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COLLEGE OF AGRICULTURE AND NATURAL SCIENCE

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ANALAYZING OF VEGETABLE MARKETING SUPPLY AT THE SHASHOGO DISRICTS, CENTRAL ETHIOPIA

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ACRONYM AND ABBRIVATIONS

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ADLI…….…….Agricultural Development Led Industrialization

CC……..Contingency Coefficient

CSA……Central Statistical Authority

DOA …… Development Office Agencies

ESF…….Ethiopian Spice Factory

FAO…….……...……Food and Agriculture Organization

NGO……..Non-Governmental Organization

RMA…….….Rapid Market Appraisal

VIF……Variance Inflation Factor

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ABSTRACT

The study was initiated with the objective of investigating and analyzing the vegetable marketing supply in Shashogo district, Hadiya Zone in Central Ethiopia Regional State. Specifically the study attempts to investigate the marketing supply of vegetables, to discover the major factors of market supply of vegetable in Shashogo district and to investigate problems and opportunities in vegetable marketing in the study area. Descriptive analysis was employed to present result of the available marketing channels, to present the party who get the largest margin and to present the opportunities and challenges discovered by the study. Multiple linear regression models were employed to identify the factors that determine the market supply of vegetable separately. Producers, brokers, local collectors, wholesalers, retailers and consumers were found the main actors of the vegetable marketing channel in the study area. Similarly, the most important channel for vegetable in terms of volume was identified that starts with the producer and ends with the consumer including retailer as the only intermediary. Regarding share of margins, retailers were identified as the parties who take the largest both in vegetable markets channels. Retailer stake 30.3 percent of the final consumer price in the vegetable markets as and they take 54.16 percent of the final consumer price in vegetable market as their new market model. The factors which determine market supply of vegetable were identified as education level of the household head, access to market, access to market information and price. For, the factors which determine its market supply were identified as education level of the household, experience and price. The major opportunities of vegetable marketing in the area were access to adequate human and natural resources, growing demand of vegetables and growing production and marketing experience of the farmers whereas, the major constraints were identified as poor infrastructure, absence of agro-processing plant and lower access to market information. The study finally recommended the regional government to consider the production capacity of the area and solve marketing problems they face by mechanisms like initiating the federal government to planting agro-processing industries and creating sustainable and shorter marketing channels in order to increase and ensure the profitability of the vegetable producing households in Shashogo district.

***Key Word**: Marketing, Multiple Linear Regression, Production.*

CHAPTER ONE

1. INTRODUCTION

1.1. Back ground of the Study

Agriculture is the back bones of economy our in Ethiopia. Ethiopia has a variety of vegetable crops grown in different agro ecological zones produced through commercial as well as small farmers both as a source of income as well as food. Horticultural crops can be differentiated as fruit (permanent crops) and vegetables (short season crops). Accordingly, permanent crops are long term crops that occupy the field planted for a long period of time and largely harvested every year and do not have to be replanted for several years after each harvest. These include tree crops such as coffee, Chat, oranges, Mangoes, Bananas, papaya, Avocados, and etc. (CSA, 2012). Horticultural crops are important for health and economy the amount and mode of production is still weak in Ethiopia. Various types of vegetable crops are grown in Ethiopia under rain-fed and/or irrigation systems. The under study area under vegetables increased from 350,600 ha with production of 2.36 million tons in 2012 to 396,510 ha with production of 4.48 million tons in 2016 for smallholder farmers. This implies that the area cultivated to vegetables increased by 13% while the production increased by 10.3%, between 2012 and 2016. Similarly, export of vegetables increased from 37,210 tons valued at USD 163.86 million in 2012 to220, 210tons valued at USD 437.5 million in 2016.

Specifically in Shashogo Woreda, in the past production year 2023/2024, onion covered 931 hectare of land and 107,191 quintal was produced of which 80,393 quintal was supplied to market while 132 hectare of land was covered by tomato and 25,840 quintal was produced by which 16,796 quintal of it was supplied to the market (ATA, 2024). The productivity of crops is very low compared to the potential yield obtained in the research centers and on farmers' field technology verification studies.

Specifically in Hadiya Zone where Shashogo Woreda founds, in the year 2024, a total area of 3,361.58 ha of land was covered by vegetables by 299,611 holders and the total production was 127,431.73 quintals of vegetable (CSA,2024). The major vegetable products produced in the study area are onion, tomato, cabbage, potato and pepper. The total quantity provided by the farm is the total amount made up all over the farm. It can also be demarcated as a set of

actors and a planned system (Donovan et al., Citation2024). It is made up of a chain of actors, from input providers, producers, and processors, to exporters and customers involved in the events essential to transport the agricultural produce from its beginning to its final usage (Kaplinsky& Morris, Citation2024).

In the Central Ethiopia region, where this study was conducted, a total area of 74,122.78 ha land were covered by vegetable products by 1,860,059 holders and a total of 1,522,944.94 quintal of vegetable was produced in the year 2016 (CSA, 2024).According to CSA (2024), Vegetables took up about 1.69 percent of the area under all crops at national level in the year 2016. However, of the total estimated area under vegetables, the lion share which is about 75.41 percent and 15.06 percent was under Red peppers and Ethiopian Cabbage, respectively. Production of vegetables contribute 2.17 percent of the total crops production, conversely, of the total production of vegetables, the above mentioned crops have the lions share, i.e. about 40.59 percent and 43.43 percent, in that order. In the year 2016, a total of 2,789,202 hectares of land were covered by vegetables, root crops and permanent crops by both smallholder and commercial farms. The total crop output for these crops was found 266,333,191 quintals. From these a total area of 13,361.58 ha of land was covered by vegetables and 127,431.73 quintal was produced (CSA, 2024).

In general the Central Ethiopia region, particularly in Shashogo district have good potential in horticultural crops production for which smallholder farming have diversified from staple food subsistence production into more market oriented and higher value commodities. Despite this production potentials and importance of horticultural crops for the country as well as the study area, there has been limited study with regard to the market supply of vegetables market. Hence, this study focuses on the analysis of vegetable market supply with a goal to achieve the efficiency of vegetable marketing system and to investigate the actors involved in the chain and the roles they play.

1.2. Statement of the Problem

The peasant agriculture is mostly subsistence labor intensive and characterized by serious deficiency of food security. These problems of tenure ship and unremunerated prices have set the farmer under perpetual poverty. But today new technologies demand higher inputs, such as more fertilizers, plant protection, live stocks, irrigation and better seeds as well as investment in power and machinery. They are minimizing cost, increase profit of peasant and national income. Also minimize subsistence of food security as individual and national level.

Vegetable production has a significant role in reducing poverty through employment creation and generation income, improving the feeding behavior of the people, and creating new opportunities for poor farmers. Cultivation of vegetable allows productive employment as the labor/land ratio is high. Depending on the crop production of horticulture crops requires at least twice the labor and up to five times the labor days per hectare compared to cereal crops. Increasing horticultural productions thus contribute to commercialization of the rural economy and create many off-farm jobs (Lumpkin et al., 2022).

Vegetable production at Shashogo district is mainly with natural rainfall and sometimes has been used irrigation especially to vegetables is over supply of harvested products is the main characteristics. The nature of the product on the one hand and the lack of organized market system on the other have been resulted in low producers' price. There are production and marketing problems challenging vegetable development in the District. These are availability of market information, price, low productivity, production seasonality from the production side and lack of transport, storage, post handling facilities, organized market system from the marketing side (Shashogo District Agricultural agency, 2024).

Therefore, demands a holistic study of the system in the form of market chain analysis. Market chain analysis is believed in studies of production and marketing problems. Investigation of the system in terms of to identifies major production and marketing constraints and opportunities of farmers and traders and institutional support services taking in to consideration the product and location specificity are used to identify the restricting factors and come up with specific possible solutions of the Shashogo District. It is for this very critical reason that the study was decided to be conducted in Shashogo Woreda.

1.3. Objectives of the Study

1.3.1. General objectives of the Study

- The overall objective of the study has to analyze the Vegetable Marketing Chain in Shashogo district.

1.3.2. Specific objectives of the study.

1. To identifies major production and marketing constraints and opportunities of farmers and traders.
2. To analyze the determinants of market Chain of vegetables in the study area.

1.4. Research Questions of the study

1. What was identifies major production and marketing constraints and opportunities?
2. What was the determinants of market Chain of vegetables in the study area?

1.5. Limitation and scope of the study

In conducting this research, the researcher was face within the following limitations that highly affect the study in achieving its objectives. The major problems that were occur during the study:- At the time of data collection the respondent was carelessness to filling the questionnaire and some of the respondents was not be interest to fill open ended questions on the questionnaire whereas the others was not be return the questionnaires. Lack of adequate time and budget were also another challenges the researcher has faced which make the geographical scope of the study limited to only Shashogo district and the two Kebeles.

