



WERABE UNIVERSITY
COLLEGE OF AGRICULTURE AND NATURAL RESOURCE
POST GRADUATE PROGRAM
DEPARTMENT OF AGRICULTURAL ECONOMICS

ANALYSIS OF ONION VALUE CHAIN AND MARKETING CHANNELS
IN SILTI WOREDA, SILITE ZONE, CENTRAL ETHIOPIA

MSC THESIS
BY
HIWOT SHEMEBO

APRIL, 2024

WERABE, ETHIOPIA

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WERABE UNIVERSITY

Declaration

I hereby declare that this MSc thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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Final approval and acceptance of the Thesis is contingent up on the submission of its final copy to the Council of Graduate Studies (CGS) through the candidate's department or school of graduate committee (DGC or SGC).

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Acronyms and Abbreviations

ATA	Agricultural Transformation Agency
CSA	Central Statistical Agency
CIAT	International Centre for Tropical Agriculture
CLRM	Classical linear regression model
EHDA	Ethiopian Horticulture Development Agency
FAO	Food and Agriculture Organization
GMMW	Gross Marketing Margin of Wholesalers
GMMP	Gross Market Margin of Producers
GMMI	Marketing margin at given stage
OLS	Ordinary list square
PP	Producer price
PR	Price of retailer
PPI	Purchase price at i^{th} link.
SNNPRS	Southern Nations Nationalities and Peoples Regional State
SSPI	Selling price at i^{th} link
USAID	United States Agency for International Development
UNIDO	United Nations Industrial Development Organization
UNCTAD	United Nations Conference on Trade and Development
USAID	United States of America Agency for International Development

VIF

Variance of inflation factor

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Abstract

Onion (Allium cepa L.) is one of the most important warm-season vegetable crops cultivated in Ethiopia. It is grown largely by smallholder farmers and few commercial growers mainly under irrigation and lower share using rain. The study has an objective to conduct value chain analysis of onion and marketing channels in Silti Woreda. To pin main actors and their functions along the onion value chain, onion marketing channels and market outlet choices of small holder farmers and analyze factors affecting quantity of onion supplied to the market by producers. The study has been conducted in major onion producing regions of Ethiopia in Central, Ethiopia, Siltie Zone. Both primary and secondary data were used for this study. The primary data were collected from onion producers, traders, and consumers using structured questionnaire. Secondary data were collected from Silti Woreda agriculture offices.

A snow ball sampling technique was applied to select the sample households (producers) and traders. Descriptive statistics, value chain analysis and econometric analysis were used for analyzing the data. Multiple linear regressions were used to identify the factors affecting quantity of onion supplied and market channel choice, respectively. Households mean age and farm size was 36.77 years and the average land size was 1. 73 ha, more than 78% of this land was cultivated through irrigation. 29.2% of households were illiterate in Silti Woreda. Fewer than 50% of the respondents were produced onion by their own credit access. Input suppliers, producers, and traders were participated in onion value chain and marketing channels. A majority of famers were selling their onion product to wholesalers and retailers. The total gross marketing margin was 69.23%. The average production cost for onion producers was 86084.4 birr/ha or 26.67 birr/kg. Education level, onion farming experience, quantity of onion produced, credit Access and membership to marketing cooperatives were found the significant determinants of quantity of onion supplied. Onion market channels were significantly determined by participation to training, experience of growing onion, family size, farm area covered by onions, education level of the household head, quantity onion supplied, frequency of getting extensions service and selling price of onion. While distance to the nearest market was negative and significant and credit access was also negative and insignificant..

KeyWord: *Onion Value Chain Analysis, Marketing Channel, Constraints*

CHAPTER ONE

1. Introduction

1.1 Background of the Study

Value chain refers to the process of enhancing a product's value through manufacturing and delivery procedures (Schmitz H, 2016). Delivering the most value to the customer at the lowest feasible cost to the business in order to maximize profit is the company's aim. In the 1980s, Michael Porter created the value chain approach, which he outlined in his book *Competitive Advantage, Creating and Sustaining Superior Performance*. His concept was to separate a company's operations into their strategic components in order to outperform competitors. It is the entire spectrum of tasks necessary to take a product from its inception to its many stages of production and transformation. It involves a number of parties, from suppliers of raw materials to exporters Kaplinsky *et al.* (2000).

Value chain analysis is concerned with how value chains evolve over time in terms of their composition, behavior, and effectiveness, especially in reaction to shifts in the marketplace, in technology, and in governmental regulations (Kodigehalli, 2011). Currently, more than 140 countries are involved in onion growing. Turkey, China, India, and the United States are the top producers of onions worldwide (FAOSTAT, 2021). Consumer or market preferences, soil appropriateness, climate, and other factors all have an impact on the diversity of onion cultivars, which varies across different regions and agro-climatic conditions Cramer *et al.* (2021).

A basic component of study on global value chains was the conceptualization and measurement of value itself. A number of problems, such as who participates on stage and how the production process operates, are addressed by the analysis of these structures. Where do the various stages occur? What is their relationship, and who gains? These responses are necessary in order to identify the relevant intervention locations that poor population sections can successfully integrate (Kodigehalli, 2011).

Governance describes the relationships and coordination processes amongst chain members within the context of the value chain idea. By concentrating on governance, the research found players that would need assistance to enhance value chain capabilities, boost sector value added, and address distributional inefficiencies. Therefore, one of the most important factors in determining how the upgrading objectives could be met was governance. Today, the crop is

grown throughout the nation for domestic use as well as the export of flowers to European markets (ETFRUIT, 1992). Onion demand has surged in recent years due to its high bulb yield and potential for producing seeds and flowers.

In the nation with little experience producing seeds, the creation of state-owned businesses significantly increased the production and grew the area planted with onions. The cultivar, growth season, environment, and proper plant protection techniques all affect the yield of onion seeds (Lemma. and Shimelis, 2021). However, because crop productivity and production are influenced by both the growing environment and possible genetic elements specific to each individual crop, crop production is not overly exploited (Acquaah. 2015).

Ethiopia boasts unique agro-climatic conditions that enable the production of a wide variety of fruits and vegetables. These conditions include altitude, which ranges from below sea level to over 3000 meters above sea level, and agro-ecological diversity, which spans from humid tropical regions to alpine climates, where the majority of vegetable crops can be grown with success (CSA, 2014). The growth of state farms and rising private investment in the industry by domestic and foreign business people have both contributed to the rise in the commercial production of horticulture products, especially vegetables, in recent years (EHDA, 2011).

Of these crops, onions are one that is grown extensively in Ethiopia for both commercial and domestic use. They increase in temperate climates that don't see excessive heat, cold, or precipitation (FAO, 2019). Foreigners brought onions to Ethiopia's agricultural community in the early 1970s.

Even though Ethiopia has a lot of capacity to produce onions annually for both domestic and export markets, other issues have an impact on the marketing of Ethiopian produce.

A few of these include price fluctuations or low pricing during periods of high supply, a lack of produce standards, a lack of producer coordination, a lack of access to marketing and market research data, a weak chain connection, a lack of storage facilities, and inadequate road access Almazet *al.*(2014).

Onion (*Allium cepa* L.) is one of the most important warm-season vegetable crops cultivated in Ethiopia. It is grown largely by smallholder farmers and few commercial growers mainly under irrigation and lower share using rain. Onion provides business options from seed, dry bulb, and seedling production. It has a low risk of over-production than most other vegetables because it

can withstand the rough handling from field harvesting to final delivery to consumers.

Moreover, onion dry bulb can be stored for 2–3 months when properly cured Selamawitet *al.* (2013). In Ethiopia, onions are an important economic Centre due to their easiness of cultivation, more yield per hectare, and the irrigation system increasing onion production from time to time. In Ethiopia, the total area under onion production was about 38,952.58 ha, of which 3,460,480.88 tons were produced in 2020/2021, with an average yield of about 8.8 t ha⁻¹ (CSA, 2021). This showed that the production of onion in Ethiopia (8.8 t ha⁻¹) is lower as compared to Republic of Korea (73.21 t/ha) and Guyana (77.75 t/ha) Lyngkhoiet *al.*(2021). Production of onions can be constrained by unsuitable spacing, deprived fertilization, and inaccessibility of quality planting materials organized with other cultural practices (CSA, 2021).

Onion production and marketing has a significant role in reducing poverty through employment generation and creating new opportunities for poor farmers (Agidew, 2018). Improved information and marketing facilities enable smallholders to plan their production more in line with market demand, to schedule their harvests at the most profitable time, to decide which markets to send their produce to and negotiate on a more even footing with traders and also it enables traders to move produce profitably from surplus to deficit market and to make decisions about the economics of storage, where technically possible (Rehima and Dawit, 2012).

Enhancing smallholder farmers' income from onion production and marketing is a vital determinant of prosperity and advancement in Ethiopia. In rural areas, onion marketing plays a crucial role in generating better income and enhancing the welfare of smallholder farmers and thus contributes to their livelihoods. Successful market chain developments for onion products with a relatively large demand may lead to the adding up effect with market potential being exaggerated by the strong interest from the side of market participants Abrahimet *al.* (2021)

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1.2. Statement of the Problem

The production of vegetable is constrained by variable seasonal conditions. As a result, the variation in its supply on rural and urban market is considerably low. Moreover, the marketing issue is particularly important because vegetable products are bulky in nature, highly perishable with short shelf life and requires careful handling in storage and transportation. Therefore, the nature of the product on the one hand and lack of properly functioning marketing system on the other, often resulted in lower producers' price (Tadesse, 2011). Hailegiorgis (2017) revealed that the ineffectiveness of the onion marketing was due to the existence of high illegal brokers, low market awareness of producers and oligopolistic market structure which results in lower income of the smallholder farmers.

Marketing of vegetables are vulnerable to risks due to high cost of input, out price fluctuation, high cost of credit and timely delivery of produce to the markets Alameriet *al.*(2014). Poor marketing practices, price instabilities and poor handling practices are prevailing that discourage vegetable producers. Moreover, marketing of vegetable passes through several intermediaries with little value being added before reaching the end users. The chain is controlled by wholesalers and exporters who have capital advantage over the other chain actors. Therefore, farmers are forced to capture a lower share of profit margin (Abraham, 2021). Regasaet *al.*(2020) indicated that there exists weak competition, poor market linkages, low bargaining power of farmers, asymmetric price information and seasonal price fluctuation in vegetables marketing

system. Regasaet *al.* (2020) further argued that farmers of Eastern Ethiopian were forced to sell the produce at low prices particularly for onion during the peak production season.

According to (Abraham, 2021) the major constraints hindering the development of vegetable value chain are lack of modern input supply, high postharvest losses, the limited power of price setting, the problem of supply shortage, lack of storage facility, problem in information flow, low product quality, lack of support from concerned bodies, high monopolistic power of wholesalers, high travel distance, lack of processing and long chain condition of the market.

Even though the crop has a great contribution to both in economic and health issues, its production and productivity are not scaled to the required level. Its production trend is not consistent, rises over in a certain period of time and falls in another period of time. Thus, farmers are not yet benefited from onion production. There are a number of factors associated for these low levels of onion production. These factors are improper agronomic practices, cost of production inputs, lack of adequate storage facilities, limited access to improved seeds, high cost of transport, fluctuation of market price and lack of sufficient capital, and postharvest losses (Grema and Gashua, 2014).

According to (Jagwe, 2022), because of different marketing constraints smallholder farmers are not getting the right share of consumer price, producing and selling their product in organized manner so that some of their benefit may transfer to the intermediaries. Onion is one of the top most important vegetable crop produced almost in all parts of the country by smallholder farmers due to its requirements in the daily diet of peoples and as a source of livelihood of most people's and for the export market purposes.

Even if, the country has greater potential to produce onion ever year for both domestic and export market, there are problem that affect the marketing activity of onion produced in Ethiopia, some of them are price fluctuation or low pricing at peak supply period, lack of standard for produce, lackof coordination and marketing research and marketing information, weak linkage in the chain, lack of storage facility and poor road access (Tamirat, 2021). In spite of the policy options provided by the Ethiopian government, is very little empirical evidence on value chain analysis of onion, to design appropriate policies for the improvement of onion production and productivity in Ethiopia (Addis, 2018).

(Ayelech, 2011) used an OLS regression model to identify the factors influencing the marketable surplus of fruit. The study's findings showed that the marketable surplus of fruit was influenced by the house hold head's education level, the amount of fruit produced, experience in fruit production, extension contact, lagged price, and distance to the market.

