a type of research design that involves collecting and analyzing data from a sample of participants to describe the characteristics of a particular population or phenomenon (Creswell, 2014). By using this approach, the study aimed to achieve its objectives effectively, allowing for a comprehensive exploration of the factors influencing coffee supply. The descriptive survey method facilitated a nuanced understanding of the topic, capturing the complexities and dynamics that play in the coffee market. According to Creswell (2013), qualitative and quantitative data complement each other in several ways. Quantitative data provides a general and overarching view of the phenomenon, offering a broad perspective on the key trends and patterns. In contrast, qualitative data delves deeper into the intricacies and nuances of the subject, providing a rich and detailed understanding of the specific context and complexities. By combining both types of data, researchers can triangulate their findings, increasing the validity and reliability of their conclusions.

3.2.1 Types and Sources of data

3.2.1.1 Primary Data Sources:

The primary sources of data in this study were crucial for obtaining firsthand information regarding household demographic characteristics, socioeconomic factors, and issues related to livelihood diversification strategies. By focusing on primary data, the research captured accurate and relevant insights directly from the smallholder farmers and other stakeholders in the coffee market. This approach allowed for a deeper understanding of how demographic attributes-such as age, education, and household size-interact with socioeconomic factors like income, access to resources, and market conditions. Additionally, exploring livelihood diversification strategies provides valuable context on how farmers adapt to challenges and opportunities within the coffee supply chain. Overall, leveraging primary sources enhances the study's reliability and relevance,

ensuring that the findings genuinely reflect the lived experiences and conditions of the community involved in coffee production.

3.2.1.2 Secondary data sources

Secondary data sources included documentary archives, published and unpublished books gathered from public and school libraries, and government and private sectors. Web pages, maps, journals, and magazines were also used.

3.2.2. Sampling Design and Sampling techniques

3.2.2.1 Population of the Study

The study targets coffee farmers in Meskan Woreda, which is divided into two distinct clusters: the highland cluster and the midland cluster. The highland cluster includes nine kebeles: Mikaelo, Merab Meskan, Yetebon, Wurib, Gidena Aborat, Dobi, Meserete Wegeram, Sosit Amba, and Dega Gogot. From these kebeles, Yetebon was randomly selected as the sample kebele. This cluster comprises a total of 2,255 farmers.

In contrast, the midland cluster consists of seventeen kebeles, namely Mekicho, Misrak Meskan, Beresa, Debub Shershera, Misrak Embor, and Jole (1, 2, and 3), Semien Shershera, Shershera Mechmena, Wolensho (1 and 2), Wita, Shershera Bido, Goyban, Dirama, Merab Embor, and Dobo Tuto. From this cluster, Welensho 2, Mekicho, and Misrak Embor were randomly chosen as sample kebeles. The midland cluster has a total of 7,516 farmers. Overall, the population of coffee farmers in Meskan Woreda is 9,771, with 2,255 located in the highland cluster and 7,516 in the midland cluster.

To select samples from the clusters of kebeles in Meskan Woreda, a systematic approach is followed, focusing on the specific kebeles identified and their respective household heads. The study targets coffee farmers across two distinct clusters: the highland cluster and the midland cluster.

In the highland cluster, Yetebon was chosen as the sample kebele, which has a total of 757 household heads (518 male and 239 female). In the midland cluster, three kebeles were selected: Mekicho, with 483 household heads (351 male and 132 female); Welensho 2nd, with 250 household heads (152 male and 98 female); and Misrak Embor, comprising 330 household heads (220 male and 110 female).

The total number of household heads across all sampled kebeles is 1,820, comprising 1,241 males and 579 females. To ensure a representative analysis, a total sample of 386 households was selected from this population. This sample was proportionally allocated across the identified sample kebeles in both the highland and midland clusters, allowing for a balanced representation of each kebele's unique characteristics.

3.2.2.2 Sampling Techniques

The sampling technique employed in this study was a systematic approach, which involved selecting a random sample from the population of coffee farmers in Meskan Woreda. The researcher had identified two distinct clusters: the highland cluster and the midland cluster, and had selected specific kebeles from each cluster for the study. The sampling technique used in this study was similar to the one described by Cochran (1977), who recommended a two-stage sampling technique for selecting a sample from a large population. In the first stage, a random sample of kebeles was selected from the highland and midland clusters, and in the second stage, a random sample of households was selected from the selected kebeles.

The use of a systematic approach to select the sample from the clusters of kebeles in Meskan Woreda was a good strategy, as it allowed for a more representative sample of the population. The allocation of the sample across the identified sample kebeles was also proportionally distributed, ensuring a balanced representation of each kebele's unique characteristics. Thus, the approach allowed for a more accurate analysis of the data and reduced the risk of bias.

3.2.2.3 Sample size determination

To determine the appropriate sample size for this study, the standard statistical formula developed by Yamane (1967) was applied. Yamane's sampling method is a widely used and reliable approach for calculating sample size, and it offers multiple approaches for calculating sample size, making it flexible and easy to use for researchers (Yamane, 1967). The formula adjusts the sample size according to the population size, ensuring that the sample is proportionally representative, which in turn enhances the reliability of the results. Furthermore, Yamane's technique is widely applicable across various fields, from social sciences to market research, demonstrating its versatility. Overall, it provides a systematic and statistically sound framework for determining sample size, helping researchers make well-justified decisions that contribute to more credible and valid findings. In this study, the total number of coffee farming

household heads in meskan woreda was 9771. To calculate the sample size, the researchers used a 95% confidence level and a 5% margin of error, as recommended by Yamane (1967).

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

Where; n= sample size

N = Total number of household heads in the sample kebeles

e = Level of Precision (0.05)

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

$$\boldsymbol{n = \frac{9771}{1+9771(0.05)^2}}$$

n= <u>386</u>

Based on the above computation 386 households were selected from the total of 9771 households in the area under study. Finally, the proportional allocation principle was used to give the chance for all households of the selected "kebeles" to share appropriate samples in terms of the size of households they constitute.

Table 1: Proportion of Rural Sample Household Heads from each sample KebelesTable 1: Proportion of Rural Sample Household Heads from each sample Kebeles

No	**Sample Kebeles**	Cluster	**House hold heads**			**Sample Households**		
			M	F	T	M	F	T
1	Yetebon	High land	518	239	757	110	51	161
2	Mekicho	Midland	351	132	483	74	28	102
3	Welensho 2nd	Midland	152	98	250	32	21	53
4	Misrak Embore	Midland	220	110	330	47	23	70
Total			1241	579	1820	263	123	386

Source: Mesikan woreda Agriculture and Rural Development Office, 2024

3.2.3 Methods and Instruments of Data Collection

The researcher intended to employ the following data collecting instruments believing it enable to gather more reliable, relevant, and valid data from the proposed sources: These are:

3.2.3.1 Questionnaire:

Semi-structure questionaries' were employed for sample households, to obtain information related to household demographic and socio-economic characteristics, Institutional and technical factors, market and production factors, and the like were collected through household surveys from randomly selected 386 sample household heads. This instrument was preferred because it enabled the responses at distant residents and also allowed certain freedom and time for respondents to respond at an appropriate time and place that was suitable for them, without the need for direct contact with the researcher. In addition, it was also used due to the reason that the sample size of this group was very large and could not be reached cost-effectively by the other instruments. The objective of the study was clearly stated in the questionnaire's paper and the consent of the participants was asked for before their involvement.

3.2.3.2. Key informant Interview

To gather primary data, one key informant interview was conducted at the woreda level and four at the kebele level. These interviews were crucial in supplementing the information obtained through the household survey. The key informants were selected based on their extensive knowledge of the study area and their roles in local administration. A total of five key informant interviews were conducted for this study. At the woreda level, the interview was held with a senior expert from the Meskan Woreda Agricultural Development Office. At the kebele level, interviews were conducted with four Agricultural Development Agents who possessed in-depth knowledge of the study area.

3.2.3.3. Filed Observation

In all the sampled kebeles, observations were conducted to gather accurate information on the socio-economic factors influencing coffee supply in the market. Furthermore, the researcher aimed to pinpoint the key production and marketing challenges affecting coffee supply and evaluate the institutional and technical elements shaping the market participation of smallholder farmers. The insights gained through these observations will enhance understanding of the obstacles and opportunities in coffee marketing, aiding in the identification of potential strategies to support coffee producers and strengthen the coffee supply chain.

3.2.4. Methods of Data analysis and presentation

For this study, both descriptive and inferential statistical methods were applied to analyze the collected data. Descriptive statistics, such as percentages, means, minimum and maximum values, frequency distributions, and similar measures, were used to analyze quantitative data related to socio-economic and demographic characteristics as well as livelihood strategies (Field, 2013). Factors influencing the supply of coffee in the market were assessed using inferential statistics, specifically through multiple regression analysis. Quantitative data analysis was conducted using Statistical Package for Social Science (SPSS) version 20. SPSS is a popular software package for statistical analysis, and it provides a range of tools for data analysis, including multiple regression analysis (Field, 2013)

The multiple linear regression model was utilized to evaluate the contribution of independent variables to the dependent variable. This approach was used to identify the socio-economic factors influencing coffee market supply, analyze key production and marketing challenges affecting supply, and assess institutional and technical determinants shaping smallholder farmers' participation in the coffee market.

3.2.4.1 Model Specification

A multiple linear regression model was utilized in this study to examine the relationships between the continuous dependent variable and the independent variables. This statistical approach enabled the analysis of the relationships between the variables in a continuous and quantitative manner. According to Muthen and Muthen (2007), when the dependent variable is continuous, multiple linear regression is a suitable statistical technique to use. The model was applied to examine the combined influence of all independent variables on the dependent variable. Additionally, the step-by-step method was utilized to analyze the moderating and mediating effects of variables on the relationship between the predictor and dependent variables, following the guidelines of Field (2009).

The model was expressed through a linear equation. Using multiple linear regression analysis, the values of the constant coefficient (β_0) and slope coefficients (β) were estimated based on the collected data.

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 \ldots\ldots BpXi + \varepsilon$$

Where, y= Quantity supplied of coffee to the market in quintals (kg)

B_0= Constant (intercept)

β_1- β_3= Coefficients of independent variable

X_1- X_3= Composite index of independent variable

ε = Error term.

Definitions and Hypothesis of Variables

In research, a variable refers to a person, object, or phenomenon that is being measured or observed in some way.

The dependent variable: The dependent variable in this study is the Quantity Supplied of Coffee, which refers to the amount of coffee supplied by households to the market in the 2014/15 Ethiopian Calendar year. It is measured in quintals (kg)

The independent Variables: The following independent variables are hypothesized to affect the quantity of coffee supply:

Sex of the household head: This is a dummy variable, taking the value of 1 if the household head is male and 0 otherwise. In a mixed farming system, both men and women contribute to crop production and management.

Membership to a coffee cooperative: This is another dummy variable that takes the value of 1 if the household is a member of a coffee cooperative and 0 if not. Cooperatives improve members' understanding of the market and strengthen relationships among them. Bizualem et al. (2015) found that cooperative members, who receive dividend payments in addition to the actual price of the commodity, are more motivated to increase the quantity of coffee marketed. Therefore, this variable is expected to positively influence the quantity of coffee supplied.