Geographically, the study was limit in Hadiya Zone Shashogo District only two kebele. Conceptually, the study was also limit only about market chain analysis of vegetables in the study area. Even though many concepts have been saying about market conduct and vegetables separately; this is limit to the market chain. Conceptually it also limiting to different demographic factors: fertility and mortality rate, impact of rapid population growth on social and economic development like; education, health, transport, dependence ratio unemployment, saving habit and capital formation. Methodologically is better if inferential statistics and longitudinal studies are use, but due to some circumstance don’t use so another limitation.

1.6. Significance of the Study

This study has been generating important information useful to formulate vegetable marketing development programs and guidelines for interventions that would improve efficiency of the vegetable marketing system. The potential users of the results of this study were farmers, traders, and policy makers, governmental and non-governmental organization, who want to introduce interventions in vegetable marketing system. Furthermore, this study was used as source material for further study.

1.8. Organization of the paper

Chapter one includes introductions, statement of the problem, objectives, limitation of the study, research questions and significance of the study. The second chapter intensely reviews the available literature by entailing general concepts of market chain and empirical research results executed elsewhere. The third chapter envelops components of the research methodology including description of the study area, types of data and its collection method and method of data analysis; while the fourth chapter presents the credential of the survey results by discussing it in comparison with the results of other studies. Brief narrations of important findings of the study and appropriate recommendations are presented in chapter five.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Concepts and Definitions of Terminologies

a) Vegetables / Horticulture

A vegetable is a part of a plant that is consumed by humans or animals as food. Vegetables can include various plant parts. Vegetables are typically characterized by their low caloric content and high nutritional value, including vitamins, minerals, and dietary fiber. They are an essential part of a balanced diet and can be eaten raw or cooked in various dishes.

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

b) Market

A market is a point or a place or sphere within which price-making force operates and exchanges of title tend to be accompanied by the actual movement of the goods was affected (Backman and Davidson, 2002; Andargachew, 2003). The concept of exchange and relationships lead to the concept of market. It is the set of the actual and potential buyers of a product (Kotler and Armstrong, 2003).

c) Marketing

In its simplest form is defined as the process of satisfying human needs by bringing products to people in the proper form, time and place (Branson and Norvel, 2003). Marketing has an intrinsic productive value, in that it adds time, form, place and possession utilities to products

and commodities. Through the technical functions of storage, processing and transportation, and through exchange, marketing increases consumer satisfaction from any given quantity of output (Mendoza, 2001). Kotler (2003) also stated shortly marketing as the task of creating, promoting, and delivering goods and services to consumers and businesses.

d) Marketing channels

Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). The channel system creates time, place, possession and form utilities. However the benefits of the channel system cannot be enjoyed without an element of cost. A product may take many routes on its journey from a producer to buyers and marketers search for the most efficient route from the many alternatives available. The channel may be direct or indirect. In the direct channel a producer and ultimate consumer deal directly with each other. In the indirect channel intermediaries are involved between the producers and final consumers and perform numerous channel functions. To choose appropriate channel environmental factors, consumer characteristics, product type and the firm financial, human and technological capabilities determine (Eric and Kerin, 2020)

e) Market Chain

Agricultural commodities are produced by large numbers of farmers and consumed by large numbers of households. With the exception of food stuffs consumed on-farm or sold locally, they are bought and sold a number of times between the farm gate and the final consumer. While moving between these two points, the commodity is loaded, off-loaded, transported, stored, cleaned, graded and processed. The conduit that runs from a farmer down to a final user, through which the commodity passes and which embodies these transactions and activities is conventionally referred to as a "marketing and processing chain", "a supply chain", or "a value chain" (FAO, 2019).

Value chain on the other hand refers to the vertical alliance or strategic network between a numbers of independent business organizations within a supply chain, as it is a particular form of supply chain. It is strategic network of independent organization/business that recognizes their mutual need for one another working together to identify strategic objectives through

sharing the associated risks and benefits by investing time, energy, and resources to make the relationship work (Hobbs *etal.*, 2000).

2.1.2. Properties of Vegetables Marketing

Being produced both by commercial and small holder farmers vegetable marketing is influenced by a number of factors that can be attributed to production, product, and market characteristics. Kohl and Uhl (1985) identified these attributes such as;

i. **Perishability**

As vegetables are highly perishable, they start to lose their quality right after harvest and continued throughout the process until it is consumed. For this purpose elaborated and extensive marketing channels, facilities and equipments are vital. This behavior of vegetables exposed the commodity not to be held for long periods and fresh produce from one area is often sent to distant markets without a firm buyer or price. The urgent, informal marketing processes often leads to disputes between buyers and sellers of fresh fruits and vegetables. Producers are normally price takers and are frequently exposed for cheating by any intermediary.

ii. Price and Quantity Risks

Due to perishable nature and biological nature of production process there is a difficulty of scheduling the supply of vegetables to market demand. The crops are subjected to high price and quantity risks with changing consumer demands and production conditions. While food-marketing system demands stable price and supply, a number of marketing arrangements like contract farming provide stability.

iii. Seasonality

Vegetables have seasonal production directly influencing their marketing. Normally they have limited period of harvest and more or less a year round demand. In fact, in some cases the cultural and religious set up of the society also matter demand to be seasonal. This seasonality also worsened by lack of facilities to store.

2.1.3. Constraints and opportunity of vegetable

Expanding production of vegetables is often hindered by different factors such as lack of market access, market information, pests, inappropriate management, input supply, and credit and extension services. The range of vegetable cultivars available, the wide variation in climatic conditions, and the land, water, and labor endowments within the largest or smallest countries in the Dubancho suggest that the availability of natural resources is not an important constraint to the production and trade of vegetables. The following identifies some key factors underlying constraints and opportunities that may prove critical in expanding trade of vegetables.

Supply Factors:-Although seasonality of vegetable production can be seen as a constraining factor, it can also provide opportunities associated with "market windows" to countries with seasonal deficits. The lack of availability of investment capital may prove to be a significant constraint in enhancing marketing activities. High transfer or transportation costs for vegetables are a challenge to enhanced trade.

Technological change: - is also a supply factor of importance to future competitiveness. Technological change improves international competitiveness by reducing production costs of existing commodities or by introducing new or modified ones. Improved technology often results in varieties that withstand transport better and are more uniform in quality and appearance. Postharvest technology and development of an efficient export infrastructure can significantly affect product quality and acceptability by final consumers,
Demand Factors:- A steady increase in the demand for vegetables is a prerequisite for increased export opportunities. Such opportunities are offered by recent demographic shifts toward an older population; changing lifestyles, such as eating away from home, and increased diet, nutrition, and health concerns. An increase in the consumption of fresh vegetables has been boosted by releases of research results that link increased consumption of fruit and vegetables to a reduction in the risk of cardiovascular diseases and cancer. Ongoing socio-demographic changes have increased the relative importance of vegetable consumption expenditures.

The role of ***quality*** and ***safety*** concerns in shaping future trade opportunities cannot be overemphasized in developing or sustaining export markets. Consumers in the growing

markets for vegetables are endowed with relatively high purchasing power so that *value* and *quality* rather than just price will play a critical role in satisfying these markets.'

2.2. Empirical Literature Review

There are enormous empirical works that shows how the vegetable marketing system in Ethiopia is functioning and factors that determine vegetables production, market supply and demand. However, some of the most relevant regarding vegetable market chain and other products which may have similar relation regarding the variables they are affected by are reviewed below.

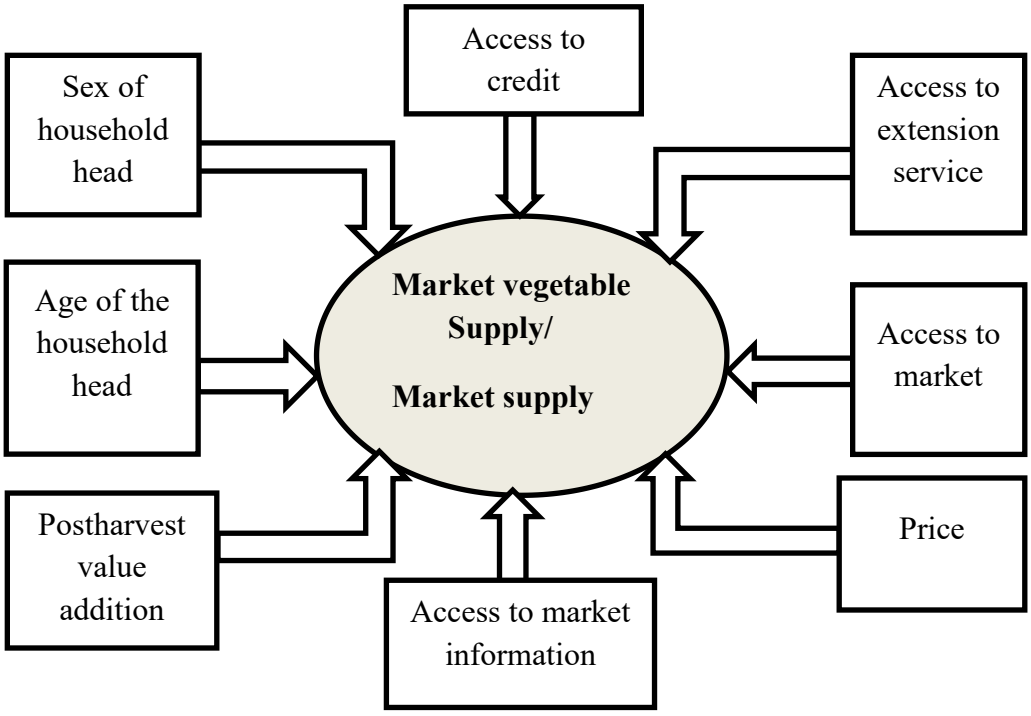
According to Gemechu (2017) identified the major factors that affect the supply of vegetables (onion and tomato) at Shashogo District. His study revealed that owned oxen number, family size, and distance from development agent and experience has affected marketable supply of onion and tomato. In similar way, Galchu (2017) identified major factors that affect marketable supply of papaya in Kidgisa kebele. Bontu"s study revealed that papaya quantity produced influenced market tables supply positively.