Study conducted by (Debela, 2013) used the Tobit model to analyse the determinants of onion supplied to the market. The study's findings showed that total family size showed a significant and negative relationship with quantity of onion supplied to the market, while non-farm income of the households, total land size of the households, total quantity of onions produced, and access to credit services affected the quantity of onions supplied to the market positively and significantly.

Rizzikiet *al.*(2015)A multinomial logistic regression model was used to conduct a study on the factors influencing the agro-pastoral Maasai of Narok and Kajiado counties in Kenya when choosing their marketing outlets for African indigenous vegetables. The results showed that the primary factors influencing the agro-pastoral Maasai's choice of marketing outlet were the amount of African indigenous vegetables sold, agricultural market distance, sex, educational level, household size, levels of value addition, farming experience in agro-pastoralists, off-farm income, and marketing costs.

(Chalwe, 2011) conducted a study on smallholder bean producers in Zambia and used a probit model to identify the characteristics that influence the choice of marketing channels. The model's results showed that the price of beans, the size of the business (as determined by the amount of beans harvested and sold), the distance to the market, the usage of farming machinery, and the ownership of livestock all had a direct impact on the choice of marketing channel. However, the modal results for the decision to sell showed that the age of the farmer and the price mechanization had a major impact on the farmer's decision. This means that the pricing factor was crucial in driving the decision to sell as well as the choice of channel.

According to (Tewodros, 2014), haricot bean producers' decisions to participate in the market were greatly influenced by a number of factors, including farm size, education level, loan availability, membership in organizations, and distance to the closest market. Thus, farm size and financing availability had a major impact on how much haricot bean producers participated in the market.

Different studies were conducted in the past on value chain analysis of onion to identify production and marketing constraints of vegetables in Ethiopia as mentioned above and others like (Mengesha, 2015), Regasa *et al.* (2020), (Afework, 2016), Alameriet *al.* (2014) and others in different part of Ethiopia. But none of these studies addressed the on value chain analysis of onion in Siltie zone. In addition, related research results are dated far back such that they bear little or no relevance to present day circumstance hence they are of hardly any meaningful value in effective policy formulation.

Therefore, the aim of this study was strong need to make value chain analysis to identify the major onion value chain actors and their respective roles, to estimate marketing costs and margins at different market channel and to identify factors affecting producer's market outlets choice in Silti Woreda, Siltie Zone, Central Ethiopia.

1.3. Research Questions

- i. Who is the main actors and their functions along the onion value chain in the study area?
- ii. What are the alternative marketing channels available for value chain actors as market outlet choices in the study area?
- iii. What are the factors affecting quantity of onion supplied to the market by producers' in the study area?

1.4. Objectives of the Study

1.4.1. General objective of the study

The general objective of the study was to analyze the onion value chain and marketing channels in Silti Woreda, Siltie Zone, and Central Ethiopia.

1.4.2. Specific objectives of the Study

- i. To identify main actors and their functions along the onion value chain in the study area;
- ii. To assess onion marketing channels and market outlet choices of small holder farmers in the study area;
- iii. To analyze factors affecting quantity of onion supplied to the market by producers in the study area.

1.5. Significance of the Study

The study enables to provide information on constraints of onion production, marketing channel and producers' market outlet choices in the study area. The result of study would be used for producers, trader, policymaker, government and non-governmental organization, who want to introduce intervention in onion marketing. In addition to this, the study generate important information for research and development organizations, extension service providers, to formulate onion marketing development programs and guidelines for interventions that would be improved efficiency of the onion marketing system. This study could be used as source of material for further studies.

1.6. Scope and Limitation of the Study

The study was focused on analysing onion market chain. It uses cross-sectional data obtained through household level surveys from Silti Woreda where onion is the most economically important vegetable crops. Sampling procedures, including important variables and timing of data collection were carefully employed to minimize misleading results. A household is a unit of analysis in this study, since a farm household is still the overriding decision-making unit in the study area

Regarding the limitation of the study, the generalizations of the finding would be limited to the study area. And also, due to the different attitudes of the respondents, there would be limitations in the data collection. The other limitation was geographical location of the kebele that most of them were far from the main road and researcher was take a long time to found the respondent and some of farmer were busy in their farm. Moreover, few producer and trader were reluctant to provide information without a benefit or payment

1.7. Organization of the thesis.

The thesis was organized under five chapters. Chapter one pinpoints background of the study, statement of the problem, research questions, objectives, significance of the study, scope and limitations of the study and organization of the thesis. Chapter two presents review of theoretical, analytical and empirical evidences to the study. Chapter three discusses research methodology (description of the study area, data types and sources, methods of data collection, sampling techniques and methods of data analysis) of the study. In chapter four, result and discussions (descriptive and econometric results) are presented and discussed in detail. Chapter five

summarizes the main findings of the study and draws conclusion and setting appropriate recommendations.

CHAPTER TWO

2. Literature Review

2.1 Basic Concepts and Definitions

The literature review covers supply chain management, value chain analysis, onion cultivation, and also relevant agricultural, logistical and general conditions in Ethiopia. The literature study has been made in order to grasp the holistic view of the topic, provide a deeper understanding and to give information to relate back to later in the research. In this chapter also an attempt has been made to explain certain concept use in this study. In addition, this part is intended to critically review the literature of the past research work in relevance to present study so that theoretical review, empirical evidence of the reviews and conceptual frame work enable better understanding of the subject.

Market channel: It is the term that is used to describe the various links between all the actors and transactions involved in the movement of agricultural goods from producer to the consumer (CIAT, 2019)

Supply chain: it is the sequence of (decision making and exclusion) process and (material, information and product) flow that aim to meet final customer requirement that take place within and between different stage along continuum, from production o final consumption. The supply chain not only including the producer but also depending on the logistic flows, transporter, ware house, retailer and consumer themselves. In the border sense supply chain include also new product development, marketing, operation distribution and finance and customer service (FAO, 2019)

Supply chain management: is about making the chain as efficient as possible through better flow scheduling and resource use, improving quality control throughout the chain, reducing the risk associated with food safety and contamination, and decreasing the agricultural industry's response to changes in consumer demand for food attributes (Karl, 2018)

Marketable surplus: quantity of product that is left out after meeting farmer consumption and utilization requirements for kind of payments and other obligations or quantity actually sold after accounting for losses and retention by farmers (Kharel, 2022)

Marketed surplus: the quantity actually sold after accounting for losses and retention by the

farmers, if any adding the previous stock left out for sale. Thus, marketed surplus maybe equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during transit (Kharel, 2022).

To optimize the performance of the supply chain, its functions must be used in a coordinated manner, but the dynamics of the socio-economic environment in which the company is acting make the coordination very difficult (Barraleset.al, 2010). The development of the supply chain implies that all firms involved in the process to share information about customers, actual level of demand, transactions level at the point of sale and corporate strategic plans.

2.2 Theoretical Literature Review

Value chain is coalition of enterprises collaborating vertically to achieve a more rewarding position in the market. The basic characteristic of a value chain is focused on collaboration of market, different business enterprises work together to produce market products and services in an effective and efficient way and it allow businesses to respond to the market place by linking production, processing and marketing activities to market demands. Value chain is set of businesses activities and relationships involved in creating a final product or service and builds on the idea that a product are infrequently consumed in its original form but becomes transformed, transported, packaged, marketed and combined with other products, until it reaches to its final consumer. In this sense, a value chain describes how producers, processors, wholesaler, retailer, sellers, and consumers separated by time and space gradually add value to products as they pass from one linkage to the next in the chain.

2.3. Agricultural value chain analysis

Agricultural value chain involves all companies and their activities engaged in input supply, production, transporting, processing, marketing and distributing of the product. It is a dynamic approach that examines how markets and industries are respond to changes in the domestic and international demand and supply for a commodity, technological change in production and marketing, developments in organizational models and institutional arrangements or management techniques. Value chain analysis focuses on changes over time in the structure, conduct and performance of value chains, particularly in response to changes in market conditions, technologies and policies (Knez,2021).Agricultural value chain can be considered as

an economic unit of analysis of a particular group of commodities that encompasses a meaningful grouping of economic activities that are linked vertically by market relationships. The emphasis is on the relationships between networks of input suppliers, producers, traders, processors and distributors (UNCTAD, 2020). Agricultural value chains link urban consumption with rural production. Changing demand, because of urbanization, emergence of modern consumption patterns or new trends in international trade, affects rural areas along value chain and spills over to marketing and production systems. These rural urban linkages bear challenges but also mutual benefits for producers and consumers and can be promising entry points for development interventions (Tefera, 2019)

2.4. Purpose of value chain analysis

According to (Diriba, 2019) the value chain analysis offers division of labor and comprehensive dispersion of the production component. The primary purpose of value chain analysis is to understand the reasons for inefficiency in the chain, and identifying potential leverage points for improving the performance of the chain. Value chain analysis; enable to identify the relationship and coordination mechanisms among the chain of actor (USAID, 2019)

2.5. Measuring of Value Chain Analysis

A fundamental aspect of global value chain research was, how value itself, is conceptualized and measured. The analysis of these structures answers to a set of questions like how does the production process take place, who participates at the stage? Where do different stages take place? How are they linked, who benefits? These answers are required to find the pertinent points of intervention for a successful integration of poor population sections (Hailu, 2016). According to (MacCarthy,2022),the value chain described as flows of product, adding of value to the product at different stages, identifies key actors and their relationships in the chain, identifies enterprises that contribute to production and characterizes by its network structure, value added and its governance form Network structure. From network theory and supply chain management were draw the network structure of the value chain. Network theory combines both horizontal and vertical relationships between actors. Supply chain management focuses on vertical connections between economic actors aiming to jointly produce for a market (Humble, 2015). The performance of an agricultural value chain depends on how well the actors in the value chain

are organized and coordinated, and how the chain is supported by business development services. Verticality, in value chains implies that conditions at one stage in the chain are likely to be strongly determined by conditions in other stages. In the vertical chain, there is direct, indirect, expected, and unexpected ways. It should be noted that intra-chain linkages are mostly of a two- way nature. A particular stage in a value chain may affect and be affected by the stage before or after it (Cuddeford,2018).

2.5. Network Structure

From network theory and supply chain management we draw the network structure of the value chain. Network theory combines both horizontal and vertical relationships between actors. Supply chain management focuses on vertical connections between economic actors aiming to jointly produce for a market Bagheri *et al.* (2019).

The performance of an agricultural value chain depends on how well the actors in the value chain are organized and coordinated, and how the chain is supported by business development services. Verticality, in value chains implies that conditions at one stage in the chain are likely to be strongly determined by conditions in other stages. In the vertical chain, there is direct, indirect, expected, and unexpected ways. It should be noted that intra-chain linkages are mostly of a two-way nature. A particular stage in a value chain may affect and be affected by the stage before or after it (Berhanu *et al.*, 2018)

Value addition: It is the adding of value to the product or service or innovation that encourage or improves the existing product by introducing new products or new product uses. This allows farmer to create new markets, or differentiate a product from others and gain have advantage over competitors (Persson, 2020). Value addition is one aspects of marketing that deal with practice that change or transform primary product in to good that have additional value. Value adding activity based on their simplicity and difficult. The simplest are washing, cleaning grading, bulking and storage, this activity are conducted by the control of framer and the complicated are ginning, roasting, refrigerating, milling, cutting, mixing, dehydration, cooking and packaging. These activities are generally undertaken by specialist market chain actors or service providers (MulukenMarye, 2018). Value addition to horticultural crops is of considerable importance when considering post- harvest operations of vegetable.

It is an economic waste if production losses are high due to poor handling. Reduction of wastage therefore must be concern in order to improve on the quantity of the product acceptable to the consumer “as fresh” or as ‘finished product. Production, harvesting and post - production systems of horticultural crops play a very important role in bringing these crops to the consumers cheaply. For ease of differentiation, post-harvest operations in this write up were divided into two parts. These are post-harvest handling and post-harvest food production (by K Wong · 2018)

Governance structure: Governance is defined as how control is exercised within the value chain actors and plays a major role in how production capabilities are upgraded; determining sustainability of the value chain and distribution of an equal benefit among the value chain actors. Governance is a depiction of the dynamic distribution of power, learning, and leadership in standards and strategy setting among a value chain's firms. (Ndeinoma, 2017).