Education status of the Household Head (EDHH): Studies have shown that educated household heads are more likely to have better skills, access to information, and are better at managing available resources. They are also more likely to have better access to credit, markets, and other economic opportunities, which can lead to improved household income and economic stability (World Bank, 2018; UNESCO, 2019). Higher levels of education may help farmers adapt to new market demands and adopt innovative production practices, thus increasing their market participation (Efa and Tura, 2018).

Household size: This continuous variable is measured by the number of family members in the household. Larger families are an important source of labor in rural areas, especially during peak

harvesting periods. While a larger household may use some of the coffee for personal consumption, it also provides additional labor, which can increase coffee production and subsequently, coffee market supply. Gezahagn (2010) found that family size positively affected income from groundnut production.

Distance to nearest local market: This continuous variable measures the distance, in kilometers, that farmers must travel to sell their coffee. A longer distance to the market increases transportation costs and time, making the market less accessible. Mohammed (2013) found that greater distance from the nearest market negatively affects the quantity of coffee marketed. Therefore, this variable is expected to have a negative impact on market supply.

Frequency of extension contact: This continuous variable is the number of days the household has been visited by a Development Agent (DA). Wondmagegn (2014) found that extension services are positively and significantly related to the volume of coffee products supplied to the market, as they provide information on improved technologies that enhance coffee production.

Quantity Produced (QUANP): This continuous variable is measured in quintal/kilograms and represents the amount of coffee produced. Studies have shown that a higher quantity of coffee production is likely to motivate farmers to increase the supply of coffee to the market (Negeri, 2017). This is because farmers with a larger quantity of coffee to sell are more likely to be actively engaged in market activities, such as seeking market or price information, in order to maximize their returns (Negeri, 2017).

Ownership of means of transportation: This is a dummy variable, taking the value of 1 if the household owns a transportation facility and 0 otherwise. Having transportation facilities makes it easier for farmers to transport their products from distant or remote areas to available markets. Agete (2014) found that owning transportation significantly boosted market supply in the red bean market. Therefore, ownership of transportation is expected to positively affect the market supply of coffee.

Amount of credit received: This continuous variable represents the amount of credit a household receives for coffee production. Credit is a crucial financial tool for overcoming low production and marketing challenges. Debashis and Debajit (2013) found that access to credit positively impacted the marketed surplus of paddy. Therefore, it is hypothesized that farmers who receive credit will positively influence the market supply of coffee.

Access to Irrigation (IRRGT):

Irrigation enhances farm households by improving production, increasing yields, reducing crop failure risks, and providing year-round returns (Hussain and Hanjra, 2004). Access to irrigable water increases the return on land, potentially boosting labor returns and improving the farmer's wealth. This reduces the pressure to engage in subsistence activities and encourages participation in market activities (Velasco, 2003). Thus, households with access to irrigation are expected to have a positive relationship with coffee production and the supply chain. The null hypothesis assumes no significant relationship, while the alternative hypothesis suggests a meaningful influence of irrigation on coffee production and the supply chain. This is a dummy variable, where 1 represents households with access to irrigation and 0 otherwise.

Table 2: Summary of the explanatory variables including their definitions and expected influences

Measurement	**Categorical**	**Expected Sign**
Sex of household head	1 = Male, 0 = Female	+ve
Membership to cooperative	1 = Member, 0 = Otherwise	+ve
Education status of HH head	1 = uneducated, 2 = read and write, 3 = primary	+ve
Household size	1 = Small (1-3), 2 = Medium (4-6), 3 = Large (7+)	+ve
Distance to local market	1 = Close (0-5 km), 2 = Medium (6-10 km), 3 = Far (10+ km)	-ve
Frequency of extension contact	1 = Rare (0-2), 2 = Moderate (3-5), 3 = Frequent (6+)	+ve
Quantity produced	1 = Low (0-100 kg), 2 = Medium (101-500 kg), 3 = High (500+ kg)	+ve
Non/off-farming income	1 = Low (0-500 Birr), 2 = Medium (501-2000 Birr), 3 = High (2001+ Birr)	+/-ve
Ownership of means of transport	1 = Owned, 0 = Otherwise	+ve
Amount of credit received	1 = Low (0-1000 Birr), 2 = Medium (1001-5000 Birr), 3 = High (5001+ Birr)	+ve
Access to irrigation	1 = Yes, 0 = Otherwise	+ve

Source, survey, 2024

The table provides a clear summary of the explanatory variables, which are used to analyze the factors that influence the quantity of coffee supplied. According to Gujarati (2003), the table helps to identify the variables that are likely to have a positive or negative impact on the dependent variable.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1 Demographic and Socio-economic Background of the Respondents

4.1.1 Demographic Background of the Respondents

Gender was analyzed by checking the number of male and female-headed households. The sample population of farmer respondents considered during the survey was 386. Out of the total households head interviewed 53.1 % were male households while 46.9% were female-headed households. This indicates that the majority of the participants in this study were male household holders.

The survey on this major demographic factor, measured in years, provided a clue on working ages of households. The mean age of the sample household heads was 50-60 years with the minimum and maximum age of 41 and 70 years, respectively. This result is relatively similar with that of Zekarias et al. (2012) who found the mean age of the sample household was 40 years old.

Regarding marital status substantial majority are married, with 334 individuals (86.5%) falling into this category. In relation family size the majority belong to larger families, with 216 individuals (56.0%) reporting family sizes of 8-11 members., 82 respondents (21.2%) have family sizes ranging from 4-7 individuals, suggesting that medium-sized households are also common. In contrast, smaller households of 1-3 individuals account for 55 respondents (14.2%), while those with more than 11 individuals represent the smallest segment, with 33 individuals (8.5%). The descriptive statistics indicate that the mean family size among the respondents was 6, with a standard deviation of 0.839. This implies that, on average, each household consisted of about six individuals living together.

Table 3: Demographic Background of the Respondents **Table 3: Demographic Background of the Respondents**

Variables	Category	Frequency	Percent
Sex	Male	205	53.1
	Female	181	46.9
	Total	386	100.0
Age	20-30 years	43	11.1
	31-40 years	47	12.2
	41-50 years	96	24.9
	51-60 years	162	42.0
	above 60 years	38	9.8
	Total	386	100.0
Marital status	Married	334	86.5
	Single	42	10.9
	Divorced	6	1.6
	Widowed	4	1.0
	Total	386	100.0
Family size	1-3 individuals	55	14.2
	4-7 individuals	82	21.2
	8-11 individuals	216	56.0
	above 11 individuals	33	8.5
	Total	386	100.0

Source: survey result, 2024

4.2 Socio-Economic Factors of coffee market supply

4.2.1 Socio-economic Background of the Respondents

In both theoretical and practical situations, education level plays an important role in ensuring household access to basic needs such as food, shelter and clothing. Skills and education enhances the working efficiency resulting into more income and food security. Furthermore, education is important to manage the business as well as in decision making (Kadigi, 2013). In the study area according to sample respondents, the mean grade level achieved by respondents was about primary to secondary education level. The minimum grade achieved was grade 0 and the maximum was diploma. Low educational attainment affects livelihood strategies and income, which can influence their livelihood strategies and the income they derive from their activities. Regarding average monthly income, Out of 386 participants, 141 individuals (36.5%) earning above 5000 birr, suggesting financial stability. The average monthly income is 3187 birr, with 36.6% of households earning more than 5000 birr per month, suggesting a high income and 3187 Birr, with 36.6% of households earning over 5000 Birr per month, suggesting high incomes that could enable them to participate in livelihood diversification activities.

Table 4: Respondents Educational status

Variables	Category	Frequency	Percent
Educational level	Uneducated	124	32.1
	Read and write only	49	12.7
	Primary level of education	113	29.3
	Secondary level of education	90	23.3
	Diploma /TVET Certificate	10	2.6
	Total	386	100.0
Average Monthly Income (in birr)	below 1000	101	26.2
	1001-2500	115	29.8
	2501-5000	29	7.5
	above 5000	141	36.5
	Total	386	100.0

Source: survey result, 2024

4.2.2 Farmers' agricultural land ownership status and land holding size

Land is a vital resource for farming communities, enabling them to sustain their livelihoods through agricultural production. However, limited land availability often leads to a focus on non-agricultural income-generating activities. Out of 386 rural household participants, all of respondents owned their own farmland, indicating that agricultural land is a critical livelihood asset. Farmers without land may face barriers to adopting livelihood diversification strategies and modern agricultural technologies.

The total land owned by the sampled households was divided as cultivated land and coffee farm land and the unit of measurement was in hectare. The size of agricultural land plays a significant role in determining opportunities for adopting agricultural technologies and expanding livelihood options. A significant majority of respondents manage farms of less than ½ hectare, limiting their agricultural productivity and income potential. The survey indicated that majority of sampled population own farms between ½ hectare and 1 hectare, with 25.4% having access to more substantial agricultural land. Only 14.4% have farms exceeding 2 hectares. The mean landholding size of respondents was 2.10 hectares, indicating that on average, rural households have 1.15 hectares of land. Scarcity of coffee land in the study area has a great impact on their economic status because as coffee land size increases, the quantity obtained will increase thereby increases the annual total income

Table 5: Farm size of rural households

Farm size of rural households	Frequency	Percent
Less than ½ hectare	137	35.5
between ½ hectare and 1 hectare	107	27.7
between 1.1 hectare and 2 hectare	98	25.4
above 2 hectares	44	11.4
Total	386	100.0

Source: survey result, 2024

4.3 Production and marketing factors coffee market supply

4.3.1 Livelihood Diversification Strategies

As shown in Figure 3, the distribution of these livelihood strategies among rural household heads is as follows: out of 386 respondents, a substantial majority, 228 individuals (59.1%), depends solely on farming. In contrast, a smaller segment of the population diversifies their income sources: 40 respondents (10.4%) engage in both farming and non-farm activities, while 55 individuals (14.2%) combine farming with off-farm work. Additionally, 63 respondents (16.3%) adopt a more comprehensive approach by integrating farming with both non-farm and off-farm activities. This indicates that while some households are beginning to explore diversification, the majority remain heavily dependent on agriculture. These findings suggest that the majority of rural household heads rely on a single livelihood strategy, which may not be sufficient to meet their basic needs. Additionally, exploring the specific non-farm and off-farm activities that farmers are involved in, and whether these activities complement or compete with farming, could offer valuable insights into the sustainability of livelihoods and the resilience of coffee farming communities.