According to Ayantu and Challa (2017) stated that the production of vegetables is seasonal and price is inversely related to supply. The situation is worsened by the perishability of the products and poor storage facilities. Farmers‟ bargaining power is low due to lack of alternative market outlet. They also found that the most common marketing channel immediately available to the farmer is through brokers i.e. up to three brokers between the producer and the trader which is an indication of long marketing channel. They recommended that the more the farmers organize themselves and access the terminal market, the more they benefit. Similarly, According to Geremu (2017) in her study of pepper marketing chain analysis identified variables that affect marketable supply. According to Hailu, access to market, production level, extension contact, and access to market information were among the variables that influence surplus. Another study by Abera (2017) on dairy marketing also captured some variables that influence dairy supply. The variables were household demographic characteristics like sex and household size, transaction cost, physical and financial wealth, education level, and extension visits. Household size, spouse education, extension contact, and transaction cost affects positively while household education affects negatively.

2.3. Conceptual Framework of the Study

According to Maina (2011) stated that a product supply chain consists of participants. All these participants help move the product in a certain chain called a market channel; which in turn develops to form a market. Participants in the channels perform different activities and thus different channels seem to offer different service outputs depending on the intended consumers need.

The performance of these channels can then be evaluated using performance indicators such as effectiveness & efficiency; which in turn comprise of measures such quality, prices, costs, quantity, delivery time, product form, and market integration. The shorter a marketing channel, the more the efficient is the marketing profit maximization; a producer or trader selects that channel of distribution which promises to yield the highest possible net profit on his sales (Anthonio, 1988).



CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Description of Study Area

Shashogo district is one the district in Hadiya zone. Shashogo is one of the Woredas in the Central Ethiopia, part of the Hadiya zone, Shashogo is bordered on south the Kambat zone, on the west by Lemo, on the northwest by Ana Lemo, on the northeast by Silt'e' Zone, and on the southeast by the Alaba Zone. Based on the CSA, this woreda has a total population of 103,722 of 52,435 are men and 51,287 women, 7.92% of its population are urban dwellers .The longitude and latitude of this woreda are approximately 7.9367.

3.2. Research Design

The research design employed in this study was cross sectional research design. This is because of this study was conduct through direct interview of societies and vegetable chain managers as well as governmental office experts once a time.

3.3. Types and Sources of data

For this study, I was using both primary and secondary source of data. Among the primary data interview and questionnaire are used with open ended and close ended type of questions. The questionnaire was prepared in English language; however, it is translated into the local language in order to make the questions simple, clear, and understandable to respondents. Secondary sources of data are gathered from different official statistical sources (like- CSA, publications and municipal documents), books, journals, internet sources, research findings of various scholars on the topic under investigation, and other publications.

3.4. Method of data collection

Primary data: Data was collected from farmers and traders. A checklist has also been used to guide the informal discussion conduct to collect data that can be collected from individual interviews. The primary data collected from farmers has been focused on factors affecting the vegetable market supply, size of output, market information, credit access, access to market

information and demographic characteristics of the household. Moreover, the interview schedule for traders includes: types of traders (wholesalers, retailers, local collectors, etc.), buying and selling strategies, source of market information, demographic characteristics.

Secondary data: Data was collected from different sources, such as: Government institutions, from District Agricultural Office (DAO), reports, bulletins and websites. Published and unpublished documents were extensively reviewed to secure relevant secondary information.

3.5. Sampling Techniques and Sample Size

The random sample technique is used; because it avoids the possibility of making personal bias. A multistage sampling procedure would be used to select sample respondents. In the first stage the study Shashogo district area was purposely select based on the extent of highly productions In the second stage two rural administration kebeles was be selected by using random sampling technique. In the third stage 180 sample respondents would be taken from two kebeles; namely Kidigsa and Bonosha kebele**.**

Therefore, Kidigsa has total household of 657, and Bonosha has total household of 543, Total target populations of two kebeles has 1,200 peoples of vegetable productions. In addition to this, we are going to use proportionate sampling that was enable us in taking samples from each sub strata' which are to be selected from the target population.

3.5.1 Sampling Technique

The multistage random sampling technique was employed in Hadiya Zone and Shashogo districts. Thus sampling covered, farmers, retailers, wholesalers, rural Assemblers and consumers on propionate to size basis.

Farmers' sampling

A two stages sampling technique made by selection of growing Kidigsa kebele and Shashogo kebeles at the first stage followed by random selection of vegetable growing farmers.Thus two kebele identification was to be through secondary data based on production coverage of the two kebeles. Respondent sample size per each two Kebeles was to be the determined proportionally to the number of target total populations 1200 and 450 growing farmers per Kebeles vegetables. Thirty three farmers from the two kebeles were interviewed.

Rural assemblers, wholesalers, and brokers sampling

Researchers do not agree on sample size and Sampling Technique that should be used in each segment of the marketing chain (Mendoza, 1995). The decisions involved were partly a function of information currently known, time and resources available, accessibility to and openness of the marketing participants as well as the estimated size of the trading population. It is estimated that about 28 rural assemblers, 35 brokers, and 64 wholesalers used to participate in the marketing of the product. However, it was arbitrarily believed to take five from each for detail interviewing. In fact, frequent rapid informal and observational surveys were also followed.

Retailers' Sampling

The sample frame was developed by taking a count of vegetable retailers in the two main retail markets; Kidigsa and Shashogo. It is estimated that 154, retailers are found 88 at Kidigsa and 66 at Shashogo central markets. After estimating the number of retailers, a proportion to size was taken 30 Kidigsa from and 20 from Shashogo were randomly selected. Fifty retailers from the two kebeles were interviewed.

Consumers' sampling

The consumers' survey were meant to understand the demand for the products. The survey were taken from two major receiving towns namely, Kidigsa and Shashogo. Fifty respondents were interviewed in the two kebeles through proportionate to size sampling technique based on the Central Ethiopia Regional Bureau of Finance and Economic Development population projection data. Accordingly, 24 respondents from Kidigsa and 26 from Shashogo were interviewed.

3.5.2. Sample Size Determination

Since we could not conduct the entire household in the Kebele, we are select sample from the total household in the two kebeles.

When we conduct our sample size, we use the Yemane (1967) formula, $n = \frac{N}{1+N(e)^2}$

Then, target populations of two kebeles are 1200 peoples.

Then by using the above Yemane (1967) formula, $n = \frac{N}{1+N(e)^2}$

$$n = \frac{1200}{1+1200(0.08)^2} \qquad n = \frac{1200}{1+7.68} \qquad n = \frac{1200}{8.68} \qquad \underline{\underline{n=138}}$$

Where: n = Sample size

N = Target population

e = Margin of error, in social science margin of error is 8%.

Therefore, the total numbers of the household selected from the two kebeles are 138 the sample size of the strata to the kebele Shashogo and Kidigisa.

3.6. Methods of Data Analysis

3.6.1. Descriptive Statistics

To identifies major production and marketing constraints and opportunities of farmers and traders. After the data collection, method of data analysis used descriptive method of data analysis for the collected data from both primary and secondary data sources are first edited, classified and organized heterogeneous classes into substrata based on their common characteristics. After data pass through this processing mechanism, then it would be pass the descriptive analysis by using percentages and tables

3.6.2. Econometric Analysis

To analyze the determining vegetable market supply used multiple linear regression model of OLS (ordinary least square) estimation. It could be an essential method of econometric analysis to recognize and realize patterns of the influencing factors.