Governance is a central concept to value chain analysis. The starting point for interest in global value chains is the fact that some firms directly or indirectly influence the organization of global production, logistics and marketing systems. Through the governance structures they create, they take decisions that have important consequences for the access of developing country firms to international markets and the range of activities these firms can undertake (Gereffi, 2021)

2.6 Marketing Channel and Actors in Onion Value

The analysis of marketing channel was intended to provide a systematic flow of goods and services from their origin (producer) to their final destination (consumer). This knowledge is acquired by studying the participants in the processes. Those who perform physical marketing functions in order to obtain economic benefits. In carrying these functions, marketing agents achieve both personal and social goals. They add value to production and by so doing help satisfy consumer needs. The price paid for the goods (the physical commodities and services (i.e. transportation, bulk breaking, grading) for the services and renders compensation to the marketing agents for this effort. This price also serves as a signal to all actors in the marketing channel, i.e. input supplier, producers, wholesale sellers, retailer and influence actors (Mohammed, 2018)

Input supplier actors: At this stage of the value chain, many actors are involved directly or indirectly in agricultural input supply in the study area. Onion growing farmers are also participated in this stage. All such actors are responsible to supply agricultural inputs like improved seed varieties, fertilizers, herbicides, pesticides and farm implements that are essential inputs at the production stage.

Producer: Onion growers are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major value chain functions that onion growers perform include ploughing, planting, fertilization, irrigating, weeding, pest/disease controlling, harvesting and postharvest handling.

Wholesaler: Wholesalers are mainly involved in buying onion from producers in larger volume than any other actors are and delivering to the retailers and consumers. They also store and assemble product and markets are the main centers for onion in the surrounding areas. They have better storage, transport and communication access than other trader does.

Broker: A broker is an individual or party that arranges transactions between a buyer and seller for a commission when the deal is executed.

Retailers: Retailer involvement in the chain includes buying of onion, transport to retail shops, grading, displaying and selling to consumers. They are the last link between producers and consumers. They mostly buy from wholesalers and sell to urban consumers.

Consumer: Those purchasing the products for consumption. Private consumers purchase onion directly from producers, retailers and wholesalers though most of the consumers purchase from retailers. Farmers also make important segment of the rural consumers since they consume part of their produces.

Influencer actors: these actors that include regulatory framework and policies such as revenue authority, trade and market development office, land administration and environmental protection office.

2.7. Status of Onion Value Chain Analysis and Production in Ethiopia

Ethiopia is a country differentiated by agro-climatic conditions that make it suitable for the production of a broad range of fruits and vegetables, altitude, level ranging from below sea level to over 3000 meters above sea level and give it wide range of agro ecological diversity ranging from humid tropics to alpine climates, where most types of vegetable crops can be successfully grown (CSA, 2019).

Commercial production of horticultural crops, including vegetables, has also been increasing in recent years because of expansion of state farms and increasing private investment in the sector by national and international entrepreneurs (Ashinie, 2018)

Among this crop onion is considered as one of the most important vegetable crops produced on large scale in Ethiopia for both commercial and consumption purposes and grows well under mild climatic conditions without extreme heat or cold or excessive rain fall (Tekle, 2018).

Onion was introduced to the agricultural community of Ethiopia in the early 1970s when foreigners

brought it in. Currently, the crop is produced in different parts of the country for local consumption and for export of flowers to European markets (Tamirat, 2021).

In recent years, the demand for onion increased for its high bulb yield, seed and flower production potential. The establishment of state owned enterprises contributed substantially to the increase in the production and expansion of area under onion in the country with limited amount of seed production experiences. Onion seed production depends on the cultivar, location, growing season and adequate plant protection measures (Atnafu, 2022)

However, yet the production of the crop is not exploited due to the production and productivity of the crops are dependent on the potential of genetic factor of the individual crops and the environment where it has been grown (Acquaah, 2018). Even if, the country has a great potential to produce onion every year for both domestic and export market, other problems affect the marketing activities of onion produce in Ethiopia.

Some of them are price fluctuation or low pricing at peak supply period, lack of standards for produce, lack of coordination among producers, inadequate availability of market research and marketing information, weak linkage in the chain, lack of storage facilities and poor road access (Almazet.al., 2017)

2.8 Empirical Literature Review on Agricultural Marketable Supply

Several investigators have studied various agricultural products from various studies undertaken on agricultural products in the field of market and value chain analysis; a few of these are included below. Tamirat's (2021) research revealed that the lack of market data and research in Ethiopia causes the honey value chain to lose out on countless opportunities. This study further supported the findings that the knowledge gap among Ethiopian small-scale farmers has grown as a result of a lack of government support, including insufficient research and training, a lack of policies and strategies, and so on. According to a study by Eshete (2020), a lack of advancements in agricultural technologies, weather-related risks, diseases, and pests, as well as population growth, are all contributing factors to the decline in the amount of land held per household and the resulting low levels of production that fall short of household consumption needs. According to a (Mahilet, 2013) use of a two-stage least squares (2SLS) regression model, the marketable supply of malt barley was considerably impacted by the output of malt barley, selling price, market information, and distance to the market. As stated by Kassa (2014) Using

the Heckman two-stage selection model, a study was conducted on the factors influencing the participation in the Ethiopian milk market and the volume of supply. The study found that the number of household members, dairy farming experiences, and daily milk yield all had a significant impact on the volume of milk supply.

According to Teamet *al.*(2019) there are number of determinants factors affecting the choice of marketing outlets for African indigenous vegetables among the agro-Pastoral Maasai of Narok and Kajiado counties of Kenya using *multinomial logistic regression model*, the study pointed that quantity of African Indigenous Vegetables sold, agricultural market distance, sex, educational level, household size, levels of value addition, farming experience in agro-pastoralist, off-farm income and marketing costs are the main factors that affecting choice of marketing outlet by the agro-pastoral.

Study conducted by (Tamirat, 2021), on Zambian smallholder bean producer and identified factors that affect choice of marketing channels by adopted *a probit model*. Results from such model indicated that the choice of marketing channel are directly affected by the price of beans, scale of operation (as measured by the quantity of beans harvested, and quantity sold), distance to the market, farming mechanization used and live stock ownership. On the other hand, modal results for decision to sell indicated that price mechanization and farmers age significantly affected farmer decision, meaning that price is very important factor in stimulating both selling decisions and channel selection. (Yimer, 2017) employed using multiple liner regression models and estimated that educational level of house hold head, market information, distance to the nearest market, extension service, and quantity of fruit produced are significantly affect marketable surplus of fruit.

A study conducted in Darolebu district of Oromia region on factor affecting vegetable supplied to the market, using Tobit model, show that irrigation access, farming experience and total land cultivate in vegetable production are significantly affect vegetable supply to the market by Tamirat, 2021 and Habtamu, 2017) identified factors affecting potato market participation of farmer and extent participation of farmer in Hadiya zone, Ethiopia by using Heckman sample selection model and the result of the study show that sex of house hold head, extension service, credit access, tropical livestock unit, lagged price and number of oxen are significant factor for volume of potato sold.

Zemelak (2018), stated that access to market information, farm size, education level, access to credit, membership to an organization and distance to the nearest market significantly affect market

participation decision of haricot bean producers. Accordingly, the extent of market participation among haricot bean producers is significantly affected by farm size, and access to credit.

2.9. Conceptual Frame Work of theStudy

Conceptual frame work for a study on learning styles would present there as on (s) why studying the particular aspect of learning styles is important, with that reason rooted in the literature; for whom studying the particular aspect of learning styles might make a difference; and how the planned design. This identification of actors and channels related to production and marketing of onion are present in a conceptual framework, based on theoretical concepts and empirical studies. The production process is start from at the stage of input supply, then covers to production by producer, processing and marketing by trader and ends up with the consumption of a certain product by consumer and quantity of onion production supply to market are influence by several expected variables, such as age of house hold head, sex of house hold, family size of house hold ,education level of household, farming experience of house hold, distance from the nearest market, farmsizeallocated, quantity of fertilizer utilized, credit access, irrigation access and extension service). The conceptual frame work for onion value chain was represented by below figure.

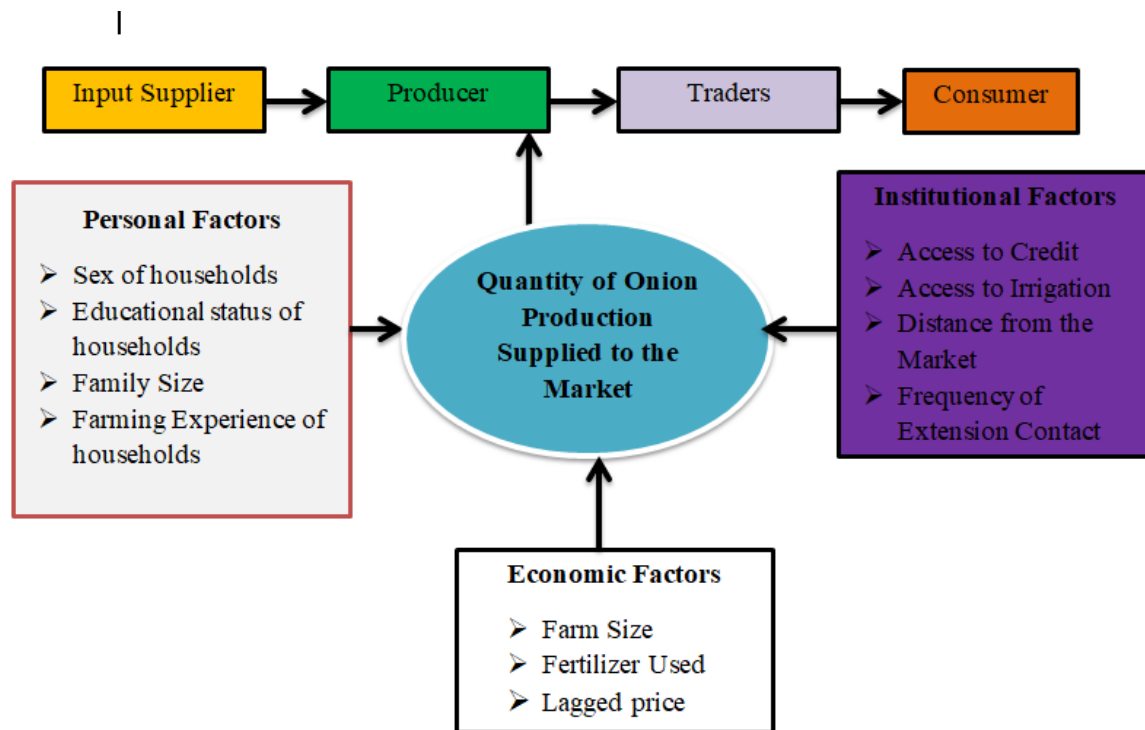


Figure 1: Conceptual framework of the study

Source: Tesfaye, 2019

CHAPTER THREE

3. Research Methodology

3.1. Description of the Study Area

The study was conducted in Silti District of Siltie Zone, Central Ethiopia Region. The district is located about 160 km south west of Addis Ababa and has a total of 25 Kebeles. Agro ecologically 4 kebeles are highlands, 6 kebeles at mid altitude and the rest 2 are found in the low land zone. The district has a total population of 74,879 in Silti Woreda district. The altitude of the district ranges from 1200 - 3300 masl with a rainfall amount of 800 mm - 1200 mm per annum. The temperature also ranges from 16°C - 37°C. There are two cropping seasons, namely, Belg (short rainy season), Meher (main rainy season). The short rainy season starts from March to May while the main rainy season is from Jun to September. The district is also surrounded by the Rift Valley lakes namely Abaya that have a great economic as well as ecological value to the area.

The economy of the Woreda depends on cereal crop, vegetable crop, pastoralist, fruit and natural forester. The most cereal crop produced in the area was maize, wheat and barley and vegetable crop were onion potato and tomato. Among the vegetable crop onion contribute the largest share and used as both for generation of income and for house hold consumption purpose selected kebeles. The total land area of the Woreda is 18000 hectors. From this total land area, 3240 hectors were covered by agricultural land, 666 hector were covered by pastoralist, 1080 hector were covered by natural forest, 3240 were covered by fruit and other crop and 200 hector were covered by onion crop(Silti Woreda natural resource and development agricultural office, 2022).



FIGURE 2: MAP OF THE STUDY AREA

3.2 Research Design

A research design is a plan for employing empirical data to address my research issue. Making decisions regarding my overall research objectives and approach is necessary when creating a research design. Whether I intend to use secondary or primary research, my subject selection criteria or sampling technique, my techniques for gathering data, the steps I'll take to gather information and my techniques for analyzing data an explanatory and descriptive research design is used in this study.