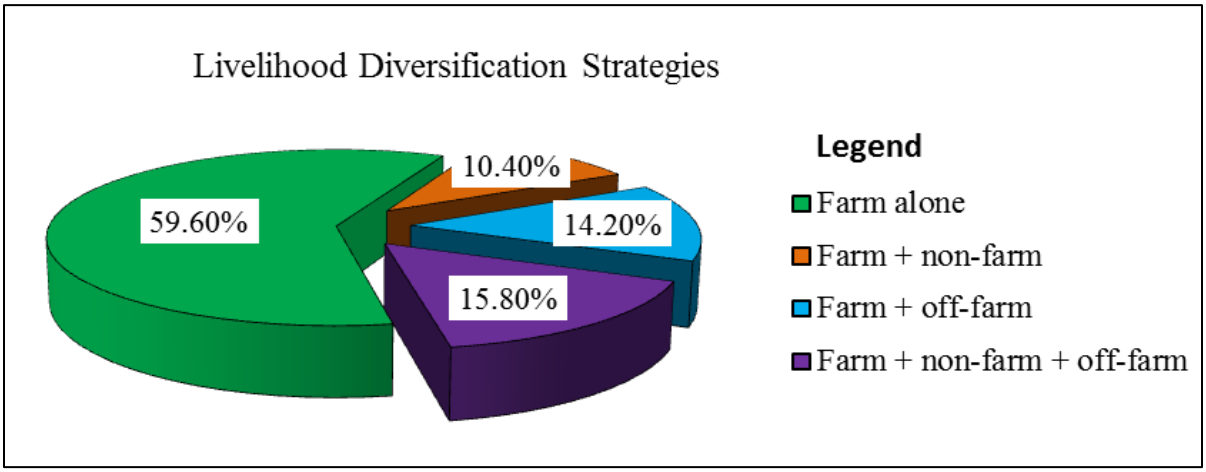

Figure 3: Livelihood Diversification Strategies

Source: survey result, 2024

4.3.2. Determinants of Quantity of Coffee Supplied to Market

As it was hypothesized that quantity of coffee produced is positively and significantly related with market supply of coffee at 1% significance level. Since, coffee is a perennial and cash crop, coffee farmers' primary decision to produce it for sales purpose in order to earn cash as well as

for household consumption purposes. According to the result of this study, there are connection between the amount of coffee supplied to the market and the livelihood diversification strategies adopted by coffee farmers. The table (see Appendix-A Table 2) presents the number and percentage of farmers in each category based on the quantity of coffee supplied, categorized by their livelihood diversification strategies. This study reveals that 68.5% of Ethiopian coffee farmers use diversification strategies, such as combining farming with non-farm activities, off-farm activities, or both. The majority of farmers (59.1%) supply 1-25 kilograms to the market, followed by 26-50 kilograms (21.5%), 51-75 kilograms (29.3%), and above 75 kilograms (30.6%).

In addition, farmers who practiced farm alone were more likely to supply 1-25 kilograms (92.7%), while those who practiced farm + non-farm and farm + off-farm were more likely to supply larger quantities (50.0%). Farmers who practiced farm + non-farm and farm + off-farm were more likely to supply 51-75 kilograms (10.6%), and farm + non-farm + off-farm were more likely to supply above 75 kilograms (50.0%).

According to the findings, livelihood diversification tactics are quite important in deciding how much is offered to the market. Farmers who practice farming alone are more likely to supply lesser quantities, but those who embrace a variety of livelihood techniques are more likely to supply larger numbers. The quantity of coffee supplied and livelihood diversification strategies are significantly correlated, according to chi-square tests. This suggests that farmers who diversify their livelihoods are more likely to supply a greater amount of coffee to the market.

4.3.2 Access to irrigation

The evidence from collected data indicates a significant difference between farmers with access to irrigation and those without, regarding their ability to supply coffee to the market. As per the result of the data shows the majority of respondents, approximately 68.4%, do not have access to irrigation, while only about 31.6% of respondents have access to irrigation This suggests that irrigation access plays a significant role in influencing the supply of coffee to the market.

Moreover, the study reveals a significant relationship between access to irrigation and the quantity of coffee supplied to the market. The majority of coffee suppliers (86.4%) have access to irrigation, supplying above 75 kilograms of coffee, while a smaller proportion (13.6%) supply less than 75 kilograms. Conversely, the majority (85.8%) do not have access to irrigation,

supplying between 51-75 kilograms of coffee. This indicates that access to irrigation is a crucial factor in determining the coffee supply. Those with access to irrigation can supply larger quantities, indicating that irrigation is essential for increasing coffee production and supply. Conversely, those without access are limited in their coffee supply, highlighting the importance of irrigation in overcoming production constraints and increasing coffee supply. Other factors such as farm size, coffee type, and market demand also play a role. The Pearson chi-square test confirms the statistically significant connection between irrigation access and coffee supply, indicating that farmers with irrigation access are more likely to supply a larger quantity of coffee to the market.

4.3.3 Distance from the market

The data in table seven focused on presenting the relationship between the distance from the market and the supply of coffee among a sample of 386 coffee farmers. The distances were categorized into three groups: 1-3 km, 4-6 km, and above 7 km. The result indicates that the majority of respondents, approximately 43.8% (169), live within a 4-6 kilometer radius from the market, while about 33.9% (131) live within a 1-3 kilometer radius. A smaller proportion, approximately 22.3% (86), lives above 7 kilometers from the market. This suggests that the majority of resondents are relatively close to the market, which can make it easier for them to transport their products to the market and sell them. This study also in line with a study conducted by Mohammed (2013) identified that distance from the nearest market affected quantity of coffee marketed significantly and negative

Table 6: Distance from the market

Distance from the market	Frequency	Percent	Cumulative Percent
1-3 km	131	33.9	33.9
4-6 km	169	43.8	77.7
above 7 km	86	22.3	100.0
Total	386	100.0	

Source: survey result, 2024

The study reveals a negative correlation between the distance from the market and the quantity of coffee supplied. The majority of coffee suppliers within 1-3 kilometers supply smaller quantities, with 43.6% supplying 1-25 kilograms, 26.0% supplying 26-50 kilograms, and 41.6% supplying 51-75 kilograms. Conversely, those farther from the market also supply smaller quantities. This suggests that farmers closer to the market are more likely to supply coffee, while those farther away are less likely to supply larger quantities. Factors such as transportation costs, market access, and alternative markets may contribute to this trend. The chi-square test was used to examine the relationship between the distance from the market and the quantity of coffee supplied. The Pearson chi-square test result of 34.579^ with 6 degrees of freedom and a p-value of 0.000 suggests that the distance from the market has a significant impact on the quantity of coffee farmers supply to the market.

4.3.4 Coffee Production Status

The results in the table 8 show that the average coffee produced per year for the 2014/15 E.C cropping season is 386 farming households. The majority of households (33.9%) produced between 1-75 kilograms of coffee per year, while 26.2% produced between 76-150 kilograms. Additionally, 22.3% of households produced between 151-225 kilograms, and 17.6% produced above 225 kilograms.

This suggests that the average coffee production per household is relatively low, with the majority of households producing less than 150 kilograms per year. However, a significant proportion of households (17.6%) produced above 225 kilograms, indicating that there is a potential for increased productivity among some farmers.

The findings of this study are consistent with the results of other studies that have shown that coffee production in Ethiopia is often characterized by low yields and small farm sizes (Rosenstock et al., 2015). The study highlights the need for farmers to adopt improved agricultural practices and technologies in order to increase their coffee production and improve their livelihoods

Table 7: On average coffee produced per year 2014/15E

On average coffee produced per year 2014/15E	Frequency	Percent	Cumulative Percent
1-75kg	131	33.9	33.9
76-150 kg	101	26.2	60.1
151-225 kg	86	22.3	82.4
above 225 kg	68	17.6	100.0
Total	386	100.0	

Source: survey result, 2024

The cross-tabulation results presented in Table (see Appendix-A Table 8) show the relationship between the annual coffee production and the quantity supplied to the market. The majority of coffee producers (131 households) produced between 1-75 kg of coffee per year, followed by 101 households who produced between 76-150 kg, 86 households who produced between 151-225 kg, and 86 households who produced over 225 kg annually.

A Pearson chi-square test was performed to assess the relationship between the quantity of coffee produced and the amount supplied to the market in the 2014/15 E.C. cropping season. The results (see Appendix-A Table 10) indicated a significant association between the two variables at the 1% level, with a chi-square value of 237.074 (df=9, N=386) and a p-value of 0.000. This suggests a strong positive relationship between coffee production and market supply, with producers who produce more coffee being more likely to supply a larger quantity to the market.

4.4 Determinants of the market supply of coffee

4.4.1 Access to credit

It is known that farmers who have access to credit are more likely to use the money sourced from different credit institution to purchase chemicals , insect pests and others for production of coffee which directly leads to the amount of produce or productivity to increase and that contributes to the quantity supplied of coffee**.** However, the study shows that 173 households (44.8%) have access to credit, while 213 households (55.2%) do not. It is expected that access to credit can increases the production of agricultural crops in general and coffee in particular. Even if credit services enhance the productivity level of farmers, there is lack of attention to access

and availability of credit from formal institution rather than borrowing from informal sources (friends, relatives or village money lenders).

Table 8: Access to credit

Access to credit	Frequency	Percent	Cumulative Percent	
Yes	173	44.8	44.8	44.8
No	213	55.2	55.2	100.0
Total	386	100.0	100.0	

Source: survey result, 2024

The cross-tabulation results (see Appendix-A Table 4) highlight the relationship between the quantity of coffee supplied to the market and access to credit. The table indicates that farmers with access to credit are more likely to supply larger amounts of coffee to the market. Farmers who have access to credit are more likely to supply larger quantities of coffee to the market, with 88.1% of them supplying above 75 kilograms, compared to 11.9% of those who do not have access to credit. This suggests that access to credit is a critical factor in determining the quantity of coffee supplied to the market.

The results also show that farmers who do not have access to credit are more likely to supply smaller quantities of coffee to the market, with 70.9% of them supplying 1-25 kilograms, compared to 29.1% of those who have access to credit. This suggests that lack of access to credit is a significant barrier to improving coffee production and market participation. The findings of this study are consistent with the results of other studies that have shown that access to credit can play a critical role in improving agricultural productivity and market participation (Rosenstock et al., 2015). The study highlights the need for farmers to have access to credit in order to improve their coffee production and market participation.

Overall, the results suggest that access to credit is a critical factor in determining the quantity of coffee supplied to the market, and that farmers who have access to credit are more likely to supply larger quantities of coffee. The chi-square test conducted on the data confirms the relationship between the quantity of coffee supplied and access to credit. The Pearson chi-square test yielded a result of 129.527 with 3 degrees of freedom and a p-value of 0.000. This indicates

a statistically significant association between the quantity of coffee supplied to the market and access to credit.

In conclusion, the chi-square results (see Appendix-A Table 10) indicate a strong and significant relationship between credit access and the quantity of coffee supplied. The chi-square test is a statistical method used to determine whether there is a significant association between two categorical variables, and in this case, it was used to investigate the relationship between credit access and the quantity of coffee supplied. Therefore, enhancing access to credit for coffee farmers is vital for increasing coffee supply and promoting sustainable production. This can be accomplished through measures such as providing tailored loan products, offering financial education, and supporting cooperatives that provide financial services to farmers.

4.4.2 Cooperative membership

As per the result of data collected, it appears that cooperative membership has a positive impact on the supply of coffee to the market. Among the 386 smallholder coffee farmers in the study area, 152 HH (39.4%) are members of a cooperative, while 234HH (60.6%) are not (table 10).