Econometric analysis is used to estimate the fundamental relationship between the dependent variable and the explanatory or independent variables. Multiple linear regressions for vegetable market supply which determine quantity of vegetable, multiple linear regression models was to use as:

$$Yi = \beta Xi + Ui \text{ ---------- eq'n(1)}$$

Where: Yi = Vegetable supplied to market

β = Vector of estimation of coeffieint of the explainatory variable

Xi = Vector of Explanatory variable

Ui = Distrurbance(error)*term*

3.6.2.1. Model specification

The multiple linear regression model is specified as Y=f(sex, age, education, experience, price, access to market information, postharvest handling practice, access to extension services, access to credit, access to market...*etc*).Multiple regression analysis takes into account the inter-correlations among all variables involved. This method also takes into account the correlations among the predictor scores they added multiple regression analysis, which means more than one predictor is jointly regressed against the criterion variable. This method is used to determine if the independent variables will explain the variance in dependent variable (Chang, *et al.,* 2020).

The model specification of supply function in matrix notation is estimated by: $Y=\beta_0+\beta_1x_1+\beta_2x_2+ \beta_3x_3+ \beta_4x_4+ \beta_5x_5+ \beta_6x_6+ \beta_7x_7+ \beta_8x_8+\beta_9x_9+ \beta_9x_{9+}Ui$------eq'n (2)

Where: Yi = Vegetable supplied to the market

β=a vector of estimated coefficient of the explanatory variables

X= a vector of explanatory variables

Ui= disturbance term

Y= Quantity of vegetable supplied to the market

X1= postharvest value addition

X2= Age of the household head

X3= Education level of the household head

X4= Experience on production

X5= Access to market

X6= Access to market information

X7= Price vegetables

X8= Access to extension service

X9= Access to credit

X10= Sex of household head

3.7. Definition of Variables

3.7.1. Dependent variable

Quantity Supplied: It is a continuous variable that represents the marketable supply of vegetable by individual households to the market, which is measured in quintals.

3.7.2. The Independent variables:

Postharvest Value Addition: It is a dummy variable measured in terms of whether the house hold practices value adding activities on his vegetable products or not. Farmers who practice better postharvest handling like (sorting, grading, transporting, cutting, separating quality product, etc) have better relationship with wholesaler and have high probability to sell to wholesaler. Abraham (2023) found that Post Harvest Value Addition affects market supply of vegetables in Shashogo and Bonosha woredas in Central Ethiopia region.

Age of the Household Head: It is a continuous variable and measured in years. Aged households are believed to be wise in resource use, on the other hand young household heads have long investment horizon and it is expected to have either positive or negative effect on volume of vegetable sales. Abera(2022) who found that age of the household head have negative effect on the elasticity of onion supply to the market. This variable is also expected to have relationship with outlet choice decision of vegetable producers. Bongiwe and Masuku(2019) found that age of the farmers was significant determinant of the choice to use non wholesale market channel over other-wholesale market channel.

Education Level of the Household Head: It is a continuous variable measured in terms of years of schooling. Education broadens farmers‟ intelligence and enables them to perform the farming activities intelligently, accurately and efficiently. Moreover, better educated farmers

tend to be more innovative and are therefore more likely to adopt the marketing systems. Formal education enhances the information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision making (Fakoya*et al*., 2021). Astewel (2022) found that if paddy producer gets educated, the amount of paddy supplied to the market increases, which suggests that education improves level of sales that affects the marketable supply.

Vegetable Farming Experience: This is a continuous variable measured by number of years a producer has experienced farming vegetables and is expected to influence production participation positively. As farmers got more experience in production and marketing, the probability of to participate would be higher. Farmers with longer farming experience are expected to be more knowledgeable and skillful (Ayelech, 2020).

Access to Market: It is a continuous variable which is the distance of the vegetables producer households from the nearest market and it is measured in Kms or hours of walking time. The closer the market, the lesser would be the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. A study by Ayelech (2020) on vegetable market in chora woreda identified that poor market access has significant and negative effect on quantity of avocado and mango supplied.

Access to Market Information: Access to market information is a dummy variable which is assumed to have positive impact on marketable supply of vegetables (onion and tomato in this case) at the farm level. Farmers marketing decisions are based on market price information, and poorly integrated markets may convey inaccurate price information, leading to in efficient product movement.

Price of Vegetables: This is a continuous variable that will measure annual average price of onion and tomato in the 2024. i.e the one year lagged price of onion and tomato. Producers are motivated to take what they produce to the market when the price is higher. In other words, supply is directly related to the previous year market price. A study conducted by Goetz (2020) on household marketing behavior in Sub-Saharan Africa found a significant positive relationship between price of grain and the probability of quantities sold.

Access to Extension Service: The variable extension service is as a dummy variable which is expected to have positive effect on volume of marketable supply of onion and tomato. Farmers that have frequent contact with development Agents will have better access to information and could adopt better technology that would increase their marketable supply of vegetables.

Access to Credit: This is a dummy variable which indicates credit taken for vegetables production and marketing. Access to credit would enhance the financial capacity of the farmer to purchase the inputs, thereby increasing vegetable production and market share size. According to Alemnew(2020) and Muhammed (2022) found that if pepper and teff producer gets credit, the amount of pepper and teff supplied to the market increases.

Sex of the Household Head: It is a dummy variable. According to Tshiunza***et*** *al.* (2022) determined that male farmers tended to produce more for market and therefore participated in vegetable market more than female farmers participate.

CHAPTER FOUR

4 RESULT AND DISCUSSIONS

This result and discussion part of this research deals with the findings from descriptive and econometric analysis of the study. The descriptive analysis was employed to identifies major production and constraints of farmers and traders. The econometric analysis was employed to identify factors that affect producers‟ market supply of the vegetable in Shashogo District.

4.1. Socio-Demographic Characteristics of farmers

This section presents the profile of the sample respondents with regard to their age, education level, Size, input supply, marketing and Access to extension services on vegetables in Shashogo District.

a) Age of the farmers

The survey on this major demographic factor measured in years provided a clue on working ages of households. The age structure of the sample households shows that the average age of the sample vegetable producers lies in the second category i.e. (amid of 26-40) which accounts about 65 percent of the total sampled population and 24.2 percent of the vegetable producers are within the age range of the largest proportions of the producers which is about 89.2 percent lie within a productive age (15-64). The percentages of age of the sample households was 85% with a male, where the largest proportions of the household head lie within a productive age and 15% was the female least proportion of the household within a productive age. The overall result has thus indicated household heads are prone to use resources with expected positive effect on product participation and production surplus.

Table 1 The Age of the farmers

Age	**Producers**		**Percent %**	
	Male	Female	Male	Female
26-40	20	2	60	5
41-55	5	2	15	5
56-64	3	1	10	5
Total	28	5	85	15

Source: Own data (2024)

b) Education level of the farmers

As total of sample respondents, about 45% and 30% of the sample household heads were illiterate and can read and write, respectively. However, 15%, 5% and 5% had joined primary school, secondary school and certificate and above respectively. This increased the vegetable production and marketing of vegetables in the study area and has also improved the ability to acquire new idea in relation to market information and improved production of the households, due to that the educational background of the sample household head is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. The result indicates that producers are able to participate in trade and marketing activities. In this case, producers have a lower risk of being cheated and taken advantage of by traders due to lack of education. However, producers in Shashogo Woreda are relatively exposed to cheating by the channel members due to their lower educational level.

Table 2: The Education levels of the Producers

No	**Education level of the Producers**	**Frequency**	**Percent %**
1	Illiterate	14	45
2	Read and Write	10	30
3	Primary School	5	15
4	Secondary School	2	5
5	Certificate and Above	2	5
	Total	**33**	**100**

Source: Own Data (2024)

C) Family size of farmers

From the data, the majority family size of the households lies in the third category which include(6-10) members in a household and accounts for about 55 percent of the total population. It is followed by the second category with a range of (3-5) members per household which accounts for about 38.3 percent of the total population. This is an advantage for the households by which they can minimize their labor cost for the production and marketing of

vegetables since they have enough labor in their own family. As seen in the data, this relatively larger family size in addition with a productive age of the family members helps the households in becoming source of labor by saving their costs and thus increasing their profitability. This is supported by Bontuand Gemechu (2025) who found that different sources of labor are employed in horticultural production of eastern Ethiopia where family labor takes the lion share for labor allotments.

d) Inputs used for vegetables production

Agricultural inputs are important elements for production and productivity. As a result the typical inputs utilized for production of the crops was seed, modern and traditional irrigation, labor, land, chemicals and fertilizer though the amount and type of chemical and fertilizer used was very limited. The use of chemicals such as pesticides and herbicides is almost none, some of the respondents use chemicals.

The source of fertilizer was from office of agriculture and rural development. The application rate was below the recommendation that was about one quintal per hectare. Farmers on the average use 48 kg of DAP and 30 kg of UREA per hectare which is below the recommended rate (75 kg DAP and 75 kg urea) per hectare. The basic reasons why farmers do not use improved varieties where due to timely unavailability, lack of information and expensiveness of the input.

e) Access to extension services

Extension service is the rural extension services are on the verge of a major shift in extension service delivery through the farmer training center system. Respondent farmers reported that the average distance they had to travel to development center was 2.5 km. Each sampled Shashogo District had two development agents assigned to work in crop production, and natural resource managements. On top of this Shashogo like use additional irrigation as the area have started deep wall modern irrigation both Drip and Sprinkler irrigation and traditional irrigation scheme.