3.3 Sampling Method and Sample Size Determination

In this study, three-stage sampling procedure was employed to select onion producing households and other onion value chain actors in the study area. In the first stage, Silti Woreda which have 28kebelewere select purposively based on the amount and volume of onion production. Silti Woreda was classified as onion producer and non-producer with consultation of agricultural office. Accordingly from 25 kebeles in silti Woreda 12 kebeles were main onion producer. In the second stage, five-onion producer kebele (*Hejera, Heshute, Goflela, Debenaseno and Shelesho*) were selected randomly and 800 onion producers were found.

In the third stage a list of onion producer was prepared for each selected Kebele and sample of onion producer were selected by simple random sampling technique and sample size was determined and allocated to each selected kebele through proportionately.

The number of selected sample from each kebele represented in table below was (33, 24, 17, 20and 12). The following formula was used in the determination of sample size because the proportion of total population is known (Yamane Taro, 1967).

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

Where n= is the sample size needed-----Equation (1)

N = is the population size and e is the level of precision(e) or sampling error equal to 9%, used to obtain a sample size required to represent a true population.

The minimum level of precision is acceptable at 10%, however for this study 9% precision level was used, because if precision level is less than 9% the sample size is large and expensive for data collection. Then, the sample size (n) were calculated as follows

$$n = \frac{800}{1 + 800(0.09)^2}$$

$$n = \frac{800}{1 + 6.48}$$

$$n = \frac{800}{7.48}$$

$$n = 106$$

Therefore, a total of 106 onion producers were select for this study from five Kebeles.

Table1: sample of onion producer in five selected kebele

No	Kebele	Total number of onion producer	Total number Sampled producer
1	<i>Hejera</i>	250	33
2	<i>Heshute</i>	180	24
3	<i>Goflela</i>	130	17
4	<i>Debenaenseno</i>	150	20
5	<i>Shelesho</i>	90	12
	Total	800	106

Source: *Silti Woreda natural resource and development agricultural office (2023)*

The sites for the trader (wholesaler, and retailer) surveys were obtained in the market. On the basis of flow of onion crop, three markets (Kibet, Butajira, Enseno) were select as, the main onion marketing sites for this study. To select sample of trader (wholesaler and retailer) simple random sampling technique were used from specified markets place.

The total numbers of trader (wholesaler and retailer) were 171. In three selected market 62 sample of trader (wholesaler and Retailer) were selected. From three selected market sit (Kibet, Butajira, Enseno) 7, 15 and 10 sample of wholesaler trader were selected respectively and 13, 9 and 8 sample of retailer were selected Kibet, Butajira, and Enseno respectively.

Table 2: Sample of onion trader in three selected market

No	Trader	Kibet	Butajira	Enseno	Sample	Total number of trader
1	Wholesaler	7	15	10	32	73
2	Retailer	13	9	8	30	98
3	Total	20	24	18	62	171

Source: *Silti Woreda natural resource and development agricultural office (2023)*

62 samples of traders were selected for this study from three selected market site. Therefore, total of 168 samples size were used, 106 producers and 62 traders of onion.

3.4 Types, Sources and Method of Data Collection

In order to address the objective of the study both primary and secondary source of data were used with cross- sectional data. The primary source of data was collected from onion producers and traders (wholesaler and Retailer) involved in onion value chain using questionnaire and focus group discussion (FGD) with key informant. The questionnaire was designed both for producers and trader (wholesaler and retailer). The structure of the questionnaire was designed in both open and close ended and focus group discussion (FGD) were hold with model onion producers based on their production capacity with trader. Secondary source of data was collected from published article and unpublished reports of different level of agricultural bureau (country, regional and zonal and Woreda,), report of central statistical agency, websites and different published articles.

3.5 Methods of Data Analysis

To conduct this study both descriptive and econometric model were used for data analysis.

Descriptive statistical tools like mean, standard deviation, maximum, and minimum were utilized to map and identify the key actors in the onion value chain and their activities within the study area, which was the first specific purpose of this study. The study's second specific objective was to evaluate the value chain actors in the study area's onion marketing channels and market outlet selections. To accomplish the above objective, such as the multiple linear regression model (OLS).The researcher employed an econometric model, such as the multiple linear regression model (OLS), to achieve the third particular purpose of the study, which was to assess the factors influencing the quantity of onions supplied to the market by producers in the study area.

3.5.1 Descriptive Statistics

Descriptive statistics were used to analyze the data that were collected from different sources in the form graph, table and to find frequency, mean, percentage, maximum , minimum and standard deviation.

3.5.2. Analysis of onion marketing Margin

Comparing prices at various marketing chain levels over the same period is the focus of marketing margin analysis. It calculates the proportion of the final selling price that a specific agent in the marketing chain receives, and it always corresponds to the final price or the price that the end user pays (Mendoza 1995). Calculating the overall gross marketing margin The ultimate price paid by the customer is always taken into consideration when calculating the total gross marketing margin (TGMM), which is then stated as a percentage (Mendoza, 1995).

$$TGMM = \frac{\text{Consumer Price} - \text{Producer Price}}{\text{Consumer Price}} * 100 \dots \dots \dots \text{Equation(3)}$$

Where:-

TGMM is the total gross marketing margin. It is useful to introduce the idea of farmer portion or producer gross marketing margin, which is the share of price paid by consumer that goes to the producer. To find the benefit of each actor the same concept would be applied with some adjustment. For the analyzing margin first total gross marketing margin would be calculated. The producer gross marketing margin calculated as:-

$$GMMP = \frac{\text{Consumer Price} - \text{Marketing margin}}{\text{Consumer Price}} * 100 \dots \dots \dots \text{Equation(4)}$$

$$GMMP=1 - TGMM$$

$$GMMi = \frac{SPi - PPi}{TGMMi} * 100 \dots \dots \dots \text{Equation(5)}$$

Where $GMMi$ is the marketing margin at given stage. SPi Is the selling price at i^{th} link and PPi is the purchase price at i^{th} link.

$GMMi$: is gross marketing margin at each stage

$$PS = \frac{Px}{Pr} * 100 = \frac{1 - MM}{Pr} * 100 \dots \dots \dots \text{Equation(6)}$$

PS =Producer's share

Px =producer price of onion

Pr =Retailer price of onion

MM = Marketing Margin.

3.6. Econometric model

This part of the analysis deals with the determinants of quantity of the onion supplied to market. For managing this, appropriate model was multiple linear regressions. Multiple linear regression model (OLS) was used to analyse factors affecting volume sales of onion because all sampled households producing onion were participated in marketing. However, when some of the assumptions of the Classical Linear Regression model are violated, the parameter estimates of the above model may not be Best Linear Unbiased Estimator (BLUE). Thus, it is important to check the presence of heteroscedasticity, multicollinearity and endogeneity problem before fitting important variables into the regression models for analysis. The problem of endogeneity occurs when an explanatory variable is correlated with the error term in the population data generating process, which causes the ordinary least squares estimators of the relevant model parameters to be biased and inconsistent. The source of endogeneity could be omitted variables, measurement error and simultaneity (Maddala, 2001).

Both Hausman test and Durbin-Wu-Hausman (DWH) test will be applied to check the presence of endogeneity. In case of this study, there is a potentially endogenous 12 variable, which is the quantity of onion produced included in the explanatory variables that could cause endogeneity bias if OLS is applied. Therefore, in identifying the determinants of farm level marketed surplus of onion a two-stage least square (2SLS) model was used. Two-stage least square is similar to OLS except that uses two completely separate stages during the analysis phase in order to avoid problems of endogeneity (Wooldridge, 2010). Econometric model specification of supply function in matrix notation is as follows: - Structural equations:

$$Y = \delta Y_1 + \beta_o + X' \beta_1 + U \quad (6)$$

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

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

$$Y_{1i} = \alpha_o + \alpha_1 X_i + \alpha_2 Z_i + v \quad (7)$$

Where, Y_{1i} is endogenous variable (quantity of onion produced), X_i is vector of exogenous variables, Z_i is a vector of excluded instruments (amount of fertilizer applied for onion and improved seed), α is the coefficients to be estimated and v is the errors terms, symmetrically distributed around zero. In order to obtain consistent estimators in this case, we need some additional information. These instruments (in this case Z) must satisfy two conditions; uncorrelated with U , also called orthogonal to the error process (exogeneity condition i.e. $\text{Cov}(Z, U) = 0$) and correlated with Y_1 the endogenous variable (relevance condition i.e. $\text{Cov}(Y_1, Z) \neq 0$) (Wooldridge, 2010). Further, multicollinearity problem among explanatory variables have been checked using the Variance Inflation Factor (VIF). As a rule of thumb, if the VIF is greater than 10, the variable is said to be highly collinear (Gujarati, 2003). A measure of multicollinearity associated with the variance inflation factors is computed as:

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

Where; R_j^2 represents a coefficient for determining the subsidiary or auxiliary regression of each independent continuous variable X . Conversely, test for heteroscedasticity have been undertaken for this study. There are a number of test statistics for the detect heteroscedasticity. For this study, robust method was employed for correcting the problem.

X_1 = Lagged price (Lnpr)

X_2 = Family size of household head (FAMZ)

X_3 = Farming experience of house hold (EXPR)

X_4 = Farm size allocated for onion production (FSA)

X_5 = Distance from the market (DNMKT)

X_6 = Fertilizer utilized (UFA)

X_7 = Education level of the house hold head (EduHH)

X_8 = Sex of the household head (SHH)

X_9 = Frequency of Extension Contact (FEC)

X_{10} = Credit access (CRA)

X_{11} = Access to irrigation (AIRRG)

Y_{1i} = Quantity Produced

A_0 = Constant

3.7. Definition of Variables and Working Hypothesis

3.7.1. Dependent variable

The dependent variable was *the total physical output of onions for the production year*, expressed in quintal.

Quantity of onion production supplied to market (Y_i): it is continuous dependent variable, represents the actual supply of onion by producers to the market, measured in quintal.

3.7.2. Independent Variables

In order to identify the factor affecting quantity of onion production supplied to the market based on economic theories and the findings of different empirical studies, the following explanatory variables are analyzed to affect the dependent variable.

Sex of the Household Head (SHH): This is a dummy variable (takes a value of 1 if the household head is male and 0 otherwise). In this study variable assumed positive relation with quantity of onion supplied to the market, (Hailu, 2017) noted that majority of the female are resource constrained given that they do not own critical resources in onion marketing to obtain additional income. As a result, male household heads have more chance to choose appropriate market outlets than female household heads.

Quantity Produced (QUAPRO): It is an economic factor and continuous variable that can affect the household level volume sales and measured in quintals. Quantity of onion produced when instrumented by improved seed and fertilizer is assumed to affect the volume supply positively, because a farmer that obtains high yield can supply more to the market than a producer who had fewer yields. Abraham (2013) illustrated an increase of vegetable production by farming households has augmented marketed output of the commodities significantly. Therefore, quantity of onion produced is hypothesized to have a positive effect on onion market supply.

Family Size (FAMSZ): Family size of a respondent is a discrete variable measured in adult equivalent. Since onion production is the function of labor, the availability of labor is assumed to have positive relation with volume of onion supply. Tadesse et al., (2012) reported that the number of adult equivalent in household members had a positive effect on vegetable market supply. Melkamu et al., (2017) also showed that families with more number of active labour forces increase vegetable production and then increase vegetable marketable surplus. Therefore, this variable is hypothesized to affect onion supplied to the market positively.

Education Level of the Household Head (EduHH): Education level of the household head is a categorical variable measured using the level of formal schooling of the household head. Education of the household head has a positive effect on the onion supplied to the market. Addisu et al., (2017) found out that, farmers who attended formal education have better skills and access to information to supply more vegetable to the market. Melkamu et al., (2017) reported that education is believed to improve the knowledge of the household to increase the quantity of production and supply to the market. Therefore, education of household head is hypothesized to affect onion supplied the market positively.

Farming Experience (EXPR): It is a continuous variable measured in number of years.

A household with better experience in onion farming are assumed to produce more amounts of production and, as a result, assumed to supply more amounts of onion to market. Moreover, a household with better farming experience are more likely to change and/or aware of production, marketing and differences in profitability in the different marketing outlets (Hailu, 2017) have also found respective commodity farming experience affected quantity of avocado and tomato supplied positively. Therefore, farming experience was expected to affect potato marketed surplus positively.

Distance from the nearest market (DNMKT): this is continuous variable, measured in km from household residence to the market center. The finding of (Efaet *al.*, 2018) indicated that, as farmers far from the nearest market, the quantity of onion supplied to the market would decrease. In this study may be distance from the nearest market is hypothesis to influence the quantity of onion supply negatively.