Furthermore, the data collected provide us insights about the specific ways in which cooperative membership contributes to the supply of coffee to the market. For example, it may be that cooperative members have better access to resources, such as finance, technology, and market information, which enable them to produce and market their coffee more effectively. Alternatively, it may be that cooperative membership provides farmers with a stronger collective bargaining power, enabling them to negotiate better prices for their coffee with buyers.

Table 9: Cooperative membership

Cooperative membership	Frequency	Percent	Cumulative Percent
Yes	152	39.4	39.4
No	234	60.6	100.0
Total	386	100.0	

Source: survey result, 2024

The cross-tabulation results between quantities supplied to the market and Cooperative membership show a relationship between the two variables. (See Appendix-A Table 6) The result reveals that 60.6% of farmers are not members of a cooperative, while 39.4% are

members. Members of cooperatives are more likely to supply larger quantities of coffee, with 59.3% supplying above 75 kilograms, compared to 40.7% of non-members. Additionally, non-members are more likely to supply smaller quantities, with 65.5% supplying 1-25 kilograms, compared to 34.5% of members. This suggests that cooperative membership is a critical factor in determining the quantity of coffee supplied to the market, and that joining a cooperative can improve coffee production and market participation, consistent with previous studies (Rosenstock et al., 2015)

The chi-square tests (see Appendix-A Table 10) conducted on the quantity supplied to the market and cooperative membership variables show significant associations between the two variables. The Pearson chi-square test result is 30.245a, with a degree of freedom (df) of 3 and an asymptotic significance level (2-sided) of .000. This indicates that the observed difference between the quantities supplied to the market by cooperative members and non-members is statistically significant. Overall, the results of the chi-square tests suggest that cooperative membership has a positive impact on the quantity of coffee supplied to the market.

Overall, the data suggest that cooperative membership is a significant factor in the supply of coffee to the market among smallholder coffee farmers in the study area. However, further analysis is needed to fully understand the nature of this relationship and to identify potential strategies for improving the supply of coffee to the market.

4.4.3 Infra-structure/own transportation

The results in Table 11 in relation to access to infra-structure/own transportation in the study area indicated that, among 386 households, the result depicted that 1333 respondents (34.5%) answered "yes" to the question, while 253 respondents (65.5%) answered "no". Specifically, the results suggest that smallholder farmers who have access to infrastructure/own transportation are more likely to supply a high amount of coffee to the market as compared to those who do not have access to infrastructure. This may enables smallholder farmers to transport their coffee beans more efficiently and effectively to the market, leading to increased productivity and profitability.

Table 10: Infra-structure/own transportation

Infra-structure/own transportation	Frequency	Percent	Cumulative Percent
Yes	133	34.5	34.5
No	253	65.5	100.0
Total	386	100.0	

Source: survey result, 2024

The cross-tabulation results show the relationship between the quantity of coffee supplied to the market and access to infrastructure/transportation. The result in the table (see Appendix-A Table 7) shows that among the 386 households surveyed, the majority of farmers (65.5%) do not have their own transportation, while 34.5% of farmers do have their own transportation.

The table also shows that the quantity of coffee supplied to the market varies significantly depending on whether or not the household has access to infrastructure/own transportation. The result in the cross-tabulation table (see Appendix-A Table 7) indicated that Farmers who have their own transportation were more likely to supply larger quantities of coffee to the market, with 53.4% of them supplying above 75 kilograms, compared to 46.6% of those without their own transportation. This suggests that having one's own transportation is a critical factor in determining the quantity of coffee supplied to the market.

The results also show that farmers without their own transportation were more likely to supply smaller quantities of coffee to the market, with 81.8% of them supplying 1-25 kilograms, compared to 18.2% of those with their own transportation. This suggests that lack of transportation is a significant barrier to improving coffee production and market participation.

The findings of this study are consistent with the results of other studies that have shown that transportation is a critical factor in determining agricultural productivity and market participation (Mbabazi et al., 2018). The study highlights the need for farmers to have access to their own transportation in order to improve their coffee production and market participation.

Therefore, the results of the cross-tabulation analysis support the hypothesis that access to infrastructure/own transportation is a significant factor in determining the quantity of coffee supplied to the market by smallholder farmers in the study area.

A Pearson chi-square test was conducted to examine whether there was a relationship between the quantity of coffee supplied to the market and access to infrastructure/transportation. The results revealed (see Appendix-A Table 10) depicted that there are significant associations between the two variables at a 1% significant level, X2 (df= 3, N= 386) = 29.747a, p<0.01. The test result of 29.747a with a p-value of 0.000 indicates that there is a strong positive relationship between the quantity of coffee supplied to the market and access to infrastructure/own transportation. This means that as access to infrastructure/own transportation increases; the quantity of coffee supplied to the market also tends to increase. This relationship suggests that smallholder farmers who have access to infrastructure/own transportation are more likely to supply a higher quantity of coffee to the market, compared to those who do not have access to these resources.

4.4.4 Extension contact:

The results of a survey conducted among smallholder farmers in the study area during the 2014/15 E.C cropping seasons, regarding their extension contact in relation to coffee production in Table 12 indicated that, out of the 386 farmers in the study area, the majority of smallholder farmers 241 HH (62.4%) had no access to extension contact in relation to coffee production, while only 145 HH (37.6%) of the smallholder farmers had extension contact during the 2014/15 E.C cropping seasons. This means that only a minority of farmers (37.6%) had extension contact during the 2014/15 E.C. cropping seasons. Therefore, from the findings, we can conclude that a significant proportion of farmers in the study area do not have access to extension services, which are critical for improving agricultural productivity and market participation.

Table 11: Extension contact in relation to coffee production in 2014/15 E.C cropping seasons

Extension contact	Frequency	Percent	Cumulative Percent
yes	145	37.6	37.6
no	241	62.4	100.0
Total	386	100.0	

Source: survey result, 2024

The cross-tabulation results in the table (see Appendix-A Table 9) indicated that, farmers who had an extension contact were more likely to supply larger quantities of coffee to the market,

with 87.3% of them supplying above 75 kilograms, compared to 12.7% of those without an extension contact. This suggests that extension services play a critical role in improving the quantity of coffee supplied to the market.

The results also show that farmers without an extension contact were more likely to supply smaller quantities of coffee to the market, with 94.5% of them supplying 1-25 kilograms, compared to 5.5% of those with an extension contact. This suggests that lack of extension contact is a significant barrier to improving coffee production and market participation.

The findings of this study are consistent with the results of other studies that have shown that extension services can play a critical role in improving agricultural productivity and market participation (Rosenstock et al., 2015). The study highlights the need for extension services to be made available to farmers, particularly those who are struggling to improve their coffee production and market participation.

Overall, the results suggest that extension contact is a critical factor in determining the quantity of coffee supplied to the market, and that farmers who have access to extension services are more likely to supply larger quantities of coffee.

A Pearson chi-square test was conducted to examine whether there was an association between the quantity of coffee supplied to the market and extension contact in relation to coffee production during the 2014/15 E.C. cropping seasons. As the results revealed (see Appendix-A Table 10) depicted there are significant associations between the two variables at 1% significant level, $X2$ ($df= 3$, $N= 386$) = 184.508, $p<0.01$. The test result of 184.508 with a p-value of 0.000 indicates that there is strong positive relationship between the quantity of coffee supplied to the market and extension contact in relation to coffee production during the 2014/15 E.C. cropping seasons. This means that farmers who supplied larger quantities of coffee to the market were more likely those who had extension contact.

4.5 Regression analysis

4.5.1 Assumptions in Regression

Before performing regression analysis, it is essential to verify that the underlying assumptions about the data are satisfied. To ensure the validity and reliability of the results, it is essential to assess the underlying assumptions of the regression analysis. In this study, the researcher carefully evaluated several key assumptions, including multicollinearity, outliers, normality,

linearity, homoscedasticity, and independence of residuals. Fortunately, the results showed that these assumptions were reasonably met, providing a solid foundation for accurately interpreting the relationships between the dependent and independent variables.

4.5.1.2 Multicollinearity analysis

The independent variables (Perceived Ease of Use, Perceived Usefulness, Attitude, Intent to Use, Efficiency, and Service Security) exhibit relationships with one another, but these relationships are not excessively strong (see Table 13). This indicates that the assumption of multicollinearity is not violated. Additionally, multicollinearity can be assessed using SPSS in a multiple regression analysis, where Tolerance and Variance Inflation Factor (VIF) values are provided. Tolerance measures how much of the variability in a specific independent variable is not explained by other independent variables in the model and is calculated using the formula ($1 - R^2$) for each variable. If the tolerance value is very low (below 0.1) and the VIF value exceeds 10, it suggests a multicollinearity problem, making regression analysis difficult. In this study, the tolerance values for all independent variables were above 0.10, and the VIF values were below 10, indicating that multicollinearity was not an issue (see Table 13).

Table 12: Collinearity Statistics Test of Independent Variables

Model		Collinearity Statistics	
		Tolerance	VIF
1	Sex	.806	1.241
	Family size	.921	1.086
	Livelihood Diversification Strategies	.418	1.395
	access to irrigation	.629	1.590
	Access to credit	.897	1.115
	Distance from the market	.741	1.350
	Cooperative membership	.748	1.337
	Infra-structure/own transportation	.357	1.804
	Average coffee produced	.408	1.451
	extension contact in production	.806	1.241

a. Dependent Variable: Quantity supplied to the market

Source: survey result, 2024

4.5.1.3 Homoscedasticity

In the context of regression analysis, homoscedasticity refers to a fundamental assumption that the variance of the dependent variable (Y) remains constant across all levels of the independent variable (X). In other words, the spread of the data points around the regression line is consistent and equal across all values of the independent variable, indicating that the variance of the dependent variable is homogeneous and not dependent on the level of the independent variable. To verify the assumption of homoscedasticity, a useful approach is to create a scatter plot of the predicted values of Y against the residuals. If the resulting plot displays a random and uniform distribution of points around zero, it suggests that the variances of the dependent variable are consistent across all levels of the independent variable. Conversely, if the plot exhibits a distinct pattern, such as a "fan" shape, where the points fan out from the center, it indicates the presence of heteroscedasticity, suggesting that the variances are not equal across all levels of the independent variable.

In this study, the scatterplot shows that the residuals are concentrated around zero, which indicates no violation of homoscedasticity (see Figure 5). This suggests that the variance of the model's errors remains stable across different levels of the independent variable, confirming the reliability of the regression analysis.