This is because the Regional Agricultural and Rural Development Bureau gives special attention to modern and traditional irrigation areas to technically support the farmers' right

from land preparation, seed selection, disease and pest, water management up to post harvest handling

f) Market Information

The assessment depicted colleague farmers are the first source of information followed by producers while traders, government extension workers and NGOs are second, third and fourth information sources in Shashogo District, respectively. Closer look at access to market information depicted; as there is no system in place that systematically collect, analyze and disseminate information relevant to the needs of different actors.

However, the overall assessment signified farmer's get limited market information than traders with their own efforts. Owing to inequitable access to information, large proportion of market power is captured by traders who have diversified information source including: neighbors, vegetables traders, personal observation and better access to mobile technology which favored traders to adverse risks of loss to this product.

4.2. Socio-Demographic Characteristics of Traders

a) Age of the Traders

The data on these demographic characteristics highlighted that, about 55 percent of the sample respondents are in the age range of 30-64 while the 35 percent of respondents‟ age ranges from 18-29 years. Only 5 traders (10 percent) are more than 64 years of age. The result of this demographic character indicates that near to all of the sampled traders are in their productive.

Table 3: The age of the Traders for different actors in Shashogo District shows as below.

No	Age	Frequency	Percent %
1	18-29	18	35
2	30-64	30	55
3	Above 64	5	10
	Total	53	100

Source: survey results (2024).

b) Experience of the Traders

Analysis on this demographic characteristic highlighted that, about 9% of traders are youngster. The age of 11 traders are in between 31-45 years. The data reveals that most of the traders are experienced by which they are well aware of the price and other important situations in the vegetable market. This lets them know when the price of vegetables becomes higher and lower and directs them from whom to buy.

c) Education level of the Traders

Education is a very crucial factor for skill development and enhancing marketing decisions. In this regard, the assessment shows that most of the traders are literate by which 50% and 30% of them completed primary and secondary school respectively. The 20% of the traders reach education level of certificate and above. Education is a very crucial factor for skill development and enhancing marketing decisions

Table 4: Educational Level of the Traders in Shashogo District shows as below.

No	Education level of traders	Frequency	Percent %
1	Primary school	26	50%
2	Secondary school	16	30%
3	Certificate and above	11	20%
	Total	53	100%

Source: Own survey results (2024).

d) Product quality

Farmers in the district do not have any Standard measure to identify the quality of onion, tomato, potato, read root and carrot. They usually identify the quality of vegetables by their color, pest damage, size, and shape, odor and foreign matter. The sampled farmers use color and shape (18%), and absence of foreign matter (38%) as a means of differentiating the quality of the product. The quality of onion as mentioned by the Shashogo DOA and Rural Development Office is good that had been assured by the Ethiopian Spice Factory (ESF) which is equivalent to other means of assessment to find a source market for contractual farming.

4.3. Socio-Demographic Characteristics of Consumers

a) Age of the consumers

The data on these demographic characteristics highlighted that, about 55 percent of the sample respondents are in the age range of 30-64 while the 35 percent of respondents‟ age ranges from 18-29 years. Consumers (20 percent) are more than 64 years of age. The result of this demographic character indicates that near to all of the sampled consumers are in their consumptive.

Table 5: The age of the consumers in Shashogo District shows as below.

No	Age	Frequency	Percent %
1	18-29	10	20
2	30-64	30	60
3	Above 64	10	10
	Total	50	100

Source: survey results (2024).

4.4. Marketing actors

The major market players include producers, wholesalers, retailers, transporters, and consumers. The 15% vegetables producing farmers sold their produce at the farm level. Based on the informal discussion with some of wholesaler, the numbers of wholesale buyers who come to Shashogo market during peak production period were estimated to be four and above, almost all of them handled equivalent amount of the product. On top of this, the numbers of wholesalers working on onion and to a very rare case on carrot were estimated to be last stage. The number of retailers in the study area estimated up to 150 on the market day of the district. The large number of retailers was found during the market day of the District. Almost all the retailers had equivalent amount of volume of product handling.

4.4.1. Farmers

These are the primary or first link actors of the market channel who cultivate and supply surplus vegetables to the market. The land for the aforementioned commodities was either its own plot, share crop and rented to produce the already mentioned crops. Since the products are

very perishable in nature right after harvest they are sold either at local market and District market.

Table 6: Types of vegetables amount in quintal and price in birr at Shashogo District market.

No	Types of vegetable	Amount in quintal	Amount of price in birr
1	Potato	1	2500 Birr
2	Tomato	1	4500 Birr
3	Read Onion	1	4800 Birr
4	Read Root	1	28000 Birr

Source: Own Observed data of 2024

4.4.2. Wholesalers

These are one of the dominant members of the channel who are known for the purchase of bulky products with better financial and information capacity. They buy vegetables at the farm gate, from local collectors and/or brokers. They resell vegetables in Shashogo Districts.

4.4.3. Retailers

These are the final link in the marketing chain who delivers vegetables to end users or consumers. Most of retailers have mobile telephone to exchange current information. The working capital of retailers ranges from 5,000 up to 50,000 birr. Retailers use rented and their own store because some traders store is not found in front of the main road to attract sellers.

Table 7: Types of vegetable, amount of vegetable in kilo and price in birr at Shashogo District market.

No	Types of vegetable	Amount in kilo	Amount price in birr
1	Tomato	1	50 Birr
2	Potato	1	25 Birr
3	Red Root	1	35 Birr
4	Red Onion	1	50 Birr
5	White Onion	1	350 Birr

Source: Own Observed data of 2024

4.4.4. Consumers

From the consumers‟ point of view, the shorter the marketing chain, the more likely is the retail price going to be affordable and the more was to quality of the product. Consumers for this particular study mean those households who bought and consume vegetables. There are individual households that purchase from vegetables retailers and there are also public institutions and prisons that bought the commodity for their own consumption only from wholesalers in the study area.

4.5. Marketing channels of vegetables

A marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2018).

The analysis of marketing channels is intended to know the alternative routes the product follow from the point of origin to final destination. These are 4 main alternative channels were identified for the vegetable marketing.

Channel-1: producer →consumers

Channel-2: producer → retailer →consumers

Channel-3: producer →wholesaler →consumer.

Channel-4: producer → wholesaler→ retailers→ consumers

4.6. Major Production and Marketing Constraints and Opportunities

4.6.1. Production and marketing constraints of farmers

4.6.1.1. Production Constraints Faced by farmers

Table 7.Production constraints faced by vegetable supplier

No	Production related constraints	Frequency	Percentage %
1	Lack of packaging material	20	14.5
2	Lack of credit facilities	16	13.76
3	High cost seed	26	21.4
4	Non-availability of labor	19	18.84
5	Poor economic condition of farmers	30	11.6
6	Lack of information about production input	27	19.56

The table outlines the production constraints faced by vegetable suppliers, highlighting various challenges they encounter.

Lack of Information about Production Inputs: This is the most significant constraint, indicating that many suppliers struggle with inadequate knowledge regarding necessary inputs for successful vegetable production. This could lead to suboptimal farming practices (refers to methods that do not maximize productivity or efficiency. Without proper knowledge, farmers may use incorrect amounts of inputs, choose unsuitable crop varieties, or fail to implement effective pest management strategies. This can lead to inefficient resource use and lower overall productivity) and reduced yields (The outcome of inadequate knowledge and suboptimal practices is "reduced yields." This means that the quantity and quality of vegetables produced may be lower than what is achievable with optimal practices. Reduced yields can impact the profitability of suppliers and their ability to meet market demand).

Poor Economic Condition of Farmers: A substantial portion of suppliers indicated that the economic challenges faced by farmers hinder production. This suggests that financial stability is crucial for ensuring effective agricultural practices (secure economic foundation allows farmers to make informed decisions and invest in improvements. Financial stability enables farmers to purchase better inputs, adopt new technologies, and manage risks associated with

farming) and can affect overall supply(economic challenges faced by individual farmers can have broader implications for the agricultural market. If many farmers are unable to produce effectively due to financial constraints, this can lead to reduced availability of agricultural products, potentially increasing prices and affecting food security).

High Cost of Seed: The high cost of seeds is a notable concern, impacting the ability of suppliers to access quality planting materials. This could deter farmers from investing in better-performing seed varieties, affecting crop quality and yield (Using inferior seeds can result in lower productivity, poor crop health, and increased susceptibility to pests and diseases. As a result, farmers may experience diminished returns on their investments, further perpetuating the cycle of reliance on suboptimal inputs).