Quantity of fertilizer utilized (UFA): It is a continuous variable measured in quintals and represents the quantity of chemical fertilizer utilized in onion production per hectare of land. An increase in yield in turn had significant and positive effect on the volume of maize supplied to the market (Abajobir, 2018). In this study this variable is hypothesized to influence the quantity of onion supply positively.

Credit Access (CRA): This is a dummy variable taking a value of one if the household takes have access to loan and zero otherwise. Use of credit would enhance the financial capacity of the farmer to purchase the necessary inputs. The variable has positive and significant effect on quantity of onion production to the market. A study conducted by (Tadesse, 2021) states that in poor societies, lack of credit is a major constraint to everyone concerned with selling and buying honey. In this study this variable is hypothesized to influence the quantity of onion supply positively.

Lagged price of onion (Lnpr): is the price of onion in 2021/2022 (one year lagged price). It is a continuous variable and measured in birr per quintal. There exists a direct relationship between the price of onion in the past and supply of onion in the current. This is because if price of onion was high in the past, it

would be motivating the farmers to supply more onion in the present. Study by Alemnew (2010) lagged market price affect marketable supply of red paper positively. Therefore, it is hypothesized to affect the volume of onion supply positively.

Access to irrigation (AIRRG): this dummy variable which takes value of one if house hold has access to irrigation and zero otherwise. A study conducted by (Tolera, 2017).

Frequency of Extension Contact (FEC): This is discrete variable which is the number of days that farmer had contact with extension agent for agricultural work supervision in a year. The objective of the extension service is introducing farmers to improved agricultural inputs and to better methods of production. Ayelech (2011) found that if fruit producer gets extension, the amount of fruits supplied to the market increases. Farmers that have frequent contact with extension agent have better access to information and could adopt better technology that would increase their marketed supply of vegetables. Therefore, extension is assumed to have positive contribution to farm level volume supply of onion.

Working Hypothesis

Ho: There is relationship between onion value chain actors and their activities in the study area;

Ha: There is no relationship between onion value chain actors and their activities in the study area;

Ho: There is relationship between marketing channels and market outlet choices of value chain actors in the study area;

Ha: There is no relationship between marketing channels and market outlet choices of value chain actors in the study area;

Ho: There is no any factor that affects the quantity of onion supplied to the market by producers in the study area.

Ha: There is factor that affects the quantity of onion supplied to the market by producers in the study area.

Table 3: definition and descriptive statistics of socioeconomic and demographic variables

Variables	Notation	Type	Code	Expected sign
Sex of the Household Head	SHH	Dummy	0 = Male, 1 = Female	+ve/-ve
Quantity Produced	QUAPRO	Continuous	Produced Onion in Quintal	+ve
Family Size	FAMSZ	Discrete	In Number of each Families	+ve/-ve
Education Level of the Household Head	EduHH	Dummy	0 = Illiterate 1 = Elementary 2 = High School 3 = Preparatory 4 = TVET 5 = Degree	+ve
Farming Experience	EXPR	Continuous	In number of years	+ve
Distance from the nearest market	DNMKT	Continuous	measured in km from household residence to the market center	-ve
Quantity of fertilizer utilized	UFA	Continuous	measured in quintals	+ve
Credit Access	CRA	Dummy	One if the household takes have access to loan and zero otherwise	-ve
Lagged price of onion	Lnpr	Continuous	measured in birr per quintal	+ve
Access to irrigation	AIRRG	Dummy	one if house hold has access to irrigation and zero otherwise	+ve
Frequency of Extension Contact	FEC	Discrete	the number of days that farmer had contact	+ve

CHAPTER FOUR

4. Result and Discussion

This chapter presents the finding of the study, with detailed analysis of data collected from both primary and secondary source. The first section of the study offerings socio-demographic characteristics of sampled producer and trader and actor participated with their marketing channel. The Second section presents constraint and opportunity in onion value chain. The last section was deliberating the results of Econometrics analysis.

4.1 Socio-Demographic Characteristic of sampled households

Table 4: Demographic characteristics of households

Variables	Category	Frequency	Percent
Education level of households	Illiterate	31	29.2
	Elementary	30	28.3
	High School	17	16.0
	Preparatory	7	6.6
	TVET	11	10.4
	Degree and above	10	9.4
Sex of Households	Male	67	63.2
	Female	39	36.8
Marital Status of Households	Single	28	26.4
	Married	37	34.9
	Divorced	30	28.3
	Widowed	11	10.4
Total		106	100.0

Source: Source: own survey result, 2024

The survey's findings indicated that, of all of the households surveyed, 36.8% had female members and 63.2% had male members. This suggests that men made up the majority of those involved in producing onions for the market. Furthermore, as Table 5 above illustrates, 26.4% of the studied household was single and 34.9% were married. (Gebrselassie, 2013) observed that challenges in selling onions and other high-value commodities in Ethiopia, as well as demands on their limited time, price fluctuations, and working capital, discouraged female farmers. He said that smallholder farmers can take advantage of local opportunities that, despite production and market risks, can increase their revenues and improve their livelihoods with the assistance of focused, targeted outside assistance. While final sales at retail

stores and open markets were led by women (74.2%) who combine onion sales with other small businesses, wholesale marketing, which is typically done in metropolitan markets, is also a male-dominated activity.

The results of the survey revealed that 29.2% of the sampled population was illiterate, while the remaining 28.3%, 16%, 6.6, 10.4, and 9.4% attended primary school, elementary, preparatory, TVET, and Degree and above respectively. This suggests that the majority of the onion-producing households were illiterate and only attended elementary school. From this angle, homes should receive a variety of training to have an adequate supply of onions for the market. This is consistent with Temesgenet *al.* (2017)'s findings. As heads of families in the study areas, the majority of the household respondents (87.04%) were men who participated in crop production, management, and marketing activities related to onions. One key factor that is thought to influence how open-minded household heads are to new concepts and inventions is their educational background.

Table 5: Descriptive statistics for categorical variables

Variables	Category	Frequency	Percent
Access to Credit	Yes	52	49.1
	No	54	50.9
Access to Irrigation	Yes	83	78.3
	No	23	21.7
Improved Seed Used	Yes	82	77.4
	No	24	22.6
Input Material Used	UREA	42	39.6
	DAP	43	40.6
	Manure	11	10.4
	Compost Chemicals	10	9.4
Problems in Faced in production of onion	Low supply of input	21	19.8
	Low irrigation facility	24	22.6
	Poor disease control	28	26.4
	Lack of technical training	9	8.5
	High cost of inputs	15	14.2
	Low Demand	9	8.5
Transportation Problem	High transport cost	35	33
	Poor road access	42	33.9
	Shortage of trucks	29	27.4
Source of Credit	Own	52	49.1
	Donated	13	12.3
	Loan	32	30.2
	Others	9	8.5
Total		106	100.0

Source: Source: own survey result, 2024

The survey result indicated that the households that are utilizing access to credit were 49.1% and those who are not utilizing access to credit were 50.9%. The result shows that access to credit service has negative and significant effect on onion producing households. Smallholder farmers due change in weather condition and non-existence of agricultural insurance, they usually fear to receive credits from formal institutions. This result corroborates Omolehinet *al.*(2019) farmers who are technically inefficient can possibly be more efficient by having access to credit because credit facility may ease the timely acquisition of inputs, thus reducing the inefficiency level of the farmer.

Also households supplying onion to the market that have access to irrigation were 78.3% and that have no access to irrigation were 21.7%, which indicated that most of households supplying onion to the market were producing the onion by using irrigation technology. 77.6% of households in Silti Woreda

farmers producing onion which is supplied to the market was used improved seed and 22.4% of households were not used improved seed. This indicated that most households were using the improved seed for their onion production which is supplied to the market in Silti Woreda. From different input materials used in the production period 40.6% was DAP, 39.6 was UREA, 10.4% of manure, and 9.4% was compost chemicals. The primary suppliers of agricultural inputs to farmers are sellers of seeds and commercial providers of agricultural chemicals. During this phase, onion producers also took part in preparing their inputs and providing input to other farmers.

Problems with SiltiWoreda's onion producing farmers was that low input availability (19.8%), inadequate irrigation infrastructure (22.6%), inadequate disease control (26.4%), low demand (8.5%), and high input costs (14.2%). Based on the provided data, I can conclude that households growing onions for the market had significant difficulty finding and purchasing costly disease control chemicals, irrigation systems, and input supplies, respectively. Additionally, the families that were produced in Silti Woreda have been having trouble accessing transportation; the data showed that the households had poor road access (33.9%) and high transit costs (33%). There is a 27.4% truck shortage. For those who live near roads, having access to them is essential since they enable transportation between different communities' homes and farms both within and outside of villages. Rural access roads have rarely been the focus of government projects, as Table 5's results show. Policymakers and donor organizations do not prioritize maintaining these roads because of budgetary limitations, cost effectiveness, and the limited number of beneficiaries. Farmers paid higher transportation costs due to poor access roads and transportation issues facing households that produced onions.

Table 6: Descriptive statistics for continuous and discrete variables

Variable	Minimum	Maximum	Mean	Std. Deviation
Farm size allocated for onion production in hectare	1	6	1.73	1.035
Quantity of onion production supplied to market	12	64	35.55	13.382
Distance from the nearest market in kilometer	5	28	14.84	7.426
Quantity of onion produced	12	65	38.5	15.410
Age of household head	22	68	36.77	12.361
price in birr	32,000	350,000	86084.4	43524.950
Farm experience in hectare	1	36	11.43	7.75

Source: own computation, 2024

Table 6 of the survey results indicated that 23.59% of respondents had access to credit, whereas 76.41% of respondents did not have credit service. Hence this result indicates that most of the households were denied to get credit access based on their need.

The mean of households farm size allocated for onion production in hectare for the sample was estimated 1.73 with minimum of 1 and maximum of 6 hectare land, the mean of households quantity of onion production supplied to market 35.55 with minimum of 12 and maximum 63 quintals in a given production year, the mean value of distance from the nearest market in kilometer was 14.84 with minimum of 5 kilometer to the maximum of 28 kilometer with standard deviation of 7.426. The mean value of households Quantity of Onion Produced is 35.55 with minimum 12 quintal and maximum of 63 quintals and standard deviation of 15.410.

The average age of sampled households was 36.77 with the minimum age of 22 and the maximum of 68 and standard deviation of 12.361 and the mean of households marketing experience for the sample was estimated 5.53 with minimum of 2-year and maximum of 12 year and standard deviation of 2.39. The average household's distance in kilometers from the closest market was 14.84, with a minimum of 5 kilometers and a maximum of 28 kilometers from their agricultural property. The mean quantity of onions delivered to the market was 35.55 quintal, with a standard deviation of 13.382 and a minimum of 12 quintal and a maximum of 63 quintal. We can draw the conclusion that the majority of households intend to produce onions that are above average in value and delivered to the market. With a minimum value of 12 quintals, a highest value of 63 quintals, and a standard deviation of 15.410, the average quantity of onions produced was 35.55. We can infer that the majority of households intend to grow onions at a higher than average rate. Lastly price of onion was sold in average price of 86,084.4 birr per quintal with standard deviation of 43,524.950.

4.1.1 Demographic characteristics of sampled traders

The survey result showed that 35.48% Sample of trader were male and 64.52 % were female and 16.13% sample of trader was illiterate, 32.26% and 24.19% attended primary school and junior school respectively.

The survey result also showed that 45.16 % Sample of respondent have no credit; access and 54.84% sample of respondent were having access to credit service as shown in table 7 below.

TABLE 7: DEMOGRAPHIC CHARACTERISTICS OF SAMPLE OF TRADERS

Variable	Frequency	Percentage
Sex		
Male	22	35.48%
Female	40	64.52%
Total	62	100%
Marital status		
Single	17	27.42%
Married	45	72.58%
Total	26	100
Educational level of trader		
Illiterate	10	16.13%
Primary(1-4)	20	32.26%
Junior(5-8)	15	24.19%
Secondary(9-10)	17	27.42%
Total	62	100
Credit Access		
No access	28	45.16%
Access	34	54.84%
Total	62	100

Source: own survey result, 2024

The average age of sampled trader was 34.31 with the minimum age of 20 and the maximum of 50 and standard deviation of 7.89 and the mean of trader marketing experience for the sample was estimated 5.53 with minimum of 2-year and maximum of 12 year and standard deviation of 2.39.

The result of survey also showed that the mean of family size for the sample of trader was 4.48 with minimum value of 2 and maximum of 10 and standard deviation of 2.04 as shown in table 6 below.