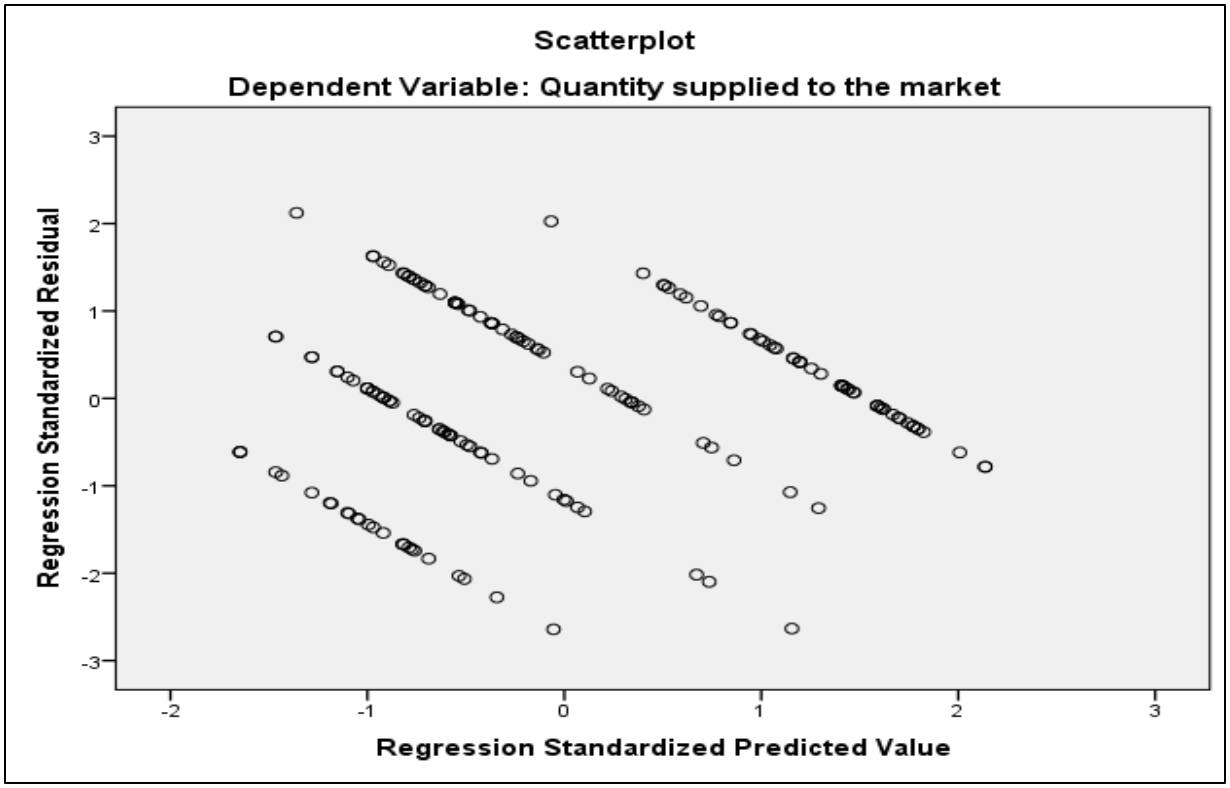

Figure 4: Scatter plot for Homoscedasticity assumption

Source: survey result, 2024

4.5.1.4 Normality

Multiple regression analysis assumes that the variables follow a normal distribution, which is a fundamental assumption of the model. According to Darlington (1968), "the assumption of normality is crucial for the validity of the results, and it can be tested using various statistical methods".

According to Hoaglin (1983), the P-P plot is a useful tool for checking the normality assumption, and it can be used to identify any deviations from normality. Significant deviations from the diagonal line on the Probability-Probit (P-P) plot may suggest that the residuals do not follow a normal distribution, which could compromise the validity of the regression analysis.

To evaluate the normality and independence of residuals, we examined the Normal Probability Plot (P-P) and Scatterplot of the Regression Standardized Residuals. The P-P plot revealed a straight diagonal line, indicating that the residuals are normally distributed. Furthermore, the Scatterplot of the standardized residuals showed a symmetrical distribution with most data points clustered around the zero line, supporting the assumption of independence of residuals. The

analysis also identified any potential outliers in the data, and no significant outliers were found.

A histogram with a normal curve overlaid provides a clear visual of the data distribution. The black line on the histogram represents the bell-shaped normal curve of the data (see Figure 6).

In conclusion, all key assumptions—multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals—were satisfied, confirming that the multiple regression analysis is valid for this study

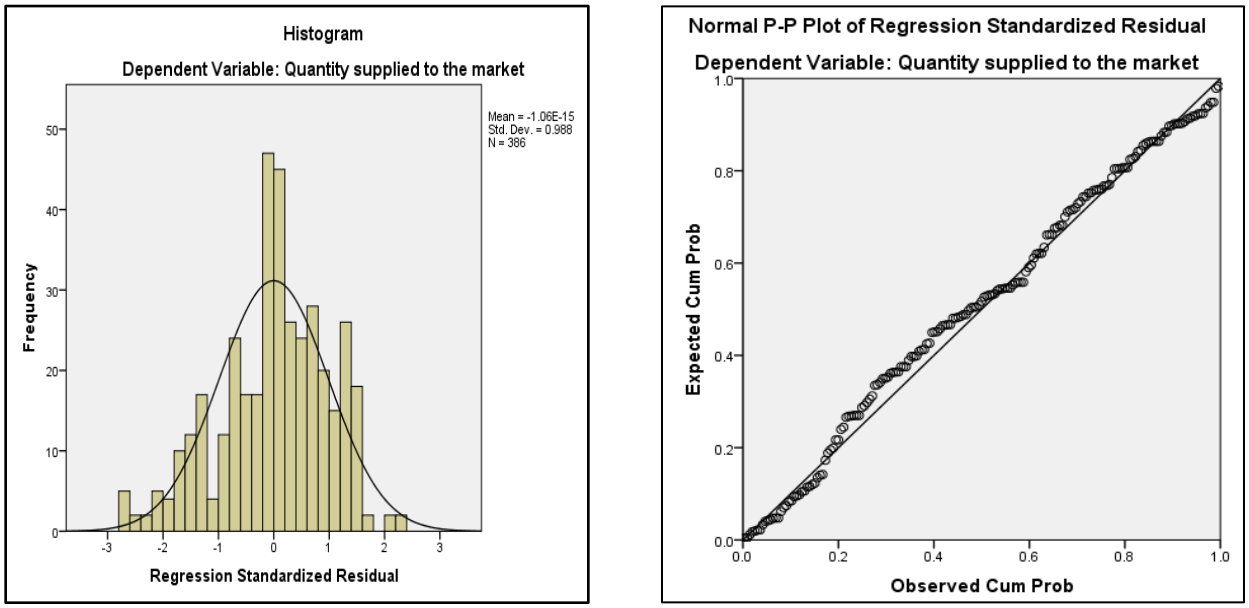

Figure 5: Histogram and P-P plot of standardized residuals Source: survey result, 2024

4.5.2 Coefficient of Determination

The results of the regression analysis, as presented in Table 15, reveal a significant correlation between the quantity of coffee supplied to the market and various independent factors. The coefficient of determination (R) is 0.791, indicating a strong and statistically significant relationship between the predictors and the quantity of coffee supplied. The Adjusted R-Squared value of 0.616 indicates that about 61.1% of the variation in the quantity of coffee supplied is explained by the independent variables included in the model. This adjusted value improves the accuracy of the goodness-of-fit measure, particularly when multiple predictors are considered.

In conclusion, the model suggests that these independent variables play a significant role in determining the quantity of coffee supplied to the market. The strong R and Adjusted R^2 values demonstrate that the model effectively explains the variation in coffee supply, highlighting key areas for intervention and policy development within the coffee sector. This information can help

stakeholders enhance production and marketing strategies, ultimately improving the livelihoods of coffee farmers.

Table 13: **Model Summary**

Model	R	R square	Adjusted R square	Std. Error of the estimate	CHANGE STATISTICS				
					R Square change	F change	df1	df2	Sig. F Change
1	.791	.625	.616	.644	.625	69.641	9	376	.000

Source: survey result, 2024

4.5.3 Analysis of variance (ANOVA)

Analysis of variance shows that, there is significant relationship between the variables under consideration and their relationship was described as follows

4.5.3.1 Coefficients regression

Constant (Intercept): The intercept term is significant, indicating that the supply of coffee to the market is significantly different from zero. This means that even when all the independent variables are held constant, there is still a positive relationship between the dependent variable and the intercept term.

Sex of the rural Household Head:

The regression coefficient for the Sex of the rural Household Head is 0.298, with a standard error of 0.073 and a t-value of 4.067, indicating a statistically significant and positive relationship with the quantity supplied to the market (p-value = 0.000). This finding is consistent with the literature on household decision-making and agricultural production, which suggests that the sex of the household head can influence agricultural outcomes (Quisumbing & Maluccio, 2003).

The unstandardized coefficient (B) of 0.298 suggests that for every unit increase in the sex of the rural household head (i.e., from female to male), the quantity supplied to the market increases by approximately 0.298 quintals. This is a relatively small effect size, but it is statistically significant. The standardized coefficient (Beta) of 0.143 suggests that the sex of the household head accounts for approximately 14.3% of the variation in the quantity supplied to the market.

This finding can be attributed to the fact that men and women may have different preferences, skills, and access to resources, which can influence their decision-making and agricultural production (Deere & Doss, 2006).

Family size of the rural Household Head:

Based on the results in the table 17, the unstandardized coefficient (B) of 0.141 suggests that for every unit increase in family size, the quantity supplied to the market increases by approximately 0.141 quintals.

The results indicate that family size of the rural household head has a statistically significant and positive relationship with the quantity supplied to the market. Specifically, the unstandardized coefficient (B) of 0.141 suggests that for every unit increase in family size, the quantity supplied to the market increases by approximately 0.141 quintals. This is a relatively small effect size, but it is statistically significant, as indicated by the p-value of 0.001.

The standardized coefficient (Beta) of 0.113 suggests that family size accounts for approximately 11.3% of the variation in the quantity supplied to the market. This is a relatively small proportion, indicating that other factors, such as household income, education, and access to resources, may also play a significant role in determining the quantity supplied to the market.

This finding is consistent with the literature on household decision-making and agricultural production, which suggests that family size can influence agricultural outcomes (Quisumbing & Maluccio, 2003). For example, larger family sizes may require more labor, which can be used to produce more and supply more to the market. Additionally, larger families may also have more resources and expertise, such as knowledge of farming practices and access to markets, which can enable them to produce more and supply more to the market (Deere & Doss, 2006).

The statistically significant and positive relationship between family size and the quantity supplied to the market highlights the importance of considering the role of family size in agricultural outcomes. This finding has implications for agricultural development policies and programs, which may need to take into account the potential effects of family size on agricultural production and supply.

Access to use irrigation

The results indicate that access to irrigation has a statistically significant and positive relationship with the quantity supplied to the market. Specifically, the unstandardized coefficient

(B) of 0.792 suggests that for every unit increase in access to irrigation, the quantity supplied to the market increases by approximately 0.792 quintals. This is a relatively large effect size, and it is statistically significant, as indicated by the p-value of 0.000.

The standardized coefficient (Beta) of 0.355 suggests that access to irrigation accounts for approximately 35.5% of the variation in the quantity supplied to the market. This is a substantial proportion, indicating that access to irrigation is a critical factor in determining the quantity supplied to the market.

This finding is consistent with the literature on agricultural production and water management, which suggests that irrigation, is a key factor in increasing crop yields and agricultural productivity (Khan et al., 2016). For example, irrigation can increase crop yields by up to 50% or more, depending on the crop and climate conditions (Khan et al., 2016). Additionally, irrigation can also help to stabilize agricultural production and reduce the risk of crop failure, which can lead to increased market supply (Khan et al., 2016).