Lack of Packaging Material: Insufficient packaging materials can hinder the ability to market and distribute vegetables effectively. This constraint suggests a need for improved logistics (emphasizes that addressing the packaging issue is part of a larger challenge. Effective logistics encompass not just packaging but also transportation, storage, and inventory management. Improving these areas can enhance the efficiency of getting products from farms to markets) and supply chain management. The lack of proper packaging can lead to increased waste, reduced profitability, and lower consumer confidence in the quality of the products. This situation can adversely affect the overall supply chain, making it critical to find solutions that enable better packaging practices.

Lack of Credit Facilities: Limited access to credit facilities restricts farmers from making necessary investments in production inputs. This highlights the importance of financial services in supporting agricultural growth. access to credit is crucial for the agricultural sector's development. Financial services enable farmers to invest in their operations, adopt modern farming practices, and respond to market demands effectively. Without these services, agricultural growth can be stunted. The lack of credit facilities can lead to a cycle of poverty, where farmers are unable to improve their operations, resulting in lower yields and incomes. This situation can also affect food security and rural economic stability by limiting the overall productivity of the agricultural sector.

Non-Economic Availability of Labor: Labor availability is crucial for farming operations. Challenges related to labor availability may affect the timely planting (challenges related to labor availability may affect the timely planting and harvesting of crops." Timeliness is vital in agriculture; delays in planting can result in missed growing seasons, while delays in harvesting can lead to crop spoilage or reduced quality. This can significantly impact yield and marketability) and harvesting of crops, impacting overall productivity (indicates that labor shortages can lead to reduced outputs and lower efficiency in farming operations. This not only affects individual farmers' income but can also have broader implications for food supply and agricultural sustainability).

The results indicate that vegetable suppliers face several interrelated production constraints, with the most significant being a lack of information on production inputs and the poor economic conditions of farmers. Addressing these issues could enhance the overall efficiency and output of vegetable suppliers. Targeted interventions, such as education on best practices, improved access to financial resources, and support for packaging solutions, could help mitigate these constraints and boost productivity in the vegetable supply chain.

4.6.1.2. Marketing Constraints Faced by farmers

Table 8: Marketing constraints faced by vegetable growers

No	Marketing related constraints	Frequency	Percentage %
1	Lack of organized marketing	19	13.76
2	Inadequate storage facilities	21	15.21
3	Inadequate transportation facilities	22	15.95
4	High transportation charge	21	15.21
5	Long chain of intermediaries	20	14.49
6	Low price	15	10.86
7	Non-availability of market information	19	13.76

The table presents data on marketing constraints faced by vegetable growers, detailing both the frequency of responses and their corresponding percentages.

Lack of Organized Marketing: This constraint is significant, indicating that many growers struggle with structured marketing strategies. This could lead to inefficiencies in reaching

consumers (If growers do not have organized marketing strategies, they may not effectively reach potential customers. This can result in lower visibility for their products and missed sales opportunities) and maximizing profits (Inefficient marketing can lead to lower sales and, consequently, reduced profits. If growers can't effectively sell their products, it diminishes their overall financial viability).

Inadequate Storage Facilities: The fact that 15.91% is the highest percentage among the listed constraints indicates that inadequate storage is the most prevalent issue identified by the growers. This suggests that many are experiencing similar problems related to storage. The highest frequency in the table suggests that storage issues are a major concern. Insufficient storage can lead to spoilage and waste, impacting profitability. Spoilage reduces the volume of sellable produce, directly leading to lower sales and income for growers. If growers must invest in alternative solutions (like frequent market trips or emergency storage options), their expenses may rise, further squeezing profit margins.

Inadequate Transportation Facilities: The figure of 15.15% indicates that a notable portion of growers identify transportation as a constraint. This suggests that it is a common and pressing problem within the industry. Similar to storage, inadequate transportation can hinder the ability to get products to market efficiently. This can affect both the freshness of the produce and the overall market reach. Poor transportation options can restrict growers' ability to reach broader markets. They may be confined to local sales or unable to access high-demand markets that require reliable transportation.

High Transportation Charges: The figure of 14.49% indicates that a substantial number of growers consider high transportation costs a significant constraint. This suggests that it is a common issue impacting their operations. High costs associated with transportation add financial pressure on growers. This could limit their market options or reduce profit margins significantly. High transportation costs directly reduce profit margins. If a significant part of revenue goes towards logistics, less is available for covering other operational costs or reinvesting in the business.

Long Chain of Intermediaries: The figure of 14.49% indicates that a notable portion of growers view the long chain of intermediaries as a significant challenge. This suggests that

many are facing similar issues related to their supply chain. A lengthy supply chain can reduce the growers' share of the final sale price. It may also complicate communication and logistics, leading to inefficiencies. A longer supply chain can introduce inefficiencies in logistics, such as delays in transportation and handling. This can reduce the freshness of the produce and increase the risk of spoilage.

Low Price: The figure of 11.76% indicates that a considerable number of growers perceive low prices as a significant constraint. This suggests that many are experiencing challenges related to the financial returns on their products. This indicates that even when products reach the market, the prices may not be favorable. Growers may struggle to cover costs, impacting their sustainability. If growers consistently receive low prices, their businesses may become unsustainable. This could lead to reduced production, loss of livelihoods, and potential market exits.

Non-availability of Market Information: The figure of 10.29% indicates that a notable portion of growers identify the lack of market information as a significant constraint. This suggests that many are affected by insufficient access to critical market data. A lack of access to market information can prevent growers from making informed decisions regarding pricing, timing, and market demand. Growers rely on market information to develop effective marketing strategies and to plan their production cycles. Without this data, they may miss opportunities or face increased risks.

4.6.1.3. Opportunities for farmers and traders

Table 9.Opportunities for farmers and traders faced by vegetable supplier

No	Opportunities for farmers and traders	frequency	Percent %
1	Direct-to-consumers sales	20	22.72
2	Value-added products	11	12.3
3	Cooperatives and collaborations	15	17.04
4	Sustainable practices	9	10.23
5	Diversifications of crops	13	14.77
6	Access to technology	10	11.36
7	Online Marketing and Sales	10	11.36

Total	88	100

The table titled "Opportunities for Farmers and Traders Faced by Vegetable Supplier" presents various opportunities along with their frequency and percentage representation.

Direct-to-Consumer Sales: With 22.72% of respondents identifying direct-to-consumer sales as a vital opportunity, it indicates strong support for this sales model among farmers and traders. This approach is seen as crucial for enhancing their business operations. This opportunity has the highest frequency, indicating that a significant number of respondents (20) believe that direct sales to consumers are a vital opportunity. This approach allows farmers and traders to increase profit margins by eliminating intermediaries. By selling directly to consumers, farmers and traders can bypass intermediaries such as wholesalers and retailers. This reduction in the supply chain allows them to retain a larger share of the sale price, leading to improved profitability.

Value-Added Products: The 22.72% frequency indicates that value-added products are perceived as equally important as direct-to-consumer sales, highlighting a strong interest among respondents in this opportunity. Tied with direct-to-consumer sales, this opportunity also shows strong interest. Respondents see potential in creating products that offer enhanced value, such as processed or packaged vegetables, which can attract higher prices and new markets. Value-added products can open doors to new market segments, including grocery stores, restaurants, and online platforms. This diversification can help stabilize income streams and reduce reliance on traditional agricultural markets.

Cooperatives and Collaborations: The 17.04% frequency indicates a significant number of respondents see value in forming cooperatives or partnerships. This suggests that many recognize the advantages of collective action in the agricultural sector. This opportunity suggests that many respondents recognize the benefits of working together, whether through cooperatives or partnerships, to improve bargaining power and resource sharing. Working together can help mitigate risks associated with market fluctuations, crop failures, and other uncertainties. Shared resources and knowledge can provide a safety net for members, enhancing overall stability.

Sustainable Practices: The 11.36% frequency indicates that a significant number of respondents (9 individuals) recognize sustainability as an important opportunity. This reflects a growing awareness of environmental issues within the agricultural community. A notable number of respondents (9) see sustainability as a key opportunity. Implementing eco-friendly practices can enhance brand reputation and cater to the growing consumer demand for sustainable products. By positioning themselves as sustainable producers, farmers and traders can differentiate their products in a crowded market. This can attract consumers willing to pay a premium for sustainably sourced goods.

Diversifications of Crops: The 14.77% frequency indicates that a notable number of respondents recognize crop diversification as a vital opportunity. This emphasizes its strategic importance in modern farming practices. This opportunity emphasizes the importance of growing a variety of crops to reduce risk and meet diverse market demands. It reflects a strategic approach to farming that can lead to resilience and profitability. Diversifying crops helps mitigate risks associated with market fluctuations, pests, diseases, and climate variability. By growing various crops, farmers can protect their income against the failure of a single crop.