Table 8: Demographic characteristics of sample of traders (continuous)

Continues Variable		Mean	Standard deviation	Min	Max
FAMZ	62	4.48	2.04	2	10
AGT	62	34.31	7.89	20	50
EXPR	62	5.53	2.39	2	12

Source: own survey result, 2024

4.1.2 Socio-economic characteristic of sample of producers and trader

Socio - economic characteristic including, working capital, source of capital and source of loan. As depicted in table 9, out of sample of trader 29.03% were used their own capital. In addition, the remaining sample of trader 11.29 % and 59.68 % were used from gift and loan service respectively during the survey.

Table 9: Source of working capital for trader

Source of working capital	Frequency	%
Own	18	29.03
Gift	7	11.29
Loan	37	59.68
Total	62	100

Source: own survey result, 2024

The survey result indicated that only 6.45 % sample respondent were used loan service from bank and 9.68 % and 43.55% of the respondent were obtained from omo-bank and relatives respectively and 40.32% of trade respondents were not used loan service.

TABLE10: SOURCE OF LOAN FOR TRADER

Source of loan	Frequency	Percentage
Bank	4	6.45
Omo bank	6	9.68
Relative/family	27	43.55
No loan service 25	25	40.32
Total	62	100

Source: own survey result, 2024

4.1.3 Actors participated in onion value chain and marketing channel

A. Input supplier

Seed suppliers (traders) and private agricultural chemicals suppliers are the main actors in supplying inputs to farmers. Onion farmers also participated in this stage in preparing their own inputs and supplying input to fellow farmers. According to table below 8, Out of the total interviewed households 39.6% were used DAP fertilizer, 40.6% used Urea, 10.4%, and 9.4% used animal manure compost respectively. Which indicated that farmers (producers) used mostly DAP and UREA fertilizer

Labour is an important factor in the production according to table 11 out of total sample of respondent interviewed 39.62% and 33.96% were used family labour in the production and 18.87% and 7.55% was hired labour involved in the production of onion in the production year. This implied that producers of onion produce by using family labour in Silti Woreda which accounts 39.62% male and 33.96% of female labour.

Table11: Source of labour for onion production

Source of labour	Frequency	Percentage
Family labour		
Male	42	39.62
Female	36	33.96
Hired labour		
Male	20	18.87
Female	8	7.55

Source: own survey result, 2024

Table 10 represent that 3.77% sample of producers got loan service from bank, 8.49% got loan from omo bank, and 16.98% of producers got from their relatives/family and 70.76% of the producer not used credit

service. That means most of onion producers in Silti Woreda weren't got credit access from different institutions or individuals or groups

Table 12: Source of loan for producer

Source of loan	Frequency	Percentage
Bank	4	3.77%
Omo-bank	9	8.49%
Relatively/family	18	16.98%
No credit service	75	70.76%
Total	106	100

Source: own survey result, 2024

B .Producers

Out of the sample of household involve in onion production 56.60% used irrigation and 43.40 % were used rain fed (meher season). Most of the farmers in Silti Woreda were produce their onion by using irrigation technology.

Table 13: Onion land coverage and output obtained

Production Method	Areal coverage(Ha)	Frequency	Percentage
Irrigations	2.50	60	56.60
Rain fed	1.75	46	43.40
Total		106	100

Source own survey result, 2024

The survey result represented in table 13 out of the total quantity of onion produced during the survey year, 94.15% qt were supplied to the market and 5.85% were consumed. The total quantity of onion produce during the survey year was 5437 quintal and 5119 supplied to the market.

Characterization of households by market channel choices

The input suppliers supplied the farmers with inputs including seedlings, fertilizer, and pesticides for plant protection; the farmers then grew the onions and sold them to the middlemen in the value chain. Farmers' onions were purchased by intermediaries including commission agents, retailers, and local traders, who then sold them to final customers. Local traders provided the product to commission agents

and wholesalers. In order to get the produce from the village to the market, the village merchant was crucial. Farmers were able to obtain information about the quantity and quality of food required by the retailer/wholesaler through local traders. The primary profession of each actor in a value chain was identified by the key processes of the chain. The value chain for onions has been mapped out in this study and is shown in Fig. 3. Aside from the core process, a number of other actors in the agricultural value chain, including laborers and small-scale farmers, were involved in numerous other processes like grading, transportation, etc. It is noted that their contributions to the value chain were minimal and that they had limited access to the overall process.

Wholesalers are well-known for purchase of bulky commodities with better financial and information capability. They are mainly involved in purchasing of onion from producers in larger quantity than any other actors and supply either to other wholesalers, retailers or consumers. Sometimes they also purchase from farmers by going to their farms and from nearest rural market. Wholesalers at local market sell onion through cell phone communication with traders in different market. They sold to another wholesaler in other market. Occasionally, some wholesalers come from other areas; the Survey Result showed that wholesalers also transport onion to Butajira in large quantity. As we have seen the result of source of credit for households was Own themselves, 49.1%, Donated 12.3%, Loan 30.2%, and others 8.5%. Therefore most of households in Silti Woreda producing onion which was supplied to market were gain credit access by themselves. According to table 19, out of the total quantity of onion supplied to the market by farm 80.64% were purchased by sample of wholesaler trader during the surveying year.

Retailers are the key actors in onion value chain in the Woreda. They are the last link of onion value chain between consumers, wholesalers and other actor and most of the are unlicensed. As observed during the survey, there are considerable numbers of retailers who trade onion. Wholesaler was purchased 19.36% of the total quantity of onion and farmer 80.64% for retailer and for final consumer.

Marketing channel is the route through which agricultural product moves from producer to consumer. The length of channel varies from commodity to commodity, depending on quantity to be moved from producer to consumer demand and degree of regional specialization in the production. Onion marketing channel illustrated were constructed based the data collected in three selected market and five selected onion producer kebele. The result displays that three marketing channel were identified for onion which were acquired from producer and trader survey. The estimated quantity of production was 5437 quintals

in the survey year of 2022. Out of this 5119 qt were supplied to the market by farm and local collectors in the market (SWNRDAO, 2022).

Three onion marketing channel were identified from point of production to the final consumption in the study area. The channel identified in the study was producer -wholesaler- retailer- consumer, producer-retailer- consumer and producer-consumer channel.

Out of the total quantity of onion supplied to the market 5437 qt were carried out through, 4,128qt Producer- wholesaler- Retailer channel, which account the largest channel 991qt were carried out through producer- retailer- consumer and 318qt were carried out through producer - consumer channel.

Channel 1 Producer-wholesaler – Retailers- consumer: this is the longest channel, which accounts 75.92% of marketed onion during the survey year.

Channel 2 Producer –retailer – consumer: This the second most important marketing channel in terms of quantity and represent 18.24% total quantity of onion marketed.

Channel 3 Producer – consumer: This the shortest channel in which the producer directly sells to the consumer at the marketed day, which accounts 5.84% total quantity of onion market..

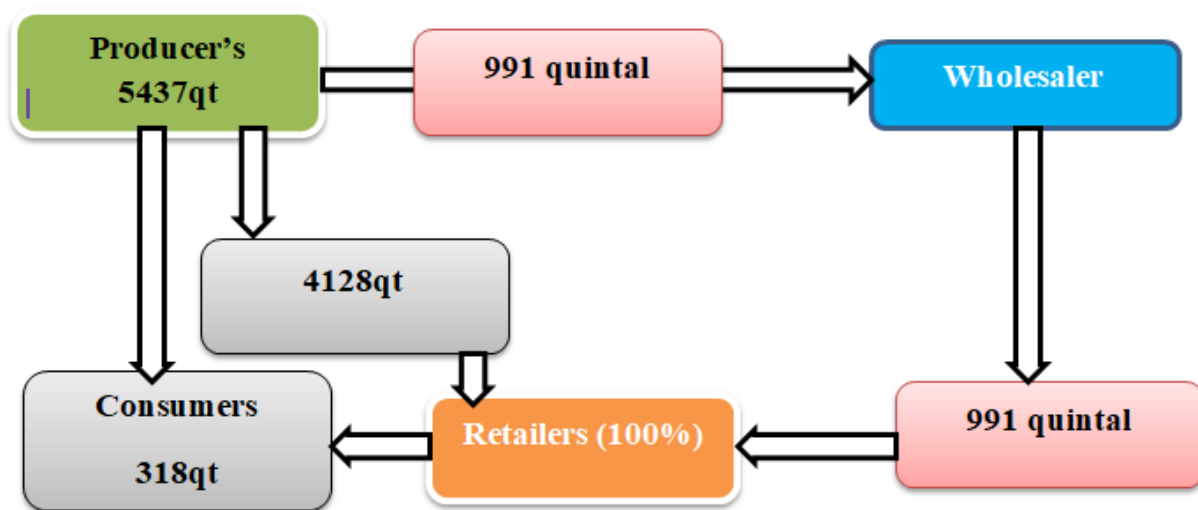


Figure 3: Silti Woreda Onion Marketing Channels, 2023

Source: own survey result, 2024

Table 14: Quantity of onion produced during the survey year during

Vegetable crop	Quantity in Produced quintal	Quantity sold in quintal	Quantity Consumed in quantity	Average selling price(birr/qt)
Onion	5437	5119	318	4500

Source own survey result, 2024

In Table 15, out of total sample of onion producer interviewed 7.55% reported that the trend of onion price was constant and the remaining 92.45% and 0 % reported the price trend were increasing and decreasing respectively. With regarding to trends of onion selling price for trader 72.58% sample of trader respondent that the trend of onion price in the market was at increasing and the remaining 0% and 27.42% sample of trader reported that the trend of onion price was decreasing and constant respectively.

C .Wholesaler

Wholesalers are well-known for purchase of bulky commodities with better financial and information capability. They are mainly involved in purchasing of onion from producers in larger quantity than any other actors and supply either to other wholesalers, retailers or consumers. Sometimes they also purchase from farmers by going to their farms and from nearest rural market. Wholesalers at local market sell onion through cell phone communication with traders in different market. They sold to another wholesaler in other market. Occasionally, some wholesalers come from other areas; the Survey Result showed that wholesalers also transport onion to Butajira in large quantity. Data given below in Table18 show, that 80.64% and 19.36% sample of wholesaler trader were purchased onion from farmer and local collector respectively and 88.70% and 11.30% sample of wholesaler trader sold to retailer and consumer respectively.

Table 15: Wholesalers response from whom they purchase and to whom they sell

From whom you buy	Frequency	Percentage	To whom do You sell	Frequency	Percentage
Farmers	50	80.64%	Retailer	55	88.70%
Local collectors	12	19.36%	Consumer	7	11.30%
Total	62	100	Total	62	100

Source own survey result 2024

According to table 15, out of the total quantity of onion supplied to the market by farm 80.64% were purchased by sample of wholesaler trader during the surveying year.

Table 16: quantity of onion purchased by sampled wholesaler

From	Quantity purchased in quintal	Percentage
Farmer	4,128	80.64%

Source, own survey 2024

D. Retailer

Retailers are the key actors in onion value chain in the Woreda. They are the last link of onion value chain between consumers, wholesalers and other actor and most of the are unlicensed. As observed during the survey, there are considerable numbers of retailers who trade onion. Wholesaler was purchased 19.36% of the total quantity of onion and farmer 80.64% for retailer and for final consumer.

Table 17: Quantity of onion purchased by sampled Wholesaler in, 2023

From	Annual quantity purchased(qt)	Percentage
Farmer	4,128	80.64%
Wholesaler	991	19.36%
Total	5119	100%

Source: own survey, 2024

The total quantity of onion supplied to the consumer and Retailer during the served year was 11.29% and 88.71% respectively.

Table 18: Quantity of onion supplied to consumer by sampled retailers and consumer

From	Annual quantity purchased(qt)	Percentage
Consumer	578	11.29%
Retailer	4541	88.71%
Total	5119	100%

Source: own survey, 2024

4.2. Econometric Analysis

Test of heteroscedasticity: Here is the Stata output for the regression and heteroskedasticity test in Table 13. The fitted values of the dependent variable are used by default in the `estat hettest` to check for heteroskedasticity. A statistically insignificant Chi-square test was indicated by the default test's p-value of 0.6042, which is higher than the selected significance level of 0.05. The number of onions produced to the market, the dependent variable, does not exhibit heteroskedasticity, as indicated by this finding. Since there is no heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables was BLUE.

Test of Endogeneity: As a showed in Table 12 result of not being correlated with the disturbance term, an endogenous variable does not violate the OLS requirements and the OLS estimates remain unbiased. The Durbin-Wu-Hausman (DWH) test and the Hausman test were used to evaluate the model for endogeneity in the quantity of onions generated, and no endogeneity issues were discovered. When added as an additional explanatory variable to the structural model, the Hausman test result showed that the predicted quantity of onion produced was statistically insignificant at ($p = 0.7981$). This suggests that the hypothesized quantity of onion produced was not endogenous because it was uncorrelated with the error term.