The statistically significant and positive relationship between access to irrigation and the quantity supplied to the market highlights the importance of irrigation in agricultural development. This finding has implications for agricultural development policies and programs, which may need to prioritize investments in irrigation infrastructure and water management systems.

Access to credit:

The results indicate that access to credit has a statistically insignificant and very small relationship with the quantity supplied to the market. Specifically, the unstandardized coefficient (B) of 0.019 suggests that for every unit increase in access to credit, the quantity supplied to the market increases by approximately 0.019 quintals. This is a very small effect size, and it is not statistically significant, as indicated by the p-value of 0.819.

The standardized coefficient (Beta) of 0.009 suggests that access to credit accounts for approximately 0.9% of the variation in the quantity supplied to the market. This is a very small proportion, indicating that access to credit is not a significant factor in determining the quantity supplied to the market.

This finding is consistent with the literature on agricultural finance and development, which suggests that access to credit is not a key determinant of agricultural productivity and market supply (Mishra et al., 2014). For example, research has shown that access to credit can have a

positive impact on agricultural productivity, but this impact is often small and may be offset by other factors such as market prices, climate, and soil quality (Mishra et al., 2014).

The statistically insignificant and small relationship between access to credit and the quantity supplied to the market highlights the limited role of credit in agricultural development. This finding has implications for agricultural development policies and programs, which may need to prioritize investments in other areas such as irrigation, soil conservation, and market access.

Distance from the market:

The results in the table 17 indicate that distance from the market has a statistically significant and negative relationship with the quantity supplied to the market. Specifically, the unstandardized coefficient (B) of -0.304 suggests that for every unit increase in distance from the market, the quantity supplied to the market decreases by approximately 0.304 quintals. This is a relatively moderate effect size, and it is statistically significant, as indicated by the p-value of 0.000.

The standardized coefficient (Beta) of -0.217 suggests that distance from the market accounts for approximately 21.7% of the variation in the quantity supplied to the market. This is a moderate proportion, indicating that distance from the market is a significant factor in determining the quantity supplied to the market.

This finding is consistent with the literature on agricultural economics and marketing, which suggests that distance from the market, can have a negative impact on agricultural productivity and market supply (Glover & Pennington-Cross, 1999). For example, research has shown that farmers who are farther away from markets tend to have lower yields, lower prices, and lower sales volumes due to increased transportation costs and reduced market access (Glover & Pennington-Cross, 1999).

The negative and significant coefficient for distance from the market indicates that households that are closer to the market supply more coffee. This is likely due to the fact that transportation costs are lower for households that are closer to the market, making it easier for them to supply coffee at a lower cost. Additionally, households that are farther away from the market may face higher transportation costs and shorter shelf life, which can reduce their incentives to produce and supply coffee to the market (Bjorner, 2013; Hertz, 2015).

The standardized coefficient (Beta) represents the change in the dependent variable (supply of coffee to the market) for a one-unit change in the independent variable (distance from the market) while holding all other independent variables being unchanged. In this case, a one-km increase in distance from the market is associated with a -0.300 quintal decrease in the supply of coffee to the market.

Cooperative membership:

The results indicate that cooperative membership has a statistically insignificant and small relationship with the quantity supplied to the market. Specifically, the unstandardized coefficient (B) of 0.102 suggests that for every unit increase in cooperative membership, the quantity supplied to the market increases by approximately 0.102 quintals. This is a very small effect size, and it is not statistically significant, as indicated by the p-value of 0.190.

The standardized coefficient (Beta) of 0.048 suggests that cooperative membership accounts for approximately 4.8% of the variation in the quantity supplied to the market. This is a very small proportion, indicating that cooperative membership is not a significant factor in determining the quantity supplied to the market.

This finding is consistent with the literature on agricultural cooperatives, which suggests that the impact of cooperative membership on agricultural production and market supply is often small and may be influenced by various factors such as the type of crop, farm size, and market conditions (Ouma, 2010). For example, However, the impact of cooperative membership may be limited in certain contexts, such as in areas with limited market access or where cooperative activities are not well-organized (Ouma, 2010). The statistically insignificant and small relationship between cooperative membership and the quantity supplied to the market highlights the limited role of cooperative membership in agricultural development.

The results of the regression analysis indicate that infrastructure/own transportation has a statistically insignificant and small relationship with the quantity supplied to the market. The unstandardized coefficient (B) of 0.042 suggests that for every unit increase in infrastructure/own transportation, the quantity supplied to the market increases by approximately 0.042 quintals. This is a very small effect size, and it is not statistically significant, as indicated by the p-value of 0.598.

The standardized coefficient (Beta) of 0.019 suggests that infrastructure/own transportation accounts for approximately 1.9% of the variation in the quantity supplied to the market. This is a

very small proportion, indicating that infrastructure/own transportation is not a significant factor in determining the quantity supplied to the market.

Research has shown that investments in infrastructure such as roads, irrigation systems, and storage facilities can increase agricultural productivity and market supply (Fafchamps & Minten, 2002). However, the impact of infrastructure may be limited in certain contexts, such as in areas with limited market access or where infrastructure is not well-maintained (Fafchamps & Minten, 2002).

On average coffee produced per year 2014/15E.C:

The results of the regression analysis indicate that on average coffee produced per year 2014/15E has a statistically significant and positive relationship with the quantity supplied to the market. The unstandardized coefficient (B) of 0.206 suggests that for every unit increase in the average coffee produced per year 2014/15E, the quantity supplied to the market increases by approximately 0.206 quintals. This is a moderate effect size, and it is statistically significant, as indicated by the p-value of 0.000.

The standardized coefficient (Beta) of 0.219 suggests that on average coffee produced per year 2014/15E accounts for approximately 21.9% of the variation in the quantity supplied to the market. This is a substantial proportion, indicating that on average coffee produced per year 2014/15E is a significant factor in determining the quantity supplied to the market.

Research has shown that the quantity of coffee produced can have a significant impact on the quantity supplied to the market (International Coffee Organization, 2019). For example, a study by the International Coffee Organization found that an increase in coffee production can lead to an increase in the quantity supplied to the market, as farmers are more likely to sell their coffee if they have a surplus (International Coffee Organization, 2019).

Therefore, it can be concluded that on average coffee produced per year 2014/15E has a statistically significant and positive relationship with the quantity supplied to the market, and that this variable is a significant factor in determining the quantity supplied to the market

Extension contact in relation to coffee production in 2014/15 E.C cropping seasons:

The results of the regression analysis indicate that extension contact in relation to coffee production in 2014/15 E.C cropping seasons has a statistically significant and positive relationship with the quantity supplied to the market. The unstandardized coefficient (B) of 0.313

suggests that for every unit increase in extension contact in relation to coffee production in 2014/15 E.C cropping seasons, the quantity supplied to the market increases by approximately 0.313 quintals. This is a moderate effect size, and it is statistically significant, as indicated by the p-value of 0.003.

The standardized coefficient (Beta) of 0.146 suggests that extension contact in relation to coffee production in 2014/15 E.C cropping season's accounts for approximately 14.6% of the variation in the quantity supplied to the market. This is a substantial proportion, indicating that extension contact in relation to coffee production in 2014/15 E.C cropping seasons is a significant factor in determining the quantity supplied to the market.

Research has shown that extension services can play a crucial role in improving agricultural productivity and market supply (World Bank, 2018). For example, a study by the World Bank found that extension services can help farmers improve their yields, increase their income, and expand their market access (World Bank, 2018).

Therefore, it can be concluded that extension contact in relation to coffee production in 2014/15 E.C cropping seasons has a statistically significant and positive relationship with the quantity supplied to the market, and that this variable is a significant factor in determining the quantity supplied to the market.

In summary, the results of the regression analysis indicate that several factors have a statistically significant and positive relationship with the quantity supplied to the market, including on average coffee produced per year 2014/15E, extension contact in relation to coffee production in 2014/15 E.C cropping seasons, and access to irrigation. These variables account for a substantial proportion of the variation in the quantity supplied to the market, with on average coffee produced per year 2014/15E accounting for 21.9% and extension contact in relation to coffee production in 2014/15 E.C cropping seasons accounting for 14.6%. In contrast, variables such as cooperative membership, infrastructure/own transportation, access to credit, and distance from the market have a statistically insignificant and small relationship with the quantity supplied to the market. These findings suggest that agricultural development policies and programs should prioritize investments in areas that support coffee production, extension services, and irrigation infrastructure to increase market supply

Table 14: Coefficients regression

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.117	.379		10.876	.000
Sex	.298	.073	.143	4.067	.000
Family size	.141	.041	.113	3.441	.001
access to irrigation	.792	.109	.355	7.255	.000
Access to credit	.019	.083	.009	.228	.819
Distance from the market	-.304	.047	-.217	-6.500	.000
Cooperative membership	.102	.078	.048	1.314	.190
Infra-structure/own transportation	.042	.080	.019	.527	.598
extension contact in relation to coffee production in 2014/15 E.C cropping seasons	.313	.106	.146	2.952	.003

a. Dependent Variable: Quantity supplied to the market

Source: survey result, 2024

4.5.3.2 Linearity analysis

All the variables included in the analysis were selected based on previous research that assumed a linear relationship between them. As indicated by the model equation, both the dependent variable (quantity of coffee supplied to the market) and the independent variables (extension contact related to coffee production in the 2014/15 E.C. cropping season, distance from the market, family size of the household head, sex of the household head, cooperative membership, infrastructure/own transportation, access to credit, access to irrigation, livelihood diversification

strategies, and average coffee production per year in 2014/15 E.C.) exhibit a linear relationship. The scatter plot shown in Figure 4 further confirms that the independent variables and dependent variable follow a linear pattern, thereby supporting the assumption of linearity.