Access to Technology: The 11.36% frequency indicates that a notable group of respondents (10 individuals) acknowledges technology as a critical factor for enhancing operations. This reflects a growing understanding of its impact on the agricultural sector. A smaller but significant percentage of respondents (10) recognize the importance of technology in improving efficiency and productivity within farming and trading operations. Technology can enhance productivity by optimizing resource use, improving crop yields, and enabling better management practices. Tools such as precision agriculture, data analytics, and automation can help farmers maximize output. **Online Marketing and Sales:** The 11.36% frequency indicates that a considerable number of respondents recognize the growing importance of online marketing and sales. This reflects an awareness of the shifting landscape in consumer purchasing behaviors. This opportunity highlights the shift towards digital platforms for marketing and sales.

4.7. Econometric Analysis

4.7.1. Determinants of Vegetables Market Supply

The probable variables expected to influence volume of marketed supply and which were included in the estimate of the market supply equation were post-harvest handling/value addition, Age of household head, education level of household head, experience of production specifically, access to market, access to market information, price, access to extension service, access to credit and sex of the household head. Multiple linear regression models were employed to estimate marketable supply factors. Before estimating the multiple linear regression models, it was necessary to check for different method of test such as multicollinearity, normality and model fitness.

Test for Multi-collinearity: the variance inflation factor (VIF) was employed to test the existence of multi-collinearity problem among explanatory variables.VIF shows how the variance of an estimator is inflated by the presence of multi-collinearity (Gujarati, 2003). All values are less than 10. This indicates the absence of serious multi-collinearity problem among independent continuous variables. Similarly contingency coefficient is used to check multi-collinearity between discrete variable. The value ranges between 0 and 1, with 0 indicating no association among or between the variables and value close to 1 indicating a high degree of association. Hence, if the value of CC is greater than 0.75 the variables are said to collinear Guajarati (2003).Consequently, for this study, contingency coefficient (CC) results indicated absence of serious multi-colliniarity problem among the independent dummy variables.

Test of Normality: the main assumption of the multiple regression models that guarantee the validity of all tests (**p, t and F**) is that residuals behave „normal". **i).** A non-graphical test is the Shapiro-Wilk test for normality. It tests the hypothesis that the distribution is normal; in this case the null hypothesis is that the distribution of the residuals is normal. If the P-value is less than the usual 0.05 threshold, therefore we have to reject the null hypothesis. We conclude then that residuals are not normally distributed. The p-value is 0.00000 (less than the usual 0.05 threshold) we have to reject the null. Therefore, here below we conclude then that residuals are not normally distributed. **ii)**. with graph the residual is not well distributed normally. If residuals donot follow a „normal" pattern then you should check for other tests

like goodness of fit test. In practice normality does not represent much of a problem when dealing with really big or large samples usually more than 50, and is mostly considered as assumption. Since the researcher used census survey in this research Normality was not tested.

Goodness of fit Test: The overall goodness of fit of the regression model is measured by the coefficient of determination ($\boldsymbol{R^2}$). It tells what proportion of the variation in the dependent variable explained by the explanatory variable. $\boldsymbol{R^2}$ lies between 0 and 1, the closer it is to 1, and the better is the fit.

Source	Ss	df	MS
Model	1209.6169	10.0	120.96169
Residual	494.006284	127	3.8898132
Total	1703.62319	137	12.4352058

Numbers of obs	= 138	R-squared	= 0.7100
F (10, 127)	= 31.10	Adj R-squared	= 0.6872
Prob> F	= 0.0000	Root MSE	= 1.9723

Quantity supplied quintals	Coefficient	Std. err,	T	p> /t/	[95%conf.	interval]
Postharvest value addition	. 5907216	.4855451	1.22	0.226	-.3700844	1.551528
Age of household head years	-.0494806	.0280953	-1.76	0.081	-.1050761	.006114
Education level	1.065513	.3015604	-3.53	0.001	-1.662247	-.468779
Experience on production	.0762595	.0502714	1.52	0.132	-.0232186	.175737
Access to market	-.1241592	.1553957	-0.80	0.426	-.4316591	.183340
Access to market information	2.150499	.624911	3.44	0.001	.9139126	3.387085
Price of vegetables	.363602	.0044727	8.33	0.000	.0275095	.0452109
Access to extension	1.600864	.6312941	-2.54	0.012	-2.850081	-.351646
Access to credit	.5528225	.5041424	1.10	0.275	-.4447843	1.550429
Sex of household head	.9650912	.4722819	2.04	0.043	.0305305	1.899652
-cons	-7.062689	2.772039	-2.55	0.012	-12.54805	-1.57732

Table 10: Stata results

R-squared (R2=0.7100):-This indicates that approximately 71.00% of the variability in the quantity supplied of vegetables can be explained by the independent variables included in the model. This suggests a strong relationship between the predictors and the dependent variable. The value reflects a strong relationship between the predictors (independent variables) and the dependent variable (quantity supplied). A higher R-squared indicates that the model captures a significant portion of the underlying patterns in the data. The relatively high R-squared value suggests that the model can be considered reliable for understanding and predicting vegetable

supply based on the included variables. Stakeholders can use this information to make informed decisions.

Adjusted R-squared: (R-adj=0.6872):- The adjusted R-squared value of 0.6872 modifies the R-squared to account for the number of independent variables in the model. This adjustment is important because adding more predictors can artificially inflate the R-squared value, even if they do not contribute meaningfully to the model. This value adjusts for the number of predictors in the model, indicating that the model still explains a significant portion of variability once the number of predictors is taken into account. Although the adjusted R-squared indicates a good model fit, there might still be opportunities to refine the model. Identifying and including more relevant predictors could potentially improve the adjusted R-squared further. An adjusted R-squared value of 0.6872 indicates that the model effectively explains a significant portion of variability in vegetable supply, even after adjusting for the number of predictors. This suggests that the chosen independent variables are relevant and contribute meaningfully to the model's explanatory power, while also highlighting opportunities for further refinement.

Education Level years (Coef=1.065513).The coefficient of 1.065513 indicates a positive relationship between education level (measured in years) and the dependent variable. Specifically, each additional year of education is associated with an increase of approximately 1.065513 units in the outcome variable. This suggests that higher education levels positively influence the outcome variable. Education level indicates that each additional year of education is positively associated with the outcome variable, suggesting that higher education levels contribute to improved performance. This underscores the value of education in fostering better decision-making and outcomes in the agricultural context.

Access to Market Information (Coef=2.150499). The coefficient of 0.8724 indicates a strong positive relationship between access to market information and the dependent variable. Specifically, improved access results in an increase of approximately 0.872 units in the outcome variable. Improved access to market information leads to an increase of about 0.872 units in the dependent variable. This highlights the importance of information for better outcomes. Access to market information can also facilitate broader participation in markets.

By understanding market trends and demands, more individuals may be encouraged to engage in trading and supply, contributing to overall market dynamism.

Price of Vegetables ETB (Coef=-0.363602). The coefficient of -0.363602 indicates a negative relationship between the price of vegetables (measured in Ethiopian Birr) and the dependent variable. Specifically, for every unit increase in vegetable prices, the dependent variable decreases by approximately units. For every unit increase in the price of vegetables (in Ethiopian Birr), the dependent variable decreases by approximately -0.363602 units. This indicates a negative relationship, suggesting higher vegetable prices may adversely affect the outcome. While the negative relationship is significant, it's essential to consider other economic factors that may influence both price and the dependent variable. Factors such as income levels, availability of substitutes, and overall market conditions should be analyzed for a comprehensive understanding.

Sex of Household Head (Coef=0.9650912). The coefficient of 0.9650912 indicates a positive relationship between the sex of the household head and the dependent variable. Specifically, if the household head is male (assuming male is coded as a certain value), the dependent variable increase by approximately 0.9650912 units compared to households headed by males. This suggests that, on average, male-headed households may experience higher outcomes in the context of the dependent variable. This could reflect underlying socio-economic dynamics, cultural factors, or differences in resource allocation and decision-making between male and female heads of households.

Access to extension (Coef=1.600864). This indicates that improved access to extension services is associated with an increase of approximately 1.600864 units in the dependent variable (likely related to the quantity supplied of vegetables or another relevant outcome). The positive coefficient suggests that greater access to extension services positively influences the dependent variable. This implies that farmers who have better access to agricultural extension services benefit from enhanced information, resources, and support, which can lead to improved productivity or decision-making. The positive impact of access to extension services highlights the critical role that agricultural extension plays in supporting farmers.

Effective extension services can lead to better farming practices, increased yields, and overall improved outcomes for producers.