The results of the Durbin Wu-Hausman test further demonstrate that, employing the `estat endogenous` STATA command after `ivregress`, the null hypothesis of exogeneity of the quantity of onions generated was accepted at a 5% probability level ($\chi^2 = 0.07$ and $P = 0.7981$). OLS approach was therefore applied.

Multicollinearity Test: When an explanatory variable has a substantial correlation with a linear combination of the other independent variables, this phenomenon is known as multicollinearity. Although multicollinearity raises the variance of the regression coefficients, it does not break any of the model's assumptions. The parameter estimates are less accurate as a result of this increase. A further challenge in severe multicollinearity is the confused effects of explanatory factors, which makes it hard to assess the significance of any particular explanatory variable. When the variance is 1.61, it indicates that there is 50% more fluctuation than one could anticipate in the absence of multicollinearity among the independent variables. Generally speaking, a regression analysis is considered highly linked if the VIF is greater than 5.

Table 19: Ordinary least squares result for onion supplied to the market				
Variables	Coefficients	Robust	t-Value	P > t
		Std. Err.		
<i>QUAPRO</i>	.0113721**	.1117403	0.10	0.047
<i>LnPr</i>	4.27448**	1.996547	2.14	0.035
<i>DNMKT</i>	- .0751814**	.1790426	- 0.42	0.043
<i>CRA</i>	-.6408017**	.3102065	-2.07	0.082
<i>FEC</i>	1.213147**	1.014686	1.20	0.005
<i>AIRRG</i>	.6311458**	.319891	1.97	0.049
<i>FSA</i>	8.89239**	1.355177	6.56	0.000
<i>EXPR</i>	.5822767**	.2090009	2.79	0.006
<i>FAMZ</i>	1.14842**	.4211349	2.73	0.008
<i>EduHH</i>	.2524404**	.7077871	0.36	0.022
<i>SHH</i>	3.874884*	2.062469	1.88	0.063
<i>_cons</i>	27.76207**	8.286738	3.35	0.001
<i>Note: Dependent variable is quantity of onion supplied to market in quintal</i> <i>** and * Significant at $P < 0.05$ & $p < 0.1$, respectively</i> <i>Source: Computed from survey result, 2024.</i>				

Eleven explanatory variables were included in the model to analyse the determinate factors for the onion market supply. Out of the 11 variables hypothesized to influence onion market supply eight variables were significantly affect onion market supply estimated using the multiple linear regression model (OLS)(Table 20). As expected, both Educational status of households and Sex of household were positively and significantly at 5% and 10% significance level affected the amount of onion supplied to the market, respectively (Table 21). It is expected that the output was significantly impacted by the degree of education that suggest the better educated people are not only more skilled and knowledgeable than illiterate people, but they can also use alternative methods and approaches and are more confident in their own application technologies package, which helps to run an efficient production system. Thus, Educational status of households increase in the EduHH gives rise to 0.25 quintal of onion sold. The principle is that educated households have wider knowledge which helps them produce large and sell more. This finding consistent with the finding of Asaleet *al.*(2016) and the estimated result indicates education level of household head was positive and significant effect on red onion supplying to the

market at 5% significant level. This implies that as education level of household heads increases by 0.05 level of grade, the onion supplied to the market increases by 2.5% score keeping other factors remain constant. The possible reason is that education enhances their managerial skill, better access to information, and good farm planning. This corroborates the findings of GetahunMengistu (2014); Khan (2016); Omolehinet *al.* (2019); Manirihoet *al.* (2020); DagnewKoyeet *al.* (2022) and Tamiratet *al.* (2022) that access to better education enables households to better manage their resources in order to sustain the environment and produce at optimum levels.

Sex was expected to have influence on productivity and production as it affects mental and technologies handling ability. Furthermore; it has innovative impression with experience. The result of model showed that of sex of household head positively and significant influencing marketed supply of onion, where as being a male head of a household significantly increase onion quantity supplied to the market by 3.88 quintals as compared to that of female headed households, keeping other variables constant. This is consistent with the finding of (Mahlet, Bezabih, Mengistu, Jeffreyson, & Jemal, 2015) and (Giziew, 2019; Shafi, Zemedu, & Geta, 2014) who found that sex of the household head positively and significantly influenced on the volume potato and papaya marketed supply, respectively.

As the model result shows family member has a positive and significant effect on the onion supplied to the market at a 5% level of significance. As the family size of a household increases by one-man equivalent, the onion supplied to the market increases by 0.12% score keeping other factors constant. This result implies that an increase in the number of family members could increase the onion supplied to the market of households in the study area. This is because family labour is the main input in crop production and households with more members can perform farming activities effectively and efficiency since crop production in Ethiopia is a labour-intensive activity. And this implies that those households allocated more land to onion production have managed to supply more product to the market. The coefficient shows an increase in the area allocated to onion production by one hectare would result in 8.89 quintal increase in the quantity of onion supplied to the market.

This result similar to the result of (Jemil, 2020) and Manirihoet *al.* (2020) reports the contribution of more family labour in farm activity was important in managing in proper allocation of factors of production optimally.

Access to institutional services (distance to nearest market, frequency of extension contact, credit access, and irrigation access) are important determinants that affect onion market supply. Even though

frequency of extension contact is the most important element for the production of onion, only about 12.13% of households had access to extension contact. The coefficient for the frequency of extension contact has a statistically significant positive relationship with onion supplied to the market at 1.1%. The positive estimated coefficient for contact with extension workers implies that efficiency increases by 0.011 scores keeping other factors constant as the number of contacts made to the farm household by extension workers increase by one at a production period. Advisory service rendered to the farmers in general can help farmers to improve their average performance in the overall farming operation as the service widens the household's knowledge with regard to the use of improved agricultural inputs and agricultural technologies. This keeps the findings of Aniket *al.* (2017); Omolehinet *al.* (2019) and Tamiratet *al.* (2022).

Moreover, the absence of interest free credit service institution in the study area hinders smallholder farmers to utilize credits since the majority of the district residents are Muslims. In Silti Woreda, the majority of onion was produced under irrigation system in dry season. The result shows that access to credit service has negative and significant effect on onion producing farmers. Smallholder farmers due change in weather condition and non-existence of agricultural insurance, they usually fear to receive credits from formal institutions. This result corroborates Omolehinet *al.* (2019) farmers who are technically inefficient can possibly be more efficient by having access to credit because credit facility may ease the timely acquisition of inputs, thus reducing the inefficiency level of the farmer

The sample onion producers travels average walking kilo meters of 5 to access development centre and travel average walking kilo meters of 28 to access the nearest market place for their onion. It affects onion supply negatively and significantly at 5% significance level as expected. The result shows that as the distance from the nearest market increased by one kilo meter, the quantity of onion supplied to the market decreases by 0.075 quintals. This may be due to the reason that as the distance to the market centre increases, transportation cost and other marketing costs increases which leads to decrease quantity of onion supply. This finding is in line with (Taye M, 2016) who indicated that an increase of distance from nearest market caused marketable surplus of onion to decline.

As it was expected, it affected quantity of onion supplied to the market positively and significantly at 5% significance level. This relationship indicates that when the lagged price increases by one birr per kilogram, the current year supply of onion will increase by 4.28 quintals. Therefore, as the last year price of onion in the market rises, farmers are highly motivated to produce and supply more to the market and

hence the onion market supply is directly related to the previous year market price. The finding agrees with Melkamuet *al.*(2017) who indicated that one year lagged price affected potato marketable supply positively and significantly.

In this sub section of different marketing margins, the average selling prices of different participants in the onion value chain (farmers, wholesalers and retailers) were calculated. Marketing margin is one of the commonly used measures of the performance of a marketing system. It is defined as the difference between the price the consumers pay and the price the producers receive. Computing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer, expressed in percentage (Mendoza, 1995) Gross marketing margin (GMM) is the gap between prices at consecutive levels in the marketing channel. Therefore, for this study the marketing margins were computed as following. According to table 23 the gross marketing margin of wholesaler and retailer was 2000 and 1000 and the total gross marketing margin was 30.77% with producer share of 69.23%.

Table 22: Marketing margin of onion value chain

Value Chain actor	Selling price	Purchasing price	GMMi
Producer	4500	-	-
Wholesaler	5500	4500	2000
Retailer	6500	5500	1000
Consumer		6500	-

Source, own survey result, 2024

GMM of Wholesaler=(PR-PP) GMMW =6500 – 4500 = 2000

GMM of retailers= (PR-PW)

GMMR =6500 – 5500 = 1000

Where PP=Price of producer

PR = Price of retailer

PW=Price of wholesaler

$$TGMM = \frac{\text{Consumer Price} - \text{Producer Price}}{\text{Consumer Price}} * 100 \dots \dots \dots \text{Equation}(8)$$

Whereas TGMM is total gross marketing margin

$$TGMM = \frac{6500 - 4500}{6500} * 100, = 0.3077$$

Producer's gross marketing margin is the proportion of the price paid by the end consumer that belongs to the farmer as a producer.

$$GMMP = 1 - T, 1 - 0.3077 = 0.6923 = 69.23\%$$

Therefore, the Producers' gross marketing margin (GMMP) accounts for 69.23% and 30.77% of the total gross marketing margin (TGMM).

4.3. Constraints and Opportunity in Onion Value Chain Analysis

In this section a number of constraint and opportunity in the value chain in the study area were identified by asking the different value chain actors through focus group discussion. The major constraints and opportunities are briefly discussed at different stages of the value chain.

4.3.1. Opportunity along the onion value chain

One of the naturally endowed Woreda, Silti Woreda has production and marketing opportunities as well as issues that were discovered through a focus group discussion and questionnaire used in the survey year. Some of the opportunities that most onion producers take advantage of include the availability of rainfall that makes it easier to produce onions and generate income quickly, the improved productivity of onions grown on small plots of land, the ability to use onions as a source of cash income or for subsistence, the rising price of onions, and their ongoing demand in the market. The Woreda have some manufacturing and marketing opportunities, but they are also naturally endowed.

Among the things to consider are the following. The Woreda are ideal for generating market-oriented goods in addition to onion products. Naturally, in addition to this comparatively fertile arable terrain and ample weather conditions, there is also the potential for producing tropical crops like avocado, banana, and mango. Government-appropriate agricultural policy with a focus on horticulture output in the Growth and Transformation Plan (GTP) is intended to assist farmers at the local level. The arrangement of development agent at each kebele based on their academic background, Furthermore the provision of infrastructure facilities like roads, and financial support institution are the infrastructure advantage that facilitate the production and marketing of onion in the study area.

4.3.2. Marketing opportunity along the onion value chain

On the other hand, availability of market demands though out the year, growing number of buyer, high experience in onion trade.

The result of the study showed that the producer intended to expand onion to the above opportunity. The natural advantage of proximity to air condition and availability of rain and irrigation are still the opportunity which could facilitate commercialization in the Woreda.

CHAPTER FIVE

5. Summary, Conclusion and Recommendations

5.1. Summary and Conclusion

In Silti Woreda, Siltie zone, Central Ethiopia, the onion value chain and marketing channels are thoroughly analyzed. It explores the significance of value chains, their development, and the variables affecting smallholder farmers' production and marketing of onions. To address the objectives of the study, both quantitative and qualitative methods were used. The data were generated from both primary and secondary sources. The survey was conducted in January 2023 using semi-structured questionnaire to collect primary data from 106 respondents. Qualitative data were collected through key informant interviews and personal observations. The collected data analysis was made using descriptive statistics and econometric model. Multiple linear regression (OLS) models were adopted to identify the determinants of onion supplied to market.

The conclusion drawn from the analysis of the onion value chain and marketing channel in Silti Woreda is that there were significant challenges and opportunities present in the onion production and marketing sector. The study highlighted the socio-demographic characteristics of households, emphasizing the predominance of male (63.2%), illiterate households (29.2%) engaged in onion production. Constraints identified there were inadequate irrigation infrastructure (26.4%).

On the other hand, opportunities such as year-round market demand, a growing number of buyers, and high experience in onion trade were also noted. One of the naturally endowed Woredas, Silti Woreda has production and marketing opportunities as well as issues that were discovered through a focus group discussion and questionnaire used in the survey year. Some of the opportunities that most onion producers take advantage of include the availability of rainfall that makes it easier to produce onions and generate income quickly, the improved productivity of onions grown on small plots of land, the ability to use onions as a source of cash income or for subsistence, the rising price of onions, and their ongoing demand in the market. The Woreda have some manufacturing and marketing opportunities, but they are also naturally endowed.

Access to credit (50.9%) was identified as a crucial factor for smallholder farmers, though the absence of interest-free credit services in the area hindered their ability to utilize credit effectively. This result corroborates Omolehinet *al.* (2019) farmers who are technically inefficient can possibly be more efficient

by having access to credit because credit facility may ease the timely acquisition of inputs, thus reducing the inefficiency level of the farmer. And also the result of the study was in line with (Alemnewu, 2010) more pepper and *teff* will be provided to the market if producers receive credit for their work.

Producer-wholesaler – Retailers – consumer was the longest channel, which accounts 75.92% of marketed onion during the survey year.

The Producers' gross marketing margin (GMMP) accounts for 69.23% and 30.77% of the total gross marketing margin (TGMM).

The econometric analysis revealed that variables such as education level and sex of households significantly influenced the quantity of onions supplied to the market, highlighting the importance of education in improving production and market outcomes. It is expected that the output that was produced by farmers significantly impacted by the degree of education that suggest the better educated people are not only more skilled and knowledgeable than illiterate people, but they could also use alternative methods and approaches and are more confident in their own application technologies package, which helps to run an efficient production system. Thus, Educational status of households increase in the EduHH gives rise to 0.25 quintal of onion sold. The result of model showed that of sex of household head positively and significant influencing marketed supply of onion, where as being a male head of a household significantly increase onion quantity supplied to the market by 3.88 quintals as compared to that of female headed households, keeping other variables constant. This is consistent with the finding of (Mahlet, Bezabih, Mengistu, Jeffreyson, & Jemal, 2015) and (Giziew, 2019; Shafi, Zemedu, & Geta, 2014) who found that sex of the household head positively and significantly influenced on the volume potato and papaya marketed supply, respectively.

In conclusion, the analysis suggests that addressing challenges such as access to credit, input availability, and irrigation infrastructure, while capitalizing on market opportunities, can lead to improvements in the onion value chain in Silti Woreda. The role of wholesalers in the marketing channel and the impact of household characteristics on production and sales were also emphasized. Overall, the study provides valuable insights for potential strategies to enhance the onion value chain in the study area.

5.2. Recommendations

Based on the analysis of the onion value chain in Silti Woreda, there are several key recommendations that can be made to improve the socio-economic characteristics and demographic characteristics of producers and traders involved in the value chain.

- ✓ One strong recommendation is to focus on providing access to credit for smallholder farmers, as this was identified as a significant constraint for farmers in the study area. Additionally, enhancing education levels among households, especially for male producers, can have a positive impact on the quantity of onions supplied to the market.
- ✓ Moreover, addressing constraints such as low input availability, inadequate irrigation infrastructure, disease control issues, low demand, and high input costs are essential for improving the overall efficiency and productivity of the onion value chain in the study area.
- ✓ Investing in improved seeds, irrigation technologies, and providing technical training to farmers can help overcome these challenges and increase the competitiveness of onion production in Silti Woreda.
- ✓ Furthermore, creating market linkages and supporting the establishment of marketing channels, such as the producer-wholesaler-retailers-consumer channel, can help increase market access for onion producers and traders in the area.
- ✓ Developing infrastructure facilities like roads and financial support institutions can also facilitate production and marketing activities, enabling farmers to reach wider markets and improve their profitability.
- ✓ In conclusion, a holistic approach that addresses the identified constraints and capitalizes on the opportunities within the onion value chain in Silti Woreda is crucial for sustainable development and growth in the agricultural sector. By implementing these recommendations, stakeholders can work towards enhancing the livelihoods of producers and traders, boosting agricultural productivity, and stimulating economic growth in the Woreda.

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Appendix I

Survey Questionnaire

Dear, Respondent

I am a Master Student at Werabe U-niversity Undertaking Master of Science in agricultural economics. I am identifying you as a respondent to this questionnaire to gather information on the value chain analysis of onion market in Silti Woreda. Kindly I was requesting you to fill this questionnaire as honestly as possible. All of your responses were handling with confidentiality. Thank you for your cooperation. Please answer the questions freely. The information you provide were treating with utmost Confidentiality and were only be used for academic research purposes.

General Instruction for Enumerators

- ☞ Greet the respondents before starting any question in local ways
- ☞ Please introduce yourself before starting the interview.
- ☞ Inform the purpose of the study, which is to collect the first hand data that will be used only for msc thesis writing on the above indicated topic.
- ☞ Please careful on the estimates that exact measurements are not available.
- ☞ Carefully read and follow the instructions while you are starting the interview.
- ☞ Please ask each question clearly and patiently until the farmer gets your points.
- ☞ Please do not use technical terms and do not forget local units
- ☞ During the process write answers on the space provided.

Part One: Identification

- ✓ WOREDA
- ✓ Kebele.....
- ✓ Name of Enumerator.....
- ✓ Date of Interview
- ✓ Respondent Id.....
- ✓ Signature of Enumerator
- ✓ Name of Supervisor.....
- ✓ Signature of Supervisor
- ✓ Date

Producer Questionnaire

Part Two:

Demographic characteristic of households and area information put mark in the box below (√)

1. Sex of the Household Head: Male ☐ Female ☐

2. Age of household head _____ year

3. Marital status of households

Single ☐ Married ☐ Divorced ☐ Widowed ☐

4. Education level of household head attained so far

Illiterate ☐ Elementary ☐ High school ☐

Preparatory ☐ TVE ☐ Degree and above ☐

5. Family Size of household head to onion production-----?

i. Have your adequate family labour for your farm activities? A. Yes ☐ No ☐

ii. If you're answer is yes, what is the amount of family labour and labour hired for your production in 2022.

Source of labor			
Hired amount of labor		Family labor	
Male	Female	Male	Female

6. Farming experience related to Production and marketing of onion.-----?

7. How many birr would you get from one quintal in each production period-----?

Part Three: Economic Factors

1. Do you own or rent land for your onion production in 2022?-----

2. What is the size of land covered by onion crop?

Description	Hectare
Owned land	
Rented land	
Total land holding	

3. Did you use improved seeds in your own or rented land in the recent harvest year?
Yes ☐ No. ☐
4. If your answer for question number 3 is yes, how many hectare of land did you use improved seeds-----
-----?
5. Did you used fertilizer inputs in your own or rented land in the recent harvest year 2022)?
Yes ☐ No ☐
6. If your answer for question 5 is yes, how many kilograms of inputs did you used in your own and rented land?
7. What are the inputs material used for onion production
Urea ☐ DAP ☐ Manure ☐ Compost ☐ Chemicals ☐

Part Four: Institutional Factors

1. Do you have access to irrigation facilities for onion production? Yes ☐ No ☐
2. If your answer for Q.1 is yes, what is source, frequency of use?

Vegetable crop	Method of production	
	Irrigations	Rain fed
Onion crop output in quintal		

3. Do you have extension contact with regarding to your onion production in the 2022 cropping Season?
Yes ☐ No ☐

4. If your answer for question 3 is No, why? Express your reason -

5. If yes, your answer for question (4) how often extension agent contacted you?

Weekly ☐ once in two weeks ☐

Twice in the year ☐ monthly ☐

6. Did you get credit service for your production onion?

Yes ☐ No ☐

If yes for question 6, where did you get? (Multiple chooses are possible)

Own source ☐ Donation ☐ Loan ☐

Others specify _____

If the source of credit service is combination of different sources, specify the percentage share of credit from each source

Share of initial capital	Own source	Donation	Loan	Other	Total

7. Distance from production area to the market centre.

NO	Item	Description(KM)
2	Distance from production center to Woreda market.	
3	Distance from production to gravel road	

1. How long did you travel, to reach the market-----?

2. What factors do you consider, when you sell your product?

Transport availability ☐ Closeness in distance ☐
Fairness of scaling ☐ Price ☐

3. What type of transportation you used?

Vehicle ☐ Manpower ☐
Cart ☐ Donkey ☐

Part Five: Market Channel and Actors in Onion Value Chain?

1. Do you have perfect information about onion marketing channel for your product?

Yes ☐ No ☐

2. If your answer for question 1, is yes, what type of information did you get?

Market place information ☐ Product information ☐
Demand for the product information ☐ Supply of product information ☐

3. Which market channel do you follow?(Multiple chooses are possible)

Farmers ☐ Wholesalers ☐ Retailers ☐ Consumers ☐
Farmers ☐ Retailers ☐ Consumer ☐
Farmers - input supplier ☐ Consumers ☐
Farmers consumer ☐

4. Who are the actors participated in onion value chain?

5. Withregardingtoyouronionvaluechainwhatseemlikemarketingchannelallabout?

Part Six: Constraint and opportunities of onion value chain.

1. What are the constraint and opportunity of onion value chain in your Woreda? Indicate the causes with its possible solutions below.

No	Problem faced in the study area	Yes(1) No (0)	If yes, what do you think the cause of this problem?	What is your solution to solve each problem?
A	Production problems			
	Low supply of input			
	Low irrigation facility			
	Poor disease control			
	Lack of technical training			
	High cost of inputs			
	Low demand			
B	Transportation problem			
	High transport cost			
	Poor road access			
	Shortage of truck			
C	marketing problem			
	disease and pest problems			
	unfair pricing			
	Lack of credit			
	Lack of strong cooperation			
	Lack of market information			
	Poor linkage with value chain of actor			

2. What opportunities did you get from onion production?

3. What expectation do you have over the value chain activities of your product in your area?

Have your partnership in trading how many are they?

Number of partnership		
Male	Female	Total

4. How long have you been in onion marketing experience? express in year-----

i. Did you sell onion in the year 2022? Yes ☐ No ☐

ii. If your answer for Q1 is yes, how much and to whom did you sell and buy your product?

5. What is your source of working capital for onion trading?

Own. Loan ☐ ☐

Gift Others specify-----

6. If loanQ5 from whom did you get credit service?

Bank Microfinance institution other traders ☐

NO	Problem faced in the study area.	Yes or No	If yes what do you think was/ were) the cause(s) of this problem?	What is your suggestion to solve each problem?
A	Marketing			
1	Unfair pricing and fluctuation			
2	Shortage of supply			
3	Brokers intervention			
4	Too much competition			
5	Transportation cost			
6	High transport cost			
7	Shortage of truck			

7. What are the opportunities in onion trading?

8. What is the general overview of the value chain activities of onion in the area? --

i. Do you have perfect information about onion marketing channel for your product?

Yes

No

4. Who are actors participated in onion value chain? -----

PART FOUR: QUESTIONNAIRE FOR FARMERS FOCUS GROUP DISCUSSION

Instruction

Group members should:

- ✓ Respect each other's and their views
- ✓ Strive to be honest and transparent
- ✓ Recognize and acknowledge social reactions

Moderator should

- ✓ Act as catalyst between individuals of the group
- ✓ Strive to enhance capacity of rural people in analysis of problems and opportunity.
- ✓ Make sure that the group keeps to the topic but flexible in handling additional information
- ✓ Take care of time management
- ✓ Listen carefully to any group member and does not much Name of Woreda-

Name of Kebele -----

Date -----

1. Who are the main actors participated in onion value chain?

2. What are the opportunities production& marketing of onion?

3. What are the constraint in onion production and marketing?

4. What is your possible solution to rectify the production and marketing related problems?

Appendix II

TABLE 232: ENDOGENIETY TEST

```
. test QUANTON_res

( 1)  QUANTON_res = 0

      F( 1, 104) =    0.07
      Prob > F =    0.7981
```

TABLE 243: HETEROSCEDASTICITY CHECK FOR INDEPENDENT VARIABLES

```
. estat hettest, rhs

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: QUAPRO LnPr SHH EduHH FAMSZ EXPR FSA DNMKT UFA FEC CRA

      chi2(11)    =    9.19
      Prob > chi2  =    0.6042
```

,

SOURCE OWN SURVEY RESULT 2024

TABLE 25: MULTI CO LINEARITY CHECK

. vif

Variable	VIF	1/VIF
FAMSZ	3.83	0.261337
EXPR	3.80	0.263390
QUAPRO	1.22	0.818342
FSA	1.18	0.850326
EduHH	1.13	0.884714
SHH	1.11	0.897947
LnPr	1.10	0.909686
UFA	1.09	0.915087
DNMKT	1.09	0.917678
FEC	1.08	0.925572
CRA	1.04	0.962270
Mean VIF	1.61	