



SCHOOL OF GRADUATE STUDIES

**MARKET CHAIN ANALYSIS OF WHEAT IN HAGEREMARIAM
KESEM DISTRICT, NORTH SHEWA ZONE, ETHIOPIA**

MSc THESIS

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JANUARY, 2024

WOLKITE, ETHIOPIA

Wolkite University
School of Graduate Studies

**Market Chain Analysis of Wheat in Hageremariam Kesem District North
Shewa Zone, Ethiopia**

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

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DEDICATION

I dedicate this thesis manuscript to my loving mother, Zewudnesh Ayele who sacrificed many things and enables me to reach up here and remaining families who have always give me moral support to study.

STATEMENT OF THE AUTHOR

I declare by my signature that this thesis is my own work and I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this thesis. All sources materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfilment of the requirements for M.Sc. degree at Wolkite University. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate. Brief quotations from this thesis are allowable without special permission provided that accurate acknowledgement of source is made.

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BIOGRAPHICAL SKETCH

The author was born in August 24, 1991, in North Shewa zone Hageremariyam Kesem district Debretsge kebele. She attended her elementary education in Bulga Elementary School from 1998 to 2005 and secondary and preparatory education in Bulga secondary school from 2006 to 2009 E.C. In 2010, she joined Wolkite University and graduated with BSc degree in Agribusiness and value chain management in 2013. After graduation, she was employed by Wolkite University Assistance lecture. After this, she joined Wolkite University, school of graduate studies for the degree of Master of Science in agribusiness and value chain management in November 2014.

ACKNOWLEDGEMENTS

First of all, I would like to express my inestimable gratitude to Almighty God and the mother of God St. Virgin Mary, who always helped me in all circumstances and give everything in reaching me to this position to finish my final thesis.

I would like to acknowledge the entire staff of the department of agribusiness and value chain Management, Wolkite University for their sincere and honest support. Special thanks also go to my major Advisor Bizualem Assefa (Asst.prof.) and co- advisors Dr. Desalegn Gachena for their, guidance, and constructive criticism during my final thesis. Without their encouragement, insight and professional expertise, the completion of this work would not have been achieved.

ABBREVIATION AND ACRONMYS

CSA	Central Statistical Agency
CR	Concentration Ratio
FAO	Food and Agriculture Organization
GMM	Gross Marketing Margin
HKWARDO	Hageremariam Kesem Woreda Agricultural and Rural Development Office
MLE	Maximum Likelihood Estimation
MVP	Multivariate Probit
OLS	Ordinary Least Squares
SNNPR	Southern Nations Nationalities and Peoples Region
S-C-P	Structure Conduct Performance
TGMM	Total Gross Marketing Margin
2SLS	Two -Stage List Squares
USAID	United States Agency for International Development

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Market Chain Analysis of Wheat in Hageremariam Kesem District, North Shewa Zone, Ethiopia

ABSTRACT

This study was conducted in Hageremariam Kesem District, North Shewa Zone Ethiopia as the area is known for its potential production of wheat. The aims of this study were to identify the structure, conduct, and performance of the wheat market; identify the factors that determines market supply of wheat and identify factors affecting wheat market outlet choice by smallholder farmers in Hageremariam Kesem district. Data from primary sources were used wheat producers from three randomly selected kebeles. Data from secondary sources were obtained from different published documents, internet, and district of agricultural office. Descriptive Statistics and Econometric models were used. The identified wheat market chain actors in the study area include producers, local collectors, retailers, wholesalers and consumers. Five market channels were identified for wheat in the study area with the major share of Volumes of wheat marketed to marketing through channel III (producers-wholesalers-consumers) at 676 qt (23.4%). The result from the analysis of market concentration indicated that the structure of the wheat market in Hageremariam Kesem district is a strong oligopoly with the four largest wheat traders' concentration ratios of 58.58%. Total gross marketing margin (TGMM) is highest in channel V (producers-local collector- wholesalers-retailer-consumers) at 22.6 % and lowest in channel II (producers-retailers-consumers) at 7.5%. Tobit econometric model was employed to identify the underlying determinants of wheat market supply. The result revealed that age, sex and lagged price were positively significant, while access to credit has negatively significant. Multivariate probit model for the determinants of producer market outlet choice decision was used for data analysis. The finding stress that policy aiming at offering farmers a fair price and targeting gender inclusive strategy (paying attention to women) were recommended.

Key word: wheat, concentration ratio, Tobit model, market margin.

1. INTRODUCTION

1.1. Background Information

Agriculture is the backbone of the Ethiopian economy and the growth domestic product of the country. Its economy registered was 7.7 % growth in 2017/2018, slower than the 10.9% expansion recorded in 2015/2016. This growth was attributed 12.2% rise in industrial output, 8.8 % expansion sector and 3.5% growth in agriculture (Kassa, 2017).

Wheat (*Triticumaestivum* L.) is one of the globally produced and marketed cereal crops which covers 15% of the total sowing areas of cereal crops in the world (Habtamu, 2021). It is a significant food and industrial grain that is traded internationally and ranks second importance among all cereal crops in the world, behind rice (Falola et al., 2017). Wheat is also an important crop in sub-Saharan African improving food security and generating agricultural income (Amentae et al., 2017; Minot et al., 2015). Wheat is grown in many African countries for both domestic use and export, though production and sales levels differ throughout countries. Wheat is the second-most important food, ranking behind teff (10%), sorghum (11%) and Enset (12%) and after maize (19%) (FAO, 2015).

In Ethiopia, wheat ranks fourth after teff, maize and sorghum in area coverage and third after maize and teff in total production (CSA; 2017 Minot et al., 2015). But the production of wheat is tremendously of a subsistence nature and dominated by the country's numerous smallholder farmers that cultivates more of wheat for consumption and less of it for the market (Nicholas et al., 2015).

Wheat is used to Prepare a range of traditional foods in Ethiopia, such as the traditional staple pancake of injera, fermented bread called Dabo, non-fermented bread called Hambasha/kitta, boiled grain, roasted grain, snacks made of bread flour called Dabokolo, cracked and boiled grain called Kinche, porridge, local fermented beer called Tella, and modern processed foods like pasta and macaroni (Dessale, 2019). This demonstrates that wheat is a significant market-oriented good and a significant source of income for many wheat growers in Ethiopia.

Market chain analysis aims to determine the link between the key participants in the supply chains for commodities as well as along the market chain for the actors' advantage. The

wheat market chain involves a wide range of participants, including smallholder farmers, wholesalers, retailers, brokers, processors, cooperatives, the government, and private consumers take part in the wheat market chain (Addisu, 2016).

Hageremariam Kesem district is endowed with Favourable climatic and natural resource conditions for cereal crops and livestock product. The major crops produced in the study area includes wheat, Teff, chickpea, barley, pea, vetch and beans. Wheat is the main crop in the Hageremariam Kesem district mostly for consumption and market because of the high price afters to teff, peas and beans (HKWARD0, 2022).

1.2. Statement of the Problem

A major driver of economic growth, agricultural marketing influences the production and distribution of agricultural goods in a directing and stimulating way. More organized routes for processing and distributing agricultural products are necessary due to the rising levels of income and the proportion of the population living in urban center. Low producer prices and high consumer prices both have an impact on Ethiopian farmers, particularly in the northern areas and the country as a whole. Grain marketing in Ethiopia is characterized by limited institutional support and inadequate infrastructure, despite the potential for production and growing demand for grain (Dessale, 2019).

According to data from the Agricultural and Rural Development Office's annual report for Hageremariam Kesem district year (2021/22), the majority of smallholder farmers in the study area grow and market wheat primarily as a food and cash crop. Even though there is an upward tendency in wheat production, wheat marketing is characterized by an inefficient market. The price of wheat was increased year to year. The importance of markets opportunity for farm households and other rural enterprises to sell farm output tap farmers into a range of public and private services like credit and extension services. The more accessible the markets were the greater the rural populations capability to remain economically self-sufficient (Tigist, 2015).