Confidence Intervals: The **[95% Conf. Interval]** provides a range in which we can be 95% certain the true coefficient lies. If this interval does not include zero, it further supports the significance of the variable**.**"Range of Values" The CI provides a range (lower bound and upper bound) within which we are 95% confident that the true population coefficient lies. For example, if the CI is (1.5, 3.0), we can be 95% confident that the actual coefficient is between 1.5 and 3.0."Significance if the entire confidence interval does not include zero, it indicates that the variable is statistically significant at the 5% level. This means there is strong evidence to suggest that the variable has an effect on the dependent variable, and it is unlikely that this effect is due to random chance. "Practical Implication" A significant coefficient implies that changes in the independent variable are associated with changes in the dependent variable. For instance, if the CI is (1.5, 3.0), we could interpret it to mean that for every one-unit increase in the independent variable, the dependent variable is expected to increase by between 1.5 and 3.0 units. Overall, a 95% confidence interval that does not include zero reinforces the validity of the relationship between the variable and the outcome being studied.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

This study was to analyze the marketing system of vegetables Chain in Shashogo District, Hadiya Zone of the Central Ethiopia Regional States. The specific objectives included assessing market, analyzing the production and marketing support services of extension, input supply, credit and marketing and identify the opportunities and constraints of production and marketing. A very wide number of respondents at all stages of the market channel were interviewed. The most cited reasons include lack of market oriented production which is too traditional and poorly supported by scientific recommendations, excessive margin mainly due to inefficient and costly transport, absence of vegetables market information, inadequate government interventions and its marketing activity is principally attributed to poor farmers skill. Although comparative rewards such as: suitable agro-ecology, proximity to national market and cheap provision of labor are opportunities, poor market integration, absence of improved technologies and provision of extension packages are major factors that hindered production-marketing task of vegetables With existing prominent organic production the product is not yet certified in the study area.

Both descriptive and econometric analyses were employed to achieve objectives of the study. Descriptive analysis was employed to present the data using frequency and percentage while the multiple linear regression models was employed to determine the determinant factors of vegetables market supply. Therefore, a number of actions need to be undertaken in order to promote the development of vegetable market chain. This particularly includes, capacity building, technological applications, improved extension and plant breeding activities. Infrastructural development is also a key to support the sub-sector. In this arena, emphasis should be given to improved storage and transportation.

Some findings on the study are as follows: The overall result has thus indicated household heads are prone to use resources with expected positive effect on product participation and production surplus, the educational background of the sample household head is an important feature that determines the readiness of household heads to accept new ideas and innovations

and The basic reasons why farmers do not use improved varieties where due to timely unavailability, lack of information and expensiveness of the input.

5.2. Conclusions

The analysis highlights key production constraints faced by vegetable suppliers, primarily a lack of information on production inputs and poor economic conditions. These issues lead to suboptimal farming practices, reduced yields, and financial instability. Additionally, high seed costs, insufficient packaging materials, limited access to credit, and labor availability further hinder productivity. Addressing these interrelated challenges through targeted interventions—such as education, improved financial access, and better packaging solutions—could significantly enhance efficiency and output in the vegetable supply chain.

The marketing constraints faced by vegetable growers include a significant lack of organized marketing strategies, which limits their ability to reach consumers and maximize profits. Inadequate storage facilities and transportation issues contribute to spoilage and restricted market access, further impacting profitability. High transportation charges add financial pressure, while a long chain of intermediaries reduces growers' earnings. Additionally, low prices and a lack of market information hinder financial sustainability. Addressing these constraints through improved marketing strategies, storage solutions, and access to market data could enhance growers' profitability and market presence.

The result of multiple linear regression model show that education level of the household, access to market, access to market information and price of the vegetable determine quantity to market. Availability of the needed natural and human resource, increasing demand of vegetables and long years experience of vegetable production and marketing of producers were identified as the major opportunities in the Shashogo District. The major marketing constraints were also identified as lack of credit, lack of market information, lack of demand at one season and shortage of supply at the other season, and problem of market information.

5.3. Recommendations

The recommendations are about to improve the marketing system in Shashogo District includes based on production and market oriented activities. The following explanation tries to put these recommendations accordingly:-

- Enhance Education Programs**:** Focus on improving educational opportunities for farmers to enhance their decision-making and agricultural practices, as higher education levels positively influence market supply.
- Improve Access to Market Information**:** Develop systems to provide farmers with timely and relevant market information, facilitating better engagement and participation in markets.
- Stabilize Vegetable Prices**:** Implement policies to stabilize vegetable prices, as higher prices negatively affect supply. Consider subsidies or price supports during peak production periods.
- Strengthen Extension Services: Invest in agricultural extension services to provide farmers with essential resources and support, improving their productivity and decision-making.
- Address Gender Disparities: Create programs that empower female-headed households, ensuring equitable access to resources and opportunities to enhance their market outcomes. By focusing on these areas, stakeholders can significantly improve vegetable supply and farmer livelihoods.

Therefore, All Stakeholders should be great need to make information available to farmers at the right time and place in response to this challenge; also it should be good to developing an integrated agricultural marketing information system that will be linked to District information center, and to link them to government's program.

CHAPTER SIX

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CHAPTER SEVEN

7. APPENDEX

A QUESTIONNAIRE PREPARED FOR ANALYZES OF VEGETABLE MARKETING SUPPLY: THE CASES OF THE SHASHOGO DISTRICTS, HADIYAZONE, ETHOIPIA.

Date_____

Woreda (district) _____Kebele _____

Respondent's name (Farmer's)_____

I. Respondent's Socio-Economic Characteristics

1. Sex Male 0. Female 1
2. Age _____ Years.
3. Ethnicity: 0. Hadiysa 1. Amharic 2.Others (Specify)_____
4. Religion: 0. Muslim 1. Orthodox Christian 2. Protestants 3. Others (Specify)_____
5. Marital status: 0. Married 1. Single 2. Divorced/separated 3. Widowed/widower 4. Others (Specify)_____
6. Education level: 0. Illiterate 1. Read and write 2. Elementary complete 3. Junior complete 4. High school complete & above.
7. Farming experiences; Number of years since started farming _____years
8. Do you have any other occupation in addition to farming?0. Yes 1. No

II. Area Information

1. Distance of your residence from the nearest market center from farm gate _____ Km or _____ walking time (minutes/hrs.').

2. Distance of your residence to the nearest development center _____walking time (Minutes).

3. Major means of income (in rank) f or all crop production (in rank) for perennial vegetables (in rank)Vegetable production _____ Teff production _____Wheat production _____

Fruit production _____Livestock production _____Other sources _____

4. Is supply of labor a problem during production? 0. Yes 1. No

III. Production

1. What was your input for vegetables production and their sources in past yours?

0. DAP____ 1. Urea____2. Compost____(Kg)3.Manure_____ (Lt) 4. Pesticide_____ (Lt) 5.Seed (Nursery seedling) _____

2. Is supply of labor a problem during production? 0. _Yes 1. _ No

3. What is the labor source for vegetables?0. Familylabor 1. Hired labor

2. Labor exchange 3. Cooperation 4. Cooperatives

4. What are the constraints in the vegetables production? Rank horizontally?

0. Crop Insects Disease 1. Seedling Shortage 2. Fertilizer shortage 3. Theft

IV. Access to Services

1. Did you have extension contact in relation to vegetables production in the past seasons?

0. Yes 1. No

2. If yes, how often the extension agent contacted you specifically for vegetables production and marketing purpose in the past year?0. Weekly 1. Once in two week 2.Monthly3.Twice in the year4. Once in a year 5. Any time I ask them

3. Did you need credit in the past year? 0. Yes 1.No

4. If yes, have you received credit in past for vegetable production purpose? 0. Yes 1. No

5. If yes, how much did you take for vegetable production purpose? ---------- In Birr (ETB)

6. From whom did you get credit for vegetable production? _

0. Relative 2.Bank 4.Micro finance institution 6. Friends

1. Traders 3.NGO 5.Peasant association 7. Others (specify) --------

V. Marketing Aspect

1. Amount of vegetables supplied to the market and market agents in the past years?

I. Where the Crop to sell? 0. Farm gate 1. Local market 2.Town Distance to market (km)
II. What Transport to used? 0. On donkey 1. Vehicle 2.Onfoot (Being carried)
III. To whom do you sell? 0. Wholesaler 1.Retailer 2.Consumer 3.Processors 4.Brokers 5. Local collector

2. How do you get market price information of vegetables?

3. Did you know the nearby market price before you sold your vegetables? 0. Yes 1. No

7. Does your produce have preferred quality by buyers in the past years? 0. Yes 1. No

8. If no, what interventions are needed to attract better price 2015? _____

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. vif
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Variable	VIF	1/VIF
PriceofVeg~B	5.34	0.187260
AccesstoMa~m	3.00	0.332792
Education~04	2.92	0.342212
Experience~s	2.78	0.360070
AccesstoE~01	2.35	0.426108
AccesstoC~01	2.03	0.493813
PostHarve~01	2.02	0.495846
SexofHous~01	1.95	0.512371
AccesstoMa~0	1.64	0.607954
AgeofHouse~s	1.55	0.646866
Mean VIF	2.56	

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. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of QuantitySuppliedquintals

         chi2(1)      =     0.78
         Prob > chi2  =   0.3787
```