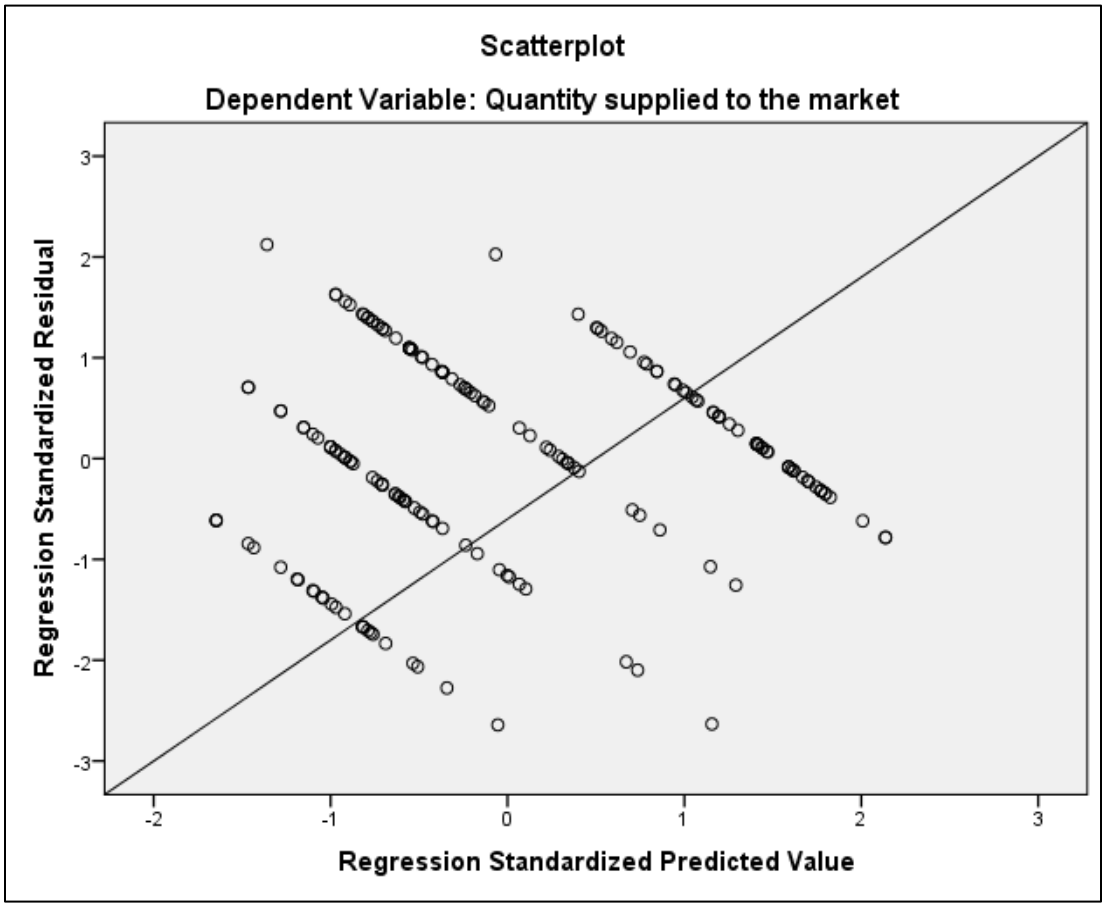

Figure 6: Linearity assumption

Source: survey result, 2024

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

This study assessed the determinants of market supply of coffee by smallholder farmers in Meskan Woreda, East Gurage Zone, Ethiopia. A survey was conducted with 386 households using simple random sampling during the 2014/15 Ethiopian calendar year. Structured questionnaires were employed to collect primary data, which was analyzed using descriptive and inferential statistical techniques, including multiple linear regression and chi-square tests. The result of the study shows that the coefficient for the Sex of the rural Household Head is 0.256, with a standard error of 0.106 and a t-value of 2.418. The p-value associated with this coefficient is 0.017. This means that the supply of coffee to the market is significantly associated with the sex of the rural household head, with male-headed households supplying more coffee to the market than female-headed households. The study also found that the effect of the Sex of the rural Household Head on the supply of coffee to the market is significant at the 0.05 level, with a t-value of 2.418 and a p-value of 0.017.

In addition regarding the implication of family size, the coefficient for family size of the rural household head is positive and significant, indicating that larger families have a higher supply of coffee to the market. This could be due to the fact that larger families have more labor available for farming or have more mouths to feed, leading to a higher demand for coffee. Moreover, the coefficient for Livelihood Diversification Strategies is positive and significant, indicating that an increase in the use of diversification strategies is associated with an increase in the supply of coffee to the market. This suggests that a one-unit increase in Livelihood Diversification Strategies is associated with a 0.145-unit increase in the supply of coffee to the market, which is a statistically significant result.

Furthermore, the coefficient for access to irrigation (B = -0.624, Std. Error = 0.171, t = -3.641, Sig. = 0.000) is negative and significant, indicating that households with access to irrigation supply less coffee to the market. This could be due to the fact that irrigation allows farmers to control the amount of water used for their crops, leading to higher yields and therefore less need to supply coffee to the market.

The coefficient for distance from the market (B = -0.300, Std. Error = 0.069, t = -4.326, Sig. = 0.000) is negative and significant, indicating that households that are closer to the market supply more coffee. This could be due to the fact that transportation costs are lower for households that are closer to the market, making it easier for them to supply coffee at a lower cost. To sum up distance from the market and quantity of coffee supplied to the market had a negative relationship. As a result, the majority of farmers who supply coffee to the market were located within 1-3 km from the market.

5.2. Conclusion

Based on the analysis of the data, it is imperative to conclude that the coefficient for sex of the rural Household Head is significant, with a p-value of 0.017, which is less than our chosen significance level of 0.05. This means that we have evidence to suggest that the supply of coffee to the market is significantly associated with the sex of the rural household head.

Livelihood Diversification Strategies (LDS) is positively associated with the supply of coffee to the market. This suggests that households that diversify their livelihoods supply more coffee to the market, which could be due to the fact that diversification strategies such as crop rotation, intercropping, or animal husbandry can increase the productivity of the farm and lead to higher coffee yields. Access to irrigation leads to a decrease in the supply of coffee to the market. The coefficient for access to irrigation is negative and significant, indicating that households with access to irrigation supply less coffee to the market. This is likely because irrigation allows farmers to control the amount of water used for their crops, leading to higher yields and therefore less need to supply coffee to the market.

The coefficient for distance from the market is negative and significant; indicating that an increase in distance from the market is associated with a decrease in the supply of coffee to the market and that there is a negative relationship between distance from the market and supply of coffee to the market. This means that as the distance from the market increases, the supply of coffee to the market decreases. This is likely due to the fact that farmers who are farther away from the market face higher transportation costs and shorter shelf life, which can reduce their incentives to produce and supply coffee to the market.

Furthermore, it is possible to say that 63.2% of the coffee quantity supplied to the market is due to the cumulative effects of extension contact in relation to coffee production in 2014/15 E.C

cropping seasons, distance from the market, family size of the rural household head, sex of the rural household head, cooperative membership, infra-structure/own transportation, access to credit, access to irrigation, livelihood diversification strategies, average coffee produced per year 2014/15E.C.

5.3. Recommendations

The recommendations or policy implications to be made from this study are based on the significant variables for all dependent variables under consideration. Firstly, expanding equal accessibility of infrastructures such as road and transportation facilities needs government intervention to promote the effective marketing of coffee through all outlets. It is good if the government provide long term loans for the farmers which enable them to access agricultural inputs which promote the quantity of output and manage their coffee marketing and/or production more effectively. The concerned bodies and information centers should be able to disseminate market price information at the appropriate time for the farmers in which they can equally get the accessibility.

Secondly, households should seek other means of generating income in addition to coffee production to increase their annual total income in which they can improve the quality of their house. Local authority should be able to schedule area specific and efficient extension service in order to increase housing quality of farmers which in turn increases wellbeing status. Thirdly, the concerned authority should be able to increase the awareness of households about the importance of education and about the school age at which their children should join the school. Government intervention should be needed for the expansion of schools in which the communities would be equally benefited.

Lastly, extension agents should increase the understanding of households about the importance of agricultural inputs such as improved coffee seed and the concerned authority should be able to increase its accessibility with cost effective. Households should be able to increase the source of their total annual income such as livestock production to earn more income for the improvement of their livelihood outcomes.

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Appendices

Appendix-A

Table 1: Descriptive Statistics

Descriptives

[DataSet1] C:\Users\pc\Desktop\Belay_data - Copy.sav

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age of the rural Household Head	183	1	5	3.30	1.148
Monthly income of the respondents	183	1	4	2.55	1.230
Family size of the rural Household Head	183	1	4	2.59	.839
Land holding size of rural households heads	183	1	4	2.10	1.014
Valid N (listwise)	183				

Table 2: Quantity supplied to the market * Livelihood Diversification Strategies Crosstabulation

Quantity supplied to the market * Livelihood Diversification Strategies Crosstabulation			Livelihood Diversification Strategies				Total
			Farm alone	Farm + non-farm	Farm + off-farm	Farm + non-farm + off-farm	
Quantity supplied to the market	1-25 kilogram	Count	51	0	4	0	55
		% within Quantity supplied to the market	92.7%	0.0%	7.3%	0.0%	100.0%
	26-50 kiligram	Count	88	2	8	2	100
		% within Quantity supplied to the market	88.0%	2.0%	8.0%	2.0%	100.0%
	51-75 kiligram	Count	89	10	12	2	113
		% within Quantity supplied to the market	78.8%	8.8%	10.6%	1.8%	100.0%
	above 75 kilogram	Count	0	28	31	59	118
		% within Quantity supplied to the market	0.0%	23.7%	26.3%	50.0%	100.0%
Total		Count	228	40	55	63	386
		% within Quantity supplied to the market	59.1%	10.4%	14.2%	16.3%	100.0%

Source: survey result, 2023

Table 3: Quantity supplied to the market * access to use irrigation Crosstabulation

Quantity supplied to the market * access to use irrigation Crosstabulation			access to use irrigation		Total
			yes	No	
Quantity supplied to the market	1-25 kilogram	Count	0	55	55
		% within Quantity supplied to the market	0.0%	100.0%	100.0%
	26-50 kiligram	Count	4	96	100
		% within Quantity supplied to the market	4.0%	96.0%	100.0%
	51-75 kiligram	Count	16	97	113
		% within Quantity supplied to the market	14.2%	85.8%	100.0%
	above 75 kilogram	Count	102	16	118
		% within Quantity supplied to the market	86.4%	13.6%	100.0%
Total		Count	122	264	386
		% within Quantity supplied to the market	31.6%	68.4%	100.0%

Source: survey result, 2023

Table 4: Quantity supplied to the market * Access to credit Crosstabulation

Quantity supplied to the market * Access to credit Crosstabulation			Access to credit		Total
			yes	no	
Quantity supplied to the market	1-25 kilogram	Count	16	39	55
		% within Quantity supplied to the market	29.1%	70.9%	100.0%
	26-50 kiligram	Count	23	77	100
		% within Quantity supplied to the market	23.0%	77.0%	100.0%
	51-75 kiligram	Count	30	83	113
		% within Quantity supplied to the market	26.5%	73.5%	100.0%
	above 75 kilogram	Count	104	14	118
		% within Quantity supplied to the market	88.1%	11.9%	100.0%
Total		Count	173	213	386
		% within Quantity supplied to the market	44.8%	55.2%	100.0%

Source: survey result, 2023

Table 5: Quantity supplied to the market * Distance from the market Crosstabulation

Quantity supplied to the market * Distance from the marke			Distance from the market			Total
			1-3 km	4-6 km	above 7 km	
Quantity supplied to the market	1-25 kilogram	Count	5	26	24	55
		% within Quantity supplied to the market	9.1%	47.3%	43.6%	100.0%
	26-50 kiligram	Count	26	51	23	100
		% within Quantity supplied to the market	26.0%	51.0%	23.0%	100.0%
	51-75 kiligram	Count	47	46	20	113
		% within Quantity supplied to the market	41.6%	40.7%	17.7%	100.0%
	above 75 kilogram	Count	53	46	19	118
		% within Quantity supplied to the market	44.9%	39.0%	16.1%	100.0%
Total		Count	131	169	86	386
		% within Quantity supplied to the market	33.9%	43.8%	22.3%	100.0%

Source: survey result, 2023

Table 6: Quantity supplied to the market * Cooperative membership Crosstabulation

Quantity supplied to the market * Cooperative membership Crosstabulation			Cooperative membership		Total
			yes	no	
Quantity supplied to the market	1-25 kilogram	Count	19	36	55
		% within Quantity supplied to the market	34.5%	65.5%	100.0%
	26-50 kiligram	Count	25	75	100
		% within Quantity supplied to the market	25.0%	75.0%	100.0%
	51-75 kiligram	Count	38	75	113
		% within Quantity supplied to the market	33.6%	66.4%	100.0%
	above 75 kilogram	Count	70	48	118
		% within Quantity supplied to the market	59.3%	40.7%	100.0%
Total		Count	152	234	386
		% within Quantity supplied to the market	39.4%	60.6%	100.0%

Source: survey result, 2023

Table 7: Quantity supplied to the market * Infra-structure/own transportation Crosstabulation

Quantity supplied to the market * Infra-structure/own transportation Crosstabulation			Infra-structure/own transportation		Total
			yes	no	
Quantity supplied to the market	1-25 kilogram	Count	10	45	55
		% within Quantity supplied to the market	18.2%	81.8%	100.0%
	26-50 kiligram	Count	25	75	100
		% within Quantity supplied to the market	25.0%	75.0%	100.0%
	51-75 kiligram	Count	35	78	113
		% within Quantity supplied to the market	31.0%	69.0%	100.0%
	above 75 kilogram	Count	63	55	118
		% within Quantity supplied to the market	53.4%	46.6%	100.0%
Total		Count	133	253	386
		% within Quantity supplied to the market	34.5%	65.5%	100.0%

Table 8: Quantity supplied to the market * extension contact in relation to coffee production in 2014/15 E.C cropping seasons Cross tabulation

Quantity supplied to the market * extension contact in relation to coffee production in 2014/15 E.C cropping seasons Crosstabulation			extension contact in relation to coffee production in 2014/15 E.C cropping seasons		Total
			yes	no	
Quantity supplied to the market	1-25 kilogram	Count	3	52	55
		% within Quantity supplied to the market	5.5%	94.5%	100.0%
	26-50 kiligram	Count	13	87	100
		% within Quantity supplied to the market	13.0%	87.0%	100.0%
	51-75 kiligram	Count	26	87	113
		% within Quantity supplied to the market	23.0%	77.0%	100.0%
	above 75 kilogram	Count	103	15	118
		% within Quantity supplied to the market	87.3%	12.7%	100.0%
Total		Count	145	241	386
		% within Quantity supplied to the market	37.6%	62.4%	100.0%

Source: survey result, 2023

Table 9: Quantity supplied to the market * On average coffee produced per year 2014/15E Crosstabulation

Quantity supplied to the market * On average coffee produced per year 2014/15E Crosstabulation			On average coffee produced per year 2014/15E				Total
			1-75kg	76-150 kg	151-225 kg	above 225 kg	
Quantity supplied to the market	1-25 kilogram	Count	39	10	6	0	55
		% within Quantity supplied to the market	70.9%	18.2%	10.9%	0.0%	100.0%
	26-50 kiligram	Count	52	38	8	2	100
		% within Quantity supplied to the market	52.0%	38.0%	8.0%	2.0%	100.0%
	51-75 kiligram	Count	40	41	28	4	113
		% within Quantity supplied to the market	35.4%	36.3%	24.8%	3.5%	100.0%
	above 75 kilogram	Count	0	12	44	62	118
		% within Quantity supplied to the market	0.0%	10.2%	37.3%	52.5%	100.0%
Total		Count	131	101	86	68	386
		% within Quantity supplied to the market	33.9%	26.2%	22.3%	17.6%	100.0%

Table 10: Chi-Square Tests

Pearson Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Quantity supplied to the market * Livelihood Diversification Strategies	240.719[a]	9	.000
Quantity supplied to the market * access to use irrigation	113.776[a]	3	.000
Quantity supplied to the market * Access to credit	62.059[a]	3	.000
Quantity supplied to the market * Distance from the market	34.579[a]	6	.000
Quantity supplied to the market * Cooperative membership	15.537[a]	3	.000
Quantity supplied to the market * Infra-structure/own transportation	13.739[a]	3	.000
Quantity supplied to the market * On average coffee produced per year 2014/15E	111.351[a]	9	.000
Quantity supplied to the market * extension contact in relation to coffee production in 2014/15 E.C cropping seasons	87.206[a]	3	.000

Source: survey result, 2023

Appendix-B

WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRIBUSINESS & VALUE CHAIN MANAGEMENT

MSc Program

Assessment of market supply of coffee by smallholder farmers in Meskan Woreda, Gurage Zone, Ethiopia

Household Survey Questionnaire

Introductory Statement: As per the requirement of the research project I prepared this questionnaire to undertake a study entitled "**Assessment of market supply of coffee by smallholder farmers in Meskan district, Gurage zone, Ethiopia".** Thus, for the objective of this research your participation is inevitable and kindly invited for giving information. I expect maximum effort and patience from the local respondents and enumerators with sincerity.

Belayneh kassa

Mobile 0960999048

April 2023

Instruction:

- No need of writing your name
- Indicate your answers with a check mark (√) in the appropriate block.

Questionnaire number_____

Name of enumerator/data collector: _____

Date: _____

Part I: General Information

1. 1. Socio-demographic information about the respondents

1. Household head/ respondent name ----------

2. Sex of household head 1/ male ☐ 2/ female

3. Age of the household head:

   1/ 20-30 years ☐ 2/ 31-40 years ☐

   3/ 41-50 years ☐ 4/ 51-60 years ☐ 5/ above 60 years ☐

5. Marital status:

1/ Married ☐ 2/ Single ☐ 3/ Divorced ☐ 4/ Widowed ☐

6. Educational level of household head

1/ Uneducated ☐ 2/ Read and write only ☐ 3/ Primary level of education ☐

4/ Secondary level of education ☐ 5/ Diploma /TVET Certificate ☐

7. Monthly income of the respondents

1/ below 1000 ☐ 3/ 2501-5000 ☐

2/ 1001-2500 ☐ 4/ above 5000 ☐

8. Family size by age category

1/ 1-3 individuals ☐ 3/ 8-11 individuals ☐

2/ 4-7 individuals ☐ 4/ above 11 individuals ☐

Part II: Main Research questions

2.1 Socio- Economic Factors that affects the supply of coffee marketing

10. Do you own the land on which you practice the agricultural activities?

1/ Yes ☐ 2/ No ☐

11 If your answer for Q No 1.1 is yes, what is the size land on which you practice agriculture?

1/ Less than ½ hectare ☐ 2/ between ½ hectare and 1 hectare ☐

3/ between 1.1 hectare and 2 hectare ☐ 4/ above 2 hectare ☐

2.2 Major Production and marketing factors that affects the supply of coffee marketing

12. Which kinds of livelihood strategies are you depending on; to lead your living?

1/ Farm alone ☐ 2/ Farm + non-farm ☐

3/ Farm + off-farm ☐ 4/ Farm + non-farm + off-farm ☐

13. Do you have access to use irrigation?

1/ Yes ☐ 2/ No ☐

14. On average how many kilometre Distance b/n the market and your residence?

1/ 1-3 km ☐ 2/ 4-6 km ☐ 3/ above 6 km ☐

15/ On average how many kilogram of coffee produced per year 2014/15E,c?

1/ 1-25kg ☐ 2/ 26-50 kg ☐ 3/ 51-75 kg ☐ 4/ above 75 kg ☐

2.3 Institutional and technical factors that affects the supply of coffee marketing

16. Do you have access to credit facilities?

1= Yes ☐ 2= No ☐

17. Did you have extension contact in relation to coffee production in 2014/15 E.C cropping seasons?

1= Yes ☐ 2= No ☐

18. Are you a member of coffee cooperative to the supply of coffee to the market?

. 1= Yes ☐ 2= No ☐

19. Do you have your own transportation to the supply coffee to the market?

. 1= Yes ☐ 2= No ☐

The end

Thank you for your cooperation!!!

Appendix-C

WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRIBUSINESS & VALUE CHAIN MANAGEMENT

MSc Program

Market supply of coffee by smallholder farmers in Meskan Woreda, Gurage Zone, Ethiopia

Open-Ended Questions for Key Informant Interviews

Demographic Information

1. Can you describe your role and responsibilities in relation to agriculture in this area?

Coffee Production

2. What are the main types of coffee cultivated by smallholder farmers in your kebele?
3. Could you explain the factors that influence the quality of coffee produced by smallholder farmers?
4. What traditional practices do smallholder farmers use in coffee cultivation, and how do these impact production?

Market Access and Supply

5. What challenges do smallholder farmers face in accessing markets for their coffee?
6. In your experience, how do price fluctuations affect the decisions of smallholder farmers regarding coffee production?
7. Can you describe the relationship between smallholder farmers and local buyers or traders? How does this relationship impact market supply?

Support and Resources

8. What types of support (e.g., training, resources, and financial assistance) do smallholder farmers receive from government or non-governmental organizations? How effective is this support?
9. How do you think the availability of information about market prices influences farmers' decisions about coffee production and selling?

Future Prospects

10. What are your thoughts on the future of coffee production among smallholder farmers in the Meskan woreda? What trends do you foresee?
11. What recommendations would you make to improve the market supply of coffee produced by smallholder farmers in this area?
12. In your opinion, how could local policies or initiatives be improved to better support smallholder coffee farmers?

Closing Remarks

- Is there anything else you would like to add regarding the market supply of coffee by smallholder farmers that we haven't covered?

Appendix-D

WOLKITE UNIVERSITY

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRIBUSINESS & VALUE CHAIN MANAGEMENT

MSc Program

Assessment of market supply of coffee by smallholder farmers in Meskan Woreda, Gurage Zone, Ethiopia

Field Observation Checklist

General Information

Date of Observation: _____

Location (Kebele): _____

Observer Name: _____

Socio-Economic Factors

Demographics of Coffee Farmers:

1. Gender distribution: Male ☐ Female ☐
2. Number of family members involved in coffee production: _____
3. Observed living conditions (e.g., housing quality, access to water and sanitation):
   i. Good ☐ Fair ☐ Poor ☐

Production Factors

4. Observed farming practices (e.g., organic, use of fertilizers, pest control):
   Organic ☐ Chemical fertilizers ☐ Integrated pest management ☐

Land and Resources:

5. Average land size dedicated to coffee cultivation: _____
6. Availability of irrigation facilities: Yes ☐ No ☐

Production Challenges:

7. Distance to the nearest coffee market: _____ km
8. Frequency of market visits by farmers: Daily ☐ Weekly ☐ Monthly ☐

Marketing Practices:

9. Methods of selling coffee: Direct to consumers ☐ Local traders ☐ Cooperatives ☐
10. Price information accessibility: High ☐ Moderate ☐ Low ☐

Market Challenges:

11. Presence of agricultural extension services: Yes ☐ ☐No
12. Observed training programs or workshops for farmers: Yes ☐ ☐ No

Cooperatives and Organizations:

13. Existence of coffee cooperatives: Yes ☐ ☐ No
14. Participation of farmers in cooperatives: Yes ☐ ☐ No