Due to low investment in the market infrastructure, segmentation of markets, persistence of high margins and limited progression move Africans towards more complex arrangements. Because of these and other factors like inefficient and costly transport services farmers do not get the right share of consumer price. In the absence of well-developed markets, marketing facilities and marketing efficiency, farmers are not a profit by selling their increased marketable surplus to traders in the market as they get low prices due to

insufficient time, knowledge and skills for the precise marketing of their produce (Dessale, 2019).

In particular, fertilizer costs are periodically rising and it becomes out of the purchasing capacity of the farmers, Lack of institutional services, inadequate storage facilities, farmers' weak bargaining power, wheat production and marketing potential are underdeveloped due to a limited supply, and a lack of market information contribute to under exploitation of wheat production and marketing potential land shortage, low level of irrigation, weak market linkage among market chain actor, lack of improved processing and storage technologies are the major problem in wheat production and marketing (HKWARDO, 2022).

Different researchers published their findings on the value chain and market chain analysis of wheat in different parts of Ethiopia. Woynishet and Hiwot (2018) on analysis of bread wheat market chain in Lemo woreda, (Habtamu, 2021) on market chain analysis of wheat in Masha woreda, (Sultan, 2016) on value chain analysis of wheat in Sinana. Even if the area is potential for wheat production, integrated and adequate information on the market chain of wheat is not well identified in the study area.

But, in opposite to these problems, available opportunities such as government policy, expansion of market supply of wheat, awareness creation for wheat farmers through training on Value adding activities, intervention on the expansion of irrigable land, increasing demand for wheat and potential of the area for wheat production and marketing encourage wheat producers and traders to engage in wheat production and marketing activities. Hence, to address the stated gaps, this study was aimed to identify the structure, conduct, and performance of wheat market, identify the factors that determine wheat market participation and volume of market supply of wheat and identify factors affecting market outlet choice by wheat smallholder farmers in Hageremariam Kesem district.

1.3. Objective

1.3.1. General objective

The overall objective of this study is to conduct market chain analysis of wheat in Hageremariam Kesem woreda of north Shewa zone, Ethiopia.

1.3.2. Sepecific objectives

- To identify the structure, conduct, and performance of wheat market in the study area
- To identify the factors that determines market supply of wheat in Hageremariam Kesem district
- To identify factors affecting market out let choice by wheat smallholder farmers in Hageremariam Kesem district

1.4. Basic Research Questions

The study is intending to answer the following research questions

1. How is the structure, conduct, and performance of wheat market in the study area?
2. What are the factor affecting of market participation and volume of market supply of wheat in smallholder farmer in the study area?
3. What are the major factors affecting wheat producers' market outlet choice decision in the study area?

1.5. Significance of the Study

The information from this study was expected to assist market participants and policymakers. Understanding the variables that affect the intensity of smallholder farmer wheat market supply will assist policy makers to create the policies needed to increase household income profitability of wheat, buyer and seller performance, potential barriers to entry for wheat marketing the various market outlets available to wheat producers. It might also be used as a source of reference material for further researches in the area.

1.6. Scope and Limitation of the Study

1.6.1. Scope of the Study

Geographically this study was delineated on only Hageremariam Kesem district of north Shewa zone. This study was focused on identify the market chains by identifying factors that affect the supply of wheat to the market and producers market outlets choices using cross-sectional data which were collected from three kebeles of Hageremariam Kesem district.

1.6.2. Limitation of the study area

The study was used in similar situation of the district, geographically limited to represent wider area, budget limitation, conflict of the district and lack of any studies conducted focusing on the district.

1.7. Organization of the Thesis

The thesis has been organized into five chapters. The first chapter includes background, statement of the problem, basic research questions, objectives, significance of the study, scope and limitation of the study. Chapter two presents literatures review of theoretical, empirical and conceptual framework. Chapter three discusses the 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. Chapter four the descriptive and econometric results and discussed them in detail. Chapter five summarizes the main findings of the study and draws conclusions and recommendations.

2. LITERATURE REVIEW

This chapter highlights definitions and basic concepts, Theoretical review, Approaches to study Agricultural marketing, Empirical review structure conduct and performance of wheat market, determinants of market supply and producers market outlets choice, and conceptual framework for the study.

2.1.Theoretical Reviews

2.1.1.Basics of market

Market: It is the collection of buyers and sellers through their actual or potential interactions to determine the price of a product or set of products. The concept of a market is linked to the degree of communication among buyers and sellers and the degree of substitutability among goods. Market means a social institution that performs activities and provides facilities for exchanging commodities between buyers and sellers. Economically the term market refers not to a place but commodity, buyers and sellers; hence they freely interact with one another (Kotler and Armstrong, 2003).

Marketing: It is the process of planning and executing as a social and managerial process by which individuals and groups obtain what they want and need through creating and exchanging products and values with others. Marketing is the set of economic and behavioral activities that are involved in coordinating the various stages of economic activities from production to consumption pricing, promotion, and distribution of ideas, goods and services to create an exchange that satisfies individual and organizational goals (Lunndy et al., 2004).

Marketing system: It is defined as the sequential set of kinds or types of business firms through which a product passes during the marketing process. It is usually seen as a system because it comprises several, usually stable, interrelated structures that, along with production, distribution, and consumption, underpin the economic process (Mendoza, 1995).

Agricultural marketing: It is defined as agriculturally oriented marketing. It includes all operations and institutions involved in moving farm products from farms to consumers (Pritchard, 1969). According to Branson and Norvell (1983), agricultural marketing covers all the activities related to agricultural production and food, feed, and fiber assembly, processing, and distribution to the final consumer, including analysis of consumer needs, motivations, and purchasing and consumption behavior.

Marketing channels: It is a business structure of the interdependent organization that reaches from the point of product origin to the consumer to move products to their final consumption destination (Kotler and Armstrong, 2003). This channel may be short or long depending on the kind and quality of the products marketed.

Market chain actors: These are individuals or groups who involves directly in productions, processing, trading or consuming a particular agricultural product that are producers, traders, retailers, consumers or indirectly provide financial and non-financial services such as a bank, credit agencies, business service providers, government, researchers, and extensions) in the chain of production and delivering the products (KIT et al., 2006).

Market chain: The term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer. Market chain analysis, therefore, identifies and describes all points in the chain (producers, traders, transporters, processors, consumers), prices in and out at each point, functions performed at each point/

Market supply: It refers to the amount taken to the markets irrespective of the need for home consumption and other requirements whereas the market surplus is the residual with the producer after meeting the requirement of seed, payment in kind and consumption by producers at the source. To describe market supply words like marketable surplus and marketed surplus are usually used (Alene et al., 2008).

Marketable and marketed surplus: Marketable surplus is the quantity of the product left out after meeting the farmer's consumption and utilization requirements for kind payments and other obligations such as gifts, donations or charity. Thus, marketable surplus shows the quantity left out for sale in the market. The marketed surplus shows the quantity sold after accounting for losses and retention by the farmers if, and adding the previous stock left out for sale. Thus, the marketed surplus may be 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 level or during transit (Kohls and Uhl, 1985).

Market chain analysis: A marketing chain is used to describe the numerous links that connect all actors and transactions involved in the movement of agricultural products from the farm to the consumer (Lunndy et al., 2004). It is the path one good follow from their

source of original production to ultimate destination for final use. Market chain analysis describes all points in the chain (producers, traders, transporters, processors, and consumers), prices in and out at each point, functions performed at each point/ who does what? Market demand/ rising, constant, declining, approximate total demand in the channel, market constraints and opportunities for the products.

Market outlets choice: It is an important farm household-specific decision to sell their products in different market outlets for generating high returns. There are also different market outlets selected by producers to sell their agricultural products to get maximum return.

2.2. Approaches to the Study of Agricultural Marketing

Approaches to Study Agricultural Marketing Different situations involved in the demand and supply of agricultural products and the unique product characteristics, require a different approach for analyzing agricultural marketing problems (Kohls and Uhl, 1985). The major and most commonly used approaches are functional, institutional, commodity behavioral, and Structure, conduct, and performance.

Functional approach: to study marketing is to break up the whole marketing process into specialized activities performed in accomplishing the marketing process (Kohls and Uhl, 1985). The approach helps to evaluate marketing costs for similar marketing middlemen and/or different commodities and costs and benefits of marketing functions (Kohls and Uhl, 1985; and Andargachew, 1990). The widely accepted functions are exchange (buying and selling), physical (processing, storage, packing, labeling and transportation) and facilitating (standardizing, financing, risk-bearing, promoting and market information).

Institutional approach: This approach focuses on the description and analysis of different organizations engaged in marketing (producers, wholesalers, and retailers) and pays special attention to the operations and problems of each type of marketing institution. An institutional approach for the marketing of the agricultural product should be instrumental in solving the three basic marketing problems, namely consumers demand for agricultural products, the price system that reflects these demands to producers and the methods or practices used in exchanging title and getting the physical product from producers to

consumers in the form they require, at the time and place desired (Kotler and Armstrong, 2003).

Behavioral approach: In this approach either a particular marketing firm or an organization of firms, such as the marketing channel, can be viewed as a system of behavior. Each is composed of people who are making decisions in an attempt to solve particular problems. If these problems and their behavioral systems for solving them can be classified and a greater understanding of changes that may be forthcoming can be obtained. In either the firm or the organization of firms' four major types of problems with their associated behavioral systems can be identified: input-output system, power system, communication system and adaptive behavior system (Cramer et al., 1997).

Commodity approach: In this approach, a specific commodity or group of commodities taken, and the functions and institutions involved in the marketing process are analyzed. This approach focuses on what is being done to the product after its transfer from its original production place to the consumer. The approach follows the commodity along the path between the producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently. Because to address marketing problems for specific commodities. Therefore, the Commodity approach will be used for this study as a guideline to study the wheat market chain in the study area.

2.3. Analytical Framework of the Study

2.3.1. Structure, conduct and performance (S-C-P) of market

The Structure-conduct-performance approach was served as a tool to evaluate the performance of the marketing system. The approach distinguishes between three related levels; the structure, conduct and performance of the market (Cramer et al., 1997).

Structure of the market

Market structure is characterized by features of a market's organization that appear to strategically influence the nature of competition through price behavior inside the market (Kohls).Uhl, 1985 ;). Market classification may be based on structural factors. The degree of seller concentration, the degree of buyer concentration, the degree of product differentiation and the condition of entry are the four key characteristics of market structures

(Kotler and Armstrong, 2003). Markets can be completely competitive, monopolistic, oligopolistic or monopolistic depending on these factors.

Market concentration displays the number of buyers and sellers in a market and their relative sizes (Abbott and Makeham, 1981). The widespread consensus is that increased market concentration indicates non-competitive behavior, which leads to inefficiency.

The concentration ratio (CR) shows how big K-large enterprises are in relation to the entire industry. It reveals whether a sector is dominated by a limited number of large companies or many smaller ones. Indicators of the relative size of businesses in relation to the industry as a whole are also based on CR_k (Kohls and Uhl, 1985). The issue with this index is that it is rather arbitrary to concentrate on the market shares of the top four companies.

Conduct of the market

The methods that businesses use in relation to price, product and promotions, as well as the connections and interconnections between and among businesses, are referred to as the market's conduct. A frequent tactic is to work with dependable partners, maintain long-term relationships with customers and suppliers, use middlemen and conduct business within specialized networks (Abah et al., 2015). According to Kohls and Uhl (1985), conduct is a pattern of conduct that enterprises adhere to in order to adopt or adjust to the market in which they sell or purchase or to put it another way, the tactics of the actors participating in the market.

Market conduct examines how businesses in price-searching industries should behave differently from those in price-taking industries (Abbott and Makeham, 1981). However, there are no established methods for examining the components of market behavior. More particularly, it addresses the following subjects: formal and informal distinctions

The availability of price information and its impact on the current price, the distance from the major market and its impact on the price, the feasibility of using alternative market outlets, marketing groups that support such practices, formal and informal producer groups that affect bargaining power (Hugo et al., 2016). The conduct of the wheat market was evaluated in this study using the availability of information regarding producers' and traders' buying and selling tactics, their capacity to adapt to the market in which they sell or buy and their experience with storage and processing.

Performance of the Market

Market performance refers to financial outcomes, including product efficacy (fitness with customer preferences), the ratio of earnings to marketing expenditures and margins, seasonality and price integration within markets, and the rate of profits. One might conceive causal relationships where the structure dictates the conduct, and the conduct and performance are interdependent (Cramer et al., 1997). By examining the costs and margins of marketing agents in various channels, it is possible to assess the performance of the market for a specific commodity.

Marketing costs: are the expenditure incurred by various market intermediaries from the time when commodity leaves the farm until it reaches the consumers (Wisdom et al., 2014). It is the cost of performing various marketing functions, which are required to transfer a commodity from the place of production to the ultimate consumers. Such costs are necessarily incurred to create form, time, place, and possession utilities in the products to make them marketable. To determine whether the marketing margins (amount received by the different marketing agencies for providing their services) will be reasonable, it will be essential to calculate the costs of these agencies. The costs incurred by the producers and other marketing intermediaries have an impact on prices as well as on the margins of the market intermediaries (Wandschneider and Yen, 2006).

Marketing margins: A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain (Mendoza, 1995). The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between consumer price and farm gate price. The marketing margin in an imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit. A wide margin means usually high prices to consumers and low prices to producers. But marketing margins can also be high, even in a competitive market due to high real market costs. Marketing margin can be a useful descriptive statistic if it is used to show how consumers' expenditure is divided among market participants at different levels of the marketing systems (Jema, 2008). It is a commonly used measure for the performance of the marketing system.

2.4. Factors Affecting the Volume of Market Supply

Different studies employed different models to identify factors that affect the marketed supply of wheat (Hasen, 2016 and Muhammed, 2014). The commonly used ones are the well-known multiple linear regression, Tobit, Double Hurdle, and Heckmans sample selection models. Heckman models was used to examine market supply if some households may prefer not to participate in a given market in favour of another, while others might be excluded by market conditions. By grouping the respondents into suppliers and non-suppliers using the Tobit model, the volume of market supply may be examined.

If and only if every household takes part in the marketing of the desired commodity, the OLS model is appropriate. When using the OLS model and excluding non-participants from the analysis, selectivity bias is introduced into the model because it is not expected that all households will participate in the marketing of the commodity. These problems have been addressed by Heckmans two-stage techniques, Tobit, Double Hurdle, and others. Probit and logit models are capable of analyzing the only selling probability, which is the only probability that needs to be examined.

2.5. Determinants of Producers Market outlets choice

When selecting whether or not to enter a certain market, a producer evaluates the expected return on investment while also accounting for transaction costs (Urquieta, 2009). Farmers will thus select markets that outlet the highest returns. For the analysis of categorical choice dependent variables, econometric models like multivariate probit/logit and multinomial probit/logit are useful. Because of the independence of irrelevant alternatives assumption, which states that the ratio of the probabilities of selecting any two alternatives is independent of the characteristics of any other alternative in the choice set, the multivariate probit model is preferred over the multinomial logit model (Greene, 2012). Therefore, multinomial models are useful when people can only select one result from the set mutual exclusive collective exhaustive alternatives.

The multivariate probit approach analyses the impact of the set of explanatory variables on the selection of market outlets while also taking into account any potential correlations between unobserved disruptions and the relationships between the choices of various market outlets (Belderbos et al., 2004).

2.6. Empirical Reviews

2.6.1. Empirical review on structure, conduct, and performance

The study by Atsbaha (2015) on value chain analysis of honey in Ahferom woreda, Central Zone of Tigray Regional state showed that the honey trader's concentration ratio was found to be 76.86 % which indicated the presence of a strong oligopoly market structure in the study area. This implies that the market is controlled by few traders. Further, the study reveals that without considering producers to consumer channels, producers share was highest in channel V (beekeeping cooperatives-enticho retailers-consumers) and lowest in channel III (Individual-beekeepers-local collectors-enticho-retailers-consumers) at the percent of 87.5 and 67.1, respectively.

The study by Sultan (2016) conducted a wheat value chain in the Sinana district of Bale zone, Oromia region, Ethiopia. The study used the S-C-P model to examine the causal relationship between market structure, conduct, and performance and evaluate how efficiently the wheat market in the study area functioning. The result of the study showed that four firms dominated 88.7% of total wheat marketing that the wheat market structure at the district level is inefficient and non-competitive due to the wheat market structure is oligopolistic whereas the conduct of the market showed wheat traders are a price maker. The performance of the wheat market also indicated that without considering channel I (producers-consumers), which farmers sell directly to consumers, producers gross marketing margin is the highest in channel VIII (producers-wholesalers-retailers-consumers) that is 87.5% where producers directly sell wheat to wholesalers.

Nugusa (2018) conducted a maize value chain in Guduru Woreda, Horro Guduru Wollega zone of Oromia Regional State, and Ethiopia. The study was employed a marketing margin to analyze the performance of market channels. The result show that maize producers gross profit was high in channel IV (producers- collectors- wholesalers- consumers) when farmers sell to collectors, and channel VI (producers- cooperatives- consumers) when they sell to cooperatives and farmers captured small profit in channel II (producers- wholesalers-consumers) when they directly sell to wholesalers. The producers' market share was high in channels III (producers- collectors- consumers) and VI, which are 97.21% and 87.85% when they directly sell to collectors and cooperatives because of the involvement of a few intermediaries. From traders, wholesalers got the highest gross profit margin in channel II and V (producers- collectors wholesalers- retailers- consumers) when directly sell to

consumers and retailers respectively. It may be because of the presence of a few intermediaries in channel II.

2.6.2. Empirical review on the determinants of market supply

Accordingly Tura (2015) identified major factors that affect wheat at Tiyo and Hetosa Districts. The author studied the relationship of farm-level marketed supply of the wheat using cross-sectional data. To capture the influence of the independent variables on the marketed supply of wheat, the author adopted Tobit regression model analysis with both dummy and continuous variables. The author found out that value-adding activities, livestock holding, distance to the nearest market, land allocation to wheat, type of wheat used, perception to the lag market price, family size, and access to credit had affected the marketed supply of wheat grain.

Tadele et al. (2016), analyzed factor affecting teff and wheat market supply at Dendi Woreda, West Shoa Zone. Two types of analysis, namely descriptive and econometric analysis were used for analyzing the data collected from farmers and traders in the study area. In Multiple linear regression models, eleven explanatory variables were employed to determine the supply of teff and wheat. From this, four variable such as the quantity of teff produced, sex of household head, access to market information and access to extension services found to be significant for teff while the quantity of wheat produced, access to credit and price of other crop found to be significant for wheat.

Accordingly Adugnaw (2017) conducted on market chain of teff and analyzed determinants of teff market supply in Hulet Ej Ense Woreda, East Gojam Zone, and Amhara Region, Ethiopia. To analyze the data, both descriptive statistics and OLS methods were used. The result indicated that family size in the active labor force, number of oxen owned, land allocated for teff, frequency of extension contact, access to market information, lagged price, and quantity of fertilizer used positively and significantly influenced amount of teff supplied to the market.

Nefisa (2018) analyzed bread wheat value chain in Lanforo Woreda of Silite Zone of Southern Ethiopia. The author used both qualitative and quantitative data from primary and secondary source from 137 wheat producing respondents, traders and other responsible bodies. She also employed both descriptive statistics and econometric model to analyze the

data. The result of the 2SLS model indicated that livestock holding, the quantity of wheat produced, farming experience, lagged market price and frequency of extension contact are positively and significantly affected wheat supplied to the market.

According to Habtamu (2021), conducted on market chain analysis of wheat in the case of Misha woreda, Hadiya zone, southern Ethiopia. To analyze the data, both descriptive statistics and econometric models were used for analyzing the data collected from wheat producers and wheat market chain actors. The result of the 2SLS model indicated that access to market information, education level, landholding size, sex of household head, access to credit, frequency of extension contact were found to influence marketable supply of wheat positively and significantly. Family size and distance to the market were found to influence marketable supply of wheat negatively and significantly for wheat.

2.6.3. Empirical review on the determinants of producer's market outlets choice

A study by Shewaye (2016) found out the major factors that affect haricot bean market outlets choices in Misraq Badawacho woreda, Hadiya Zone, Ethiopia. The study employed a multivariate probit model (MVP) for the analysis and investigated that the outlet choice of rural assemblers was negatively and significantly influenced by several equines owned and use of credit and positively influenced by distance to the nearest woreda market and distance to an all-weather road. Whereas consumer outlet was positively and significantly affected by some equine owned. Urban traders market outlet was positively and significantly affected by many equines owned, membership in a cooperative, and access to price information, use of credit while negatively and significantly affected by distance to the nearest woreda market.

According to Addisu (2016), carried out to analyze the value chain of vegetables in Ejere Woreda, Oromia Region of Ethiopia focusing on potato and onion crops. The study used for the study were collected from both primary and secondary sources. The study used a MVP model with the market outlets (wholesaler, retailer, collector and consumer). The author investigated that a competitive relationship of a retailer with a consumer outlet and wholesaler outlet with retailer, collector and consumer outlets. The author investigated the major factor that affects market outlet choices of potato producers using MVP. The MVP model result indicated that, sex, education level, family size, area of land allocated for potato, farming experience, off/non-farm income, ownership of motor pump, distance to

nearest market, quantity of potato sold and selling price of potato significantly influenced potato producers choosing of market outlets for their produce.

According to Habtamu (2021), market chain analysis of wheat in Misha woreda Hadiya Zone Ethiopia. The data used for the study were collected from both primary and secondary sources. The study used a MVP model with the market outlets (wholesaler, retailer, local collector, processor and consumer). The author investigated that a competitive relationship of a wholesaler with a retailer outlet and collector with consumer outlets. The author investigated the major factor that affects market outlet choices of wheat producers using MVP. The MVP model result indicated that, education level, distance to nearest market, quantity of supply of wheat, extension contact and market information significantly influenced wheat producers choosing of market outlets for their produce.

2.7. Conceptual Framework of the Study

Market chain describes different links that connect all the actors and activities involved in the movement of agricultural products from the producer to the final consumer. Market chain analysis is an investigation of marketing problems in the market systems which tackle market chain actors. There are also determinants which mainly affect market supply of wheat marketing. These determinants can be categorized as demographic factors like sex, family size, age, and socio-economic factors like Education level and annual income and institutional factors like access to credit, extension service, mobile availability and distance to nearest market and farm characteristics like landholding size, lagged price, farm experience and quantity produce. The main approach is that a greater market supply of farmers results in more commodities being traded and this may lead to more return being obtained by the farmers.

This study focused on analyzing factors affecting producer's market outlets choice in addition to market supply and market (S-C-P). It is assumed that the selection of different wheat marketing outlets, as well as their simultaneous choose which is led by producers willingness to maximize their profit and conditional to socioeconomic, institutional, physical, and market-related factors (Habtamu, 2021; Shewaye, 2016). The increase in the volume of wheat supplied to the market leads producers to select alternative market outlets to sell their supply that maximizes their profit.

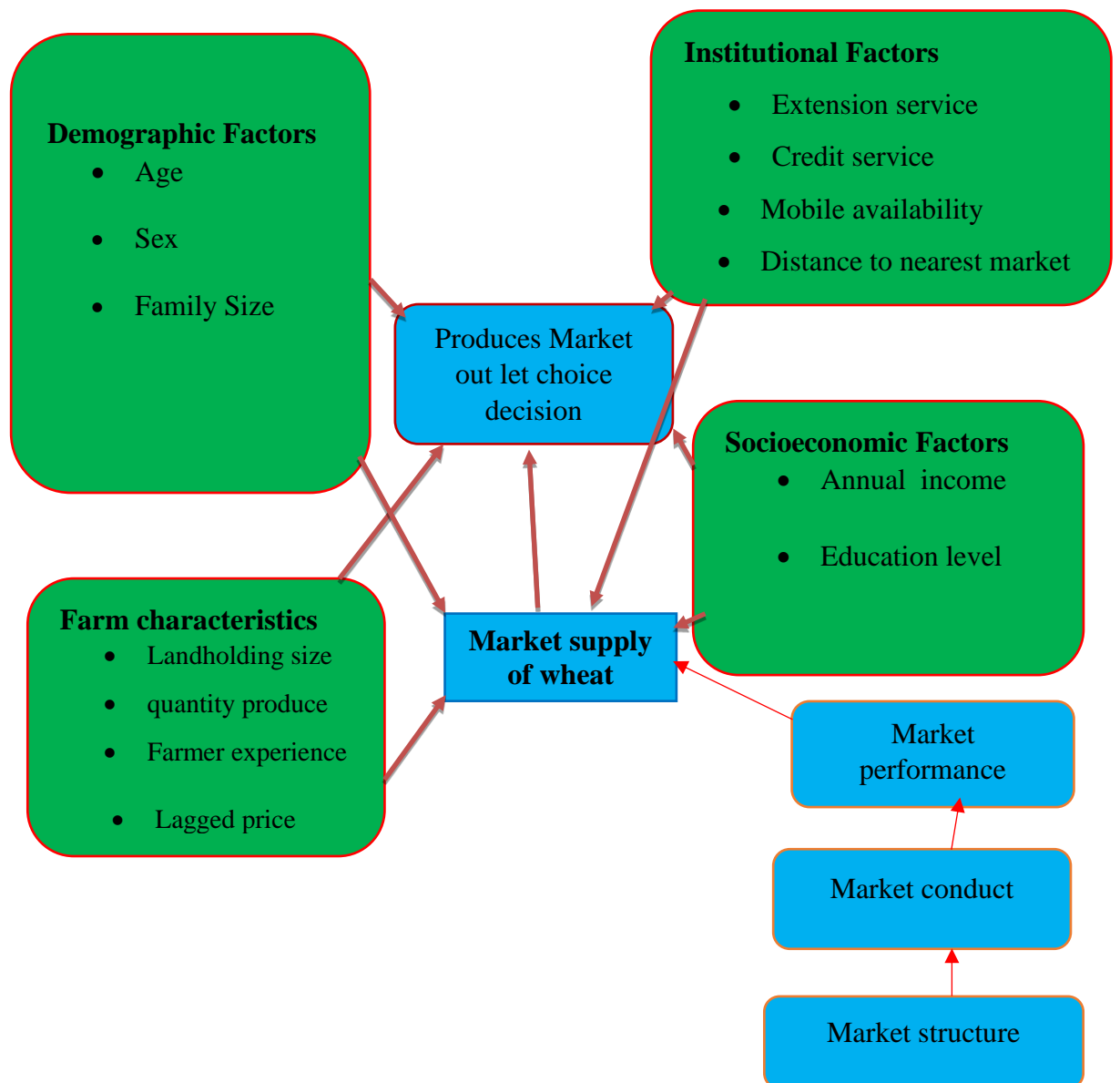


Figure 1: Conceptual framework of the study

Source: Own sketch (2022).

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

Hageremariam Kesem district is located in Amhara National Regional State north Shewa Zone. It is bordered on the South by Germama River which separates from Menjar Shenkora on the West by the Oromia region on the North by Angololla tera on Northeast by Asagirt and on the East by Berehet. The main sub town of Hageremariam Kesem District is Sholagebeya which is located at about at 130km from Addis Ababa, from regional state of Bahrdar 693km and 80kms from Debrebrhan town.

It has a latitude and longitude of 9° 19' 60.00" N and 39° 14' 60.00" E respectively and elevation between 2,833 metres (9,295 feet) meters above sea level (HKWARDO, 2022). Hageremariam kesem has a population density of 80.07, which is less than the zone average of 115.3people per square kilometre. The majority of the Inhabitants practiced Ethiopia Orthodox Christianity, with 99.9% reporting that as their religion.

The major economic activity of the Woreda is Agriculture. The major crops grown in the study area include Wheat, Barley, Chickpea, Vetch, Pea, and Bean. Among these crops, farmers used Wheat as the cash crop and food to produce it more than other crops in the Woreda. The sector is characterized by its rain-fed and small scale agriculture (HKWARDO, 2022).

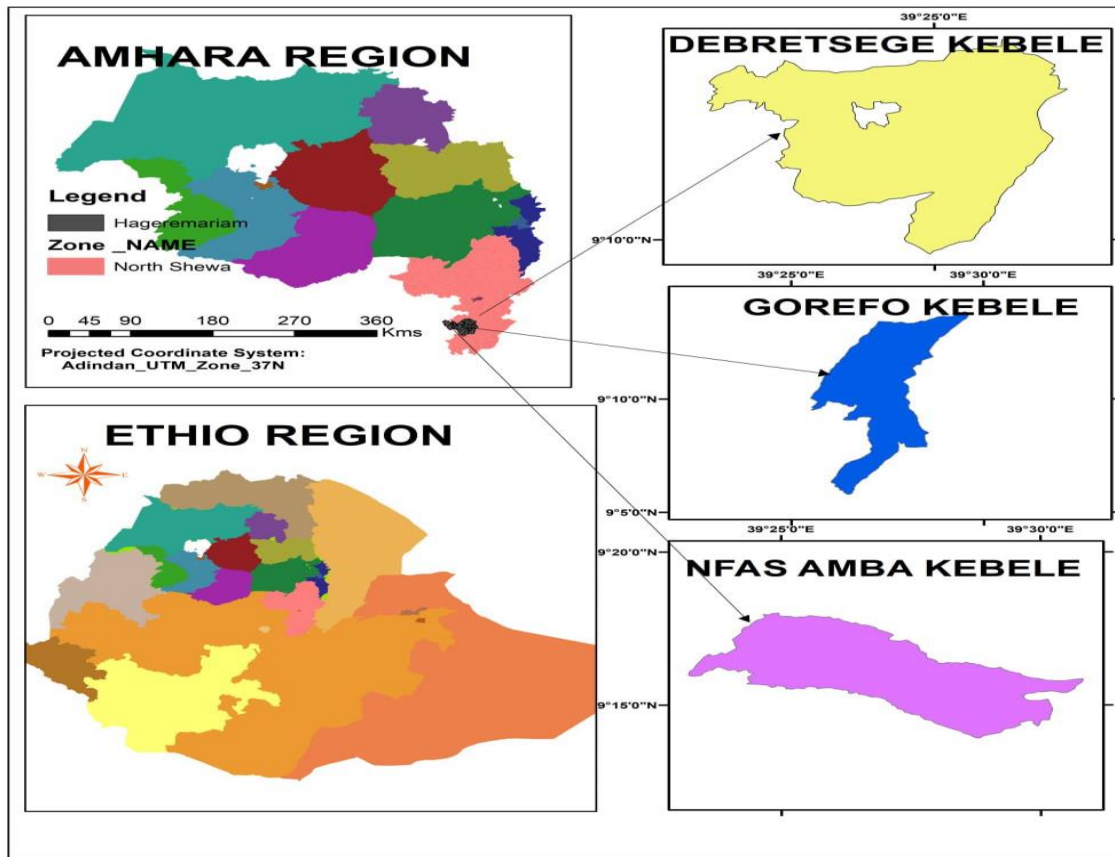


Figure 2: Map of the study area

Sources: Geographical location of the study area, 2022

3.2. Data type, Source and Methods of Data Collection

For this study both qualitative and quantitative types of data were collected from primary and secondary sources. Data from the primary source were obtained from wheat producers and wheat market chain actors like traders such as local collectors, retailers, wholesalers and consumer collected through a survey. A survey was undertaken through interviews using pre-tested structured and semi-structured questionnaires. Data from secondary source were obtained from different unpublished and published sources such as articles, district of agricultural office, internet.

3.3. Sampling Techniques and Sample Size Determination

3.3.1. Farmers sampling

The target population of the study were the wheat producing smallholder farmers in Hageremariam Kesem district. A Two-stage sampling technique was used to draw sample wheat producers. In the first stage, three producing kebeles namely Debretsige, Gorfo and

Nfasamba were selected purposively based on their potential of production. In the Second stage, 124 wheat smallholder farmers were selected randomly using probability proportionate to the population size of the sample kebeles. For this study the total sample size was determined based on the sampling formula provided by Yamane (1967). The formula used for sample size determination with 91 % confidence level degree of variability =0.09 and level of precision 9% (0.09) were.

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

Where: n=sample size N= population size and e= level of precision based on the above formula a total of 124 household were interviewed.

Table 1: Sample Distribution of Wheat Smallholder Farmer

No	Selected kebele	total number of wheat producers	sampled producers
1	Debretsge	350	73
2	Nfasamba	150	31
3	Gorfo	100	20
	Total	600	124

Source: Hageremariam Kesem district Agricultural and Rural Development Office (2022)

3.3.2. Sampling of actors other than farmers

In addition to wheat producers, the sample respondents were selected from traders. Selectively sampling wheat traders can be challenging in the Woreda since traders are more licensed to trade in cereals than in a single product. However, the purposive sample method was used to select 20 wheat traders from the specified market places were selected and interviewed based on data from the district revenue. The sites of traders and consumers were market town available in the study area.

Table 2: Sample Distribution of Trade of Wheat

Types of traders	Total number of traders	<u>Sample traders</u> Sholagebeya
Local collectors	10	5
Wholesalers	15	10
Retailers	10	5
Total	35	20

Source Hageremariam Kesem district agricultural and rural development office (2022)

3.4. Methods of Data Analysis

Two types of data analysis, namely descriptive statistics and econometric models were used for analyzing the data collected from wheat producers and wheat market chain actors to meet the objectives of this study.

3.4.1. Descriptive statistics

Descriptive statistics were utilized to analyse the socio economic characteristics of the sample respondents for intensity of market chain analysis of wheat grain in the study area. The descriptive analysis tool such as mean, minimum, maximum, percentage, standard deviation, frequency distribution t-test and Pearson chi2 test were employed to assess the relationship among the variables of interest. Furthermore, the structure conduct and performance (S-C-P) model were used to identify the type of wheat market, how the wheat market participants behave and the performance of the wheat market in Hageremariam Kesem district.

3.4.1.1. Structure of market

The number of buyers and sellers, their size, dispersion, degree of product differentiation, and ease of entry of new businesses into a sector are all terms used to describe market structure (Cramer and Jensen, 1982). Market concentration and entrance restrictions were two structural characteristics that were taken into account in this study.

Concentration Ratio (CR): Tomek and Robinson (1990) defined the term "concentration ratio" (CR) as the quantity and relative size of buyers in the market. The conventional metric of market concentration ratio is used to determine the market's firm concentration. One of the techniques that is frequently used to gauge market structure is the concentration ratio.

It is given as:
$$S_i = \frac{V_i}{\sum_{n=1}^r V_i} \dots\dots\dots (1)$$

Where: - S_i - Market share of buyer I,

V_i - Amount of product handled by buyer I

$\sum V_i$ - Total amount of product handled

$$CR = \sum_{k=0}^n S_i \dots\dots\dots (2)$$

$k=1, 2, 3 \dots n$

Where: CR = concentration ratio,

S_i = the percentage market share of the i^{th} firm, and

n = the number of the largest firm for which the ratio is going to be calculated. According to Kohls and Uhl (1985), a concentration ratio of 50% or more is an indication of a strongly oligopolistic industry, 33- 50 % a weak oligopoly, and less than that a competitive commodity.

Barriers to entry: refers to the relative ease or difficulty with which new traders may enter into market. Technological, economic, regulatory, institutional, and other factors that constrain firms from attractive in new businesses or entering new markets, State barriers to entry as one of the measures of market structure and indicate the study result in result and discussion part.

3.4.1.2. Market conduct

In order to adapt to the market places in which they sell or buy, traders and other market participants adopt certain patterns of behavior, which are referred to as market conduct. These consist of procedures for fixing prices as well as for buying and selling. Pricing tactics, collusion, advertising, research, development, and capacity investment are among the characteristics used to measure firm behavior (USAID, 2010). Using traders' pricing (using cost-oriented pricing tactics), purchasing, and selling strategies, and the market's behavior were examined in this study.

3.4.1.3. Market performance

Marketing costs: The cost of influencing pricing and the margins of market intermediaries is incurred by wheat growers and other wheat marketing intermediaries. Islam et al. (2014) marketing cost as the whole of the costs involved in moving the product from the point of purchase to the customer to final consumer, including transportation, loading and unloading, storage, labor and other costs

Marketing margin: According to Mendoza (1995), it can be analyzed using the price difference of the actors in the marketing channels. Total gross marketing margin (TGMM) is the final price paid by the end consumer, minus the producers' price, divided by the consumers' price, and expressed as a percentage. TGMM is useful to calculate the producer's gross margin (GMMp) and it is given by the formula:

$$TGMM = \frac{\text{consumer price} - \text{producer price}}{\text{final consumer price}} * 100 \dots \dots \dots (3)$$

Where: TGMM= Total Gross Marketing Margin

To gauge the level of equity in the distribution of benefits accrued along the chain, the producer's gross margin (GMMP) which is the portion of the price paid by the end buyer that goes to the producer is calculated as:

It is useful to introduce the idea of producers' gross margin (GMMp) which is the portion of the price paid by the consumer that goes to the producer. The producers' margin is calculated as:

$$GMMp = \frac{\text{end buying price} - \text{marketing gross margin}}{\text{end buyer price}} * 100 \dots \dots \dots (4)$$

Where: GMMp = Producers participation (the producers share in consumer price).

3.4.2. Econometric analysis

The econometric analysis used to estimate the effects of different factors that affect volume of wheat supply to the market and producer's market outlets choice. Hence, the model specification for both volume of wheat supply to the market and producers market outlets choices decision is presented as follows:

3.4.2.1. Determinants of wheat market supply

Limited dependent models like Heckman two-stage models, double-hurdle model and Tobit model have been used to study wheat market supply. Since the mills lambda is insignificant that indicates there is no selectivity bias in the model. Therefore, Heckman and double-hurdle model is not appropriate for the data set of this study as indicated in econometric model output. Tobit model appropriate for the data collected tend to be censored at the lower limit of zero. If only probability of participation in volume of wheat market was to be analysed, probit/logit models would be adequate techniques for addressing probability questions. However, the aim here was to look at the socioeconomic factors that affect participation decision of wheat.

A change in explanatory variables has two effects. It affects the conditional mean of Y_i^* in the positive part of the distribution, and it affects the probability that the observation will fall in that part of the distribution. Influence the intensity of volume of wheat market leading to a need for an appropriate model which is the Tobit model that uses Maximum Likelihood

estimation (MLE) (Tobin, 1958). The results obtained from the Tobit procedure were the MLE or as well as the marginal effects. The marginal effects indicate the amount of wheat market supply in (quintal) resulting from a unit change in the explanatory variables. The change in probability, on the other hand, indicates the likelihood for the farmers to participate in volume of wheat market supply. Using Tobit to determine factors affecting volume of wheat market supply while controlling for other factors, the econometric model is expressed as:

$$y^* = X_i \beta + \tau_i$$

Where $\tau_i \sim N(0, \sigma^2)$. y^* is a latent variable that is observed for values greater than τ and censored otherwise. The observed y is defined by the following measurement equation

$$y_i = \begin{cases} y^* & \text{if } y^* > \tau \\ 0 & \text{if } y^* < \tau \end{cases}$$

In the typical Tobit model, we assume that $\tau = 0$ i.e. the data are censored at 0.

$$y^* = \begin{cases} y^* & \text{if } y^* > \tau \\ 0 & \text{if } y^* < \tau \end{cases}$$

Marginal Effects for Tobit Model

Just as there are three expected values, there are three possible marginal effects

- 1) The marginal effect of an explanatory variable on the expected

$$\beta_k = \frac{\partial E(Y_i)}{\partial \chi_k}$$

Thus, the reported Tobit coefficients indicate how a one unit change in an independent variable x_k alters the latent dependent variable.

- 2) The change in intensity of volume of wheat market supply with respect to a change in an explanatory variable among participants of volume of wheat market

$$\frac{\partial E[Y_i > 0]}{\partial \chi_k} = \beta_k \left[\begin{matrix} 1 - \lambda(\alpha) \\ \frac{x_i \beta}{\sigma} + \lambda(\alpha) \end{matrix} \right]$$

$$\text{Where } \lambda(\alpha) = \frac{\phi(x_i \beta)}{\sigma \Phi(x_i \beta)}$$

This indicates how a one unit change in an independent variable χ_k affects uncensored observations, β_i is a vector of Tobit maximum likelihood estimates and σ is the standard error of the error term.

3) The change in the probability of participation in amount of wheat market supply as independent variable X_i changes

$$\beta_k \left[\frac{\mathbf{x}_i \boldsymbol{\beta}}{\partial \chi_k} \right] \phi = \frac{\partial E(Y_i)}{\partial \chi_k}$$

3.4.2.2. Determinants of producer's market outlets choice

A producer a decision whether or not to enter a certain market by evaluating the return in expected utility and accounting for any related investment and transaction expenses (Urquieta, 2009). Farmers were thus select the markets outlets that show the most positive returns. For the analysis of categorical choice dependent variables, many econometric models, such as multivariate probit/logit and multinomial probit/logit, are useful models. When individuals can only choose one outcome from a collection of mutually exclusive, exhaustive choices, the multinomial model were appropriate. However, given the possibility of simultaneous outlet choices and possible correlations between these market outlet choice decisions, the study's findings on wheat producers' market outlet choices do are not mutually exclusive. Multinomial logit model is the most frequently used nominal regression model. The dependent variable cannot be perfectly predicted from the independent variable for any case. It is not interdependent outcome responses.

The multivariate probit model is a generalization of the probit model used to estimate several correlated binary outcomes jointly. For example in this study, it is believed that the decisions of selecting market outlets of wholesaler, retailer, local collector and consumer are correlated (all decisions are binary), then, the multivariate model is appropriate for jointly predicating these four choices on an individual-specific basis. The predictive variables are independent variables and the outcome is the dependent variable. The variables can be continuous, meaning they can have a range of values, or they can be dichotomous, meaning they represent the answer to a yes or no question. The model simultaneously captures the influence of the set of explanatory variables on each of the different outlet choices, while allowing for the potential correlations between unobserved disturbances, as well as the relationships between the choices of different market outlets (Arinloye et al., 2014).

It is assumed that given producer in making a decision considering not exclusive alternatives that constituted the choice set wheat marketing outlets, the choice sets may differ according to the decision-maker. Consider the i^{th} farm household ($i=1, 2 \dots N$), facing a decision problem on whether or not to choose available market outlets. Let U_0 represent the benefits to the farmer who chooses wholesalers, and let the U_k represent the benefit of the farmer to choose the K^{th} market outlet: where K denotes a choice of local collectors (Y_1), Wholesalers (Y_2), Retailers (Y_3), and Consumers (Y_4). The farmer decides to choose the K^{th} market outlet if $Y^*_{ik} = U_k - U_0 > 0$. The net benefit (Y^*_{ik}) that the farmer derives from choosing market outlet is a latent variable determined by the observed explanatory variable (X_i) and the error term (ϵ_i):

$$Y^*_{ik} = X_i \beta_k + \epsilon_i \quad k = (Y_1, Y_2, Y_3, Y_4) \text{ -----}$$

3.4.3. Definition of Variables and Working Hypothesis

In identifying factors influencing market supply and market outlet choice of wheat producers in the study area, the main task is exploring which factors significantly influence and how (the direction of the relationship) these factors are related to the dependent variables.

3.4.3.1. Determinants of wheat supply to the market

Dependent variable:

Wheat Marketed volume (QUANTS): It is a continuous dependent variable that represents the amount of wheat supplied to the market by household during the production year 2021/22 which is measured in quintals.

Independent variables

Based on economic theories and the results of several empirical investigations, continuous and discrete variables were hypothesized to determine factors impacting the volume of wheat supply. The following variables were created as a result in order to explore the factors that affect the supply of wheat on the market.

Mobile Availability (MOBILAVAL): is a dummy explanatory variable was a value of 1 if the farmer has mobile availability and a value of 0 otherwise. The mobile availability has generated an opportunity for the farmers especially to get the information about marketing and weather. According to Tura (2015), mobile availability was related with market supply

and value chain analysis of wheat effects positively. Therefore, mobile availability was positive affected by the volume of wheat market supply.

Access to Credit (CREDIT): is a dummy variable that represents a household's access to credit for the purpose of producing wheat. It is anticipated that producers who use credit to buy better seeds, fertilizer, and other inputs will produce more than those who do not. According to Habtamu (2021), access to credit was related with market of wheat supply positively. Therefore, it was hypothesized that having access to credit had positive effects on the market's supply of wheat.

The household head's Education level (EDLEV): is a continuous variable, which represents Education level of households expected to have a positive relationship with wheat market volume. The finding of Haregitu (2019) showed that education level of households has a positive relationship with teff market participation and level of participation. This is because producers who have higher education levels have better attitudes towards the new production technologies input utilization, to actively being beneficiaries of services provided to them. Additionally, the study showed that as the educational level of farmer increases, farmer's ability to use information for their market supply also increases.

Lagged price of wheat (2021/22): It is a continuous variable measured in Ethiopian birr per quintal. It was expected to affect the volume of wheat market participation positively because prices stimulate the volume of wheat marketed. If the current market prices are low producers will not interest to sell wheat, so the volume of wheat participation will decrease until the price rises. According to Tadele (2016), the price of teff was positively affected the quantity of teff supplied to the market. Therefore lagged price was positive affected to the amount of wheat market supply.

Wheat Farming experience of the household head (EXPR): is a continuous explanatory variable that is measured in terms of the number of years that the household head has produced wheat and his or her management of wheat farm experience. According to Nefisa (2018), agricultural experience in the production of wheat has positive and significant effect on the volume of wheat marketed. Therefore, the wheat farming experience was positive affect the volume of wheat market supply.

Family size (FSZ): is a continuous variable that denotes the total number of individuals in the household. Habtamu (2021) indicates that households with more number family members supply less amount of wheat to the market than those households with relatively

fewer family members because of the increase in consumption at the household level. Thus, family size was negative impact on the volume of wheat market supply in this study.

Annual income (2021/22): The annual income refers to the total annual earnings of the family from the sale of agricultural products (sale of crops, livestock and livestock products), office workers like gardens and traders after meeting family requirements. It is measured in Birr. It is believed to be the main source of capital for purchasing agricultural inputs. Therefore, Annual income has positively impact on the volume of wheat market supply in this study.

Landholding size (LHSZ): refers to the amount of land that a wheat producer has set aside for wheat production. It is a continuous variable with a hectare unit of measurement. According to Girma (2015), the quantity of wheat supplied to the market would increase as farmer landholding size increases. It is assumed that the larger the total area of the farmland the farmer owns, the larger land is allocated for wheat and the higher would be the output that influences the large quantity of wheat supplied to the market. Thus, landholding was expected to have a positive effect on the wheat market supply.

Sex of the household head (SHH): This dummy explanatory variable has a value of 1 if the household head is a male and a value of 0 otherwise. According to the study Haregitu (2019), being the male household head increases the probability of teff market participation of the sample participant due to the reason that men contribute more labor input in the production of crops. Thus, a male-headed household has a positive impact on the volume of wheat market supply in this study.

Distance to the nearest market (DNM): continuous explanatory variable measures the distance in kilometre between the home residence and the nearest market. Nega et al (2015) found that producers are discouraged from selling high volumes of products due to the distance from the market. Hence, it was expected to influence volume of wheat market supply negatively.

Age of household head (AGE): A continuous variable with a years-based unit of measurement. The older a farmer is the better the experience and the more the production and marketing of wheat. Alemayehu (2016) this study showed that age of the household was positively effect on maize market supply. Given that ages of households was believed to use resources wisely. Thus age has a positive effect on wheat market supply in this study.

Frequency of extension service (EXT_SRV): This is a continuous explanatory variable, measured in terms of the number of visited the extension agent to the farmer within a year. Extension variables include having access to information through farmer training and visiting. Those farmers who have frequent contact with extension workers are more likely to know the advantages of cash crop production. The more the number of contacts, the higher the information and knowledge acquired. Extension services have positive effects on the volume of marketable supply of wheat through the stimulation of production and productivity. Ababo (2016) found the frequency of extension services positively influenced by the participation decision of framers in maize markets. Therefore, the frequency of extension service was expected to have a positive influence on the amount of wheat supplied to the market.

Table 3 Summary of Dependent and Independent Variables used in Tobit model

Dependent variable: wheat marketed volume by farm household to the market			
Variable	Unit measurement	Type	Expected sign
Explanatory variable			
SHH	Sex of household head	Dummy, 1=M, 0 =F	+ve
AHH	Age of hh head (year)	Continuous	+ve
FSZ	Family size (number)	Continuous	-ve
EDLEV	Education (year of schooling)	Continuous	+ve
EXPR	Farm experience of the HH,	Continuous	+ve
ENS	Extension service,	Continuous	+ve
MOBILAVAIL	Mobile availability	Dummy, 1=yes, 0=no	+ve
CREDI	Credit access,	Dummy, 1=yes, 0=no	+ve
DSNMKTM	Distance to the market (km)	Continuous	-ve
LAS	Landholding (hectare)	Continuous	+ve
LPW	Lagged price of wheat	Continuous	+ve
INCOM	Annual income (birr)	Continuous	+ve

Source: Own computation

3.4.3.2. Determinants of wheat producers market outlets choice

Dependent variable

Choice of market outlets (MKTOUT): This categorical dependent variable is based on the likelihood that farmers will sell wheat in one of the available market outlets. The model were show it as Y_1 for households that decide to sell wheat to consumers, Y_2 for producers that decide to sell to retailers, Y_3 for producers that decide to sell to wholesalers, and Y_4 for producers that decide to sell to local collectors.

Independent variables

Distance to the market (DNM) a wheat producer must travel to sell their goods in the market is a continuous explanatory variable that is measured in kilometres. According to Nuris (2016) study, choosing the wholesalers channel would become less likely as the distance to the market centre increased, whereas picking the collectors channel would become more likely. Therefore, it is anticipated that proximity to the nearest market or as distance to the nearest market decreased has a negative link with the producer's decision to select wholesaler and retailer and a positive relationship with the producers decision to select local collector and consumer market outlets.

The Household Head Education level (EDLEV): It is a continuous explanatory variable and refers to the number of years of formal schooling a household attended. An educated person makes better use of available information as the resulting producer would have the possibility to choose appropriate market outlets. Habtamu (2021) indicated that education level wholesaler and retailer was positively and significantly affected by the wheat market outlet choice. Thus, it is expected in this study that this variable has a positive and significant influence on retailers and wholesalers market outlet choice.

Family size (FSZ): This variable is a continuous explanatory variable and refers to the total number of household members. Accordingly, families with more household members tend to have more labor which in turn increases the choice of better market outlet. The study by Habtamu (2021) indicated that family size was positively and significantly associated with selling potato to wholesalers. Therefore, family size was positively related to the producer decision to choose wholesaler market outlet choice.

Access to market information (MRKTINFO): The dummy explanatory variable as a value of 1 if the farmer observed that they have access to market information and 0 otherwise. The findings of Bezabih et al., (2015) indicate that market information has a positive and significant effect on retailer channel choice decisions of potato producers. As a result, it is expected that wheat producers' access to market knowledge will have a favourable and considerable impact on the retailer and wholesaler channel while having a negative effect on local collector.

Frequency of extension contact (EXTCONT): This is a continuous explanatory variable measured by the number of days a farmer had contact with an extension agent per year on wheat production and marketing supervision. The study by Sultan (2016) indicated that the frequency of extension contact positively and significantly affected accessing wholesalers market outlet choices as compared with assembler market outlet choices at a 10% probability level. Therefore, for this study the frequency of extension contact was positively influence wholesalers and retailers wheat market outlets choice.

Access to credit (CREDIT) is a dummy variable that takes a value 1 if farmers that they have accessed to credit and 0 if otherwise. Smallholder Farmers that have access to credit may produce more. According to Shewaye's (2016) study, having access to finance makes choosing a local collector market outlet less likely while increasing the likelihood of choosing wholesalers and stores. Therefore, it is expected that having access to finance will influence wholesaler and retailers positive impact for market outlets.

Quantity produced (QNTPRD): continuous explanatory variable measures in quintal Therefore, it is expected that wheat Production will influence wholesaler, retailer and local collector a favourable impact on the market outlets and negatively impact for consumer market outlet.

Table 4: Summary of Dependent and Independent variables used in MVP model

Dependent Variables		Expected sign			
Y		Market outlet-choice			
Independent Variables	Type	Consumers	Retailers	Wholesalers	Local collectors
Family size	Continuous	-	-	+	-
The education level	continuous	-	+	+	-
Distance to market in km	Continuous	+	-	-	+
Access to market Information	Dummy, 0=no 1=yes	-	+	+	-
Extension contact	continuous,	-	+	+	-
Access to credit	Dummy, 0=no 1=yes	-	+	+	-
Wheat production	continuous	-	+	+	+

Source: Own computation

4. RESULTS AND DISCUSSIONS

This chapter summarized the major findings of the study and discusses them in comparison with the results of similar studies. The first section presents the results of descriptive statistics of the demographic and socio-economic characteristics of the sample households producers and traders. The second section deals with market chain analysis of wheat which includes market chain actors, marketing channels, marketing costs and marketing margins. The final section deals with econometric models results on factors influencing the volume of wheat supplied to the market and producers' market outlets choice in Hageremariam Kesem district.

4.1. Result of Descriptive Analysis

In this section, the descriptive statistic of the demographic characteristics, Socio-economic characteristics, farm characteristics, institutional services, and market-related issues are discussed as follows.

4.1.1. Demographic characteristics of the sample households

From the sampled respondent, in Table 5 show that 80.85% were male to the wheat market participation and the remaining 19.15% were female to participation of wheat marketed. This result indicated that the quantity supply of wheat marketed participation and non-participation positively and statistically significant at 5% significance level. The status of the sample headed households, with 1.06% and 3.33 % single, 85.11% and 86.67 % married, 3.19% widowed, and 10.64% divorced were wheat marketed participation and wheat non-participants respectively .

The average age of wheat market participation and non-participation of the respondent was 57 and 53.1 respectively. This indicates that the responsible person for production and marketing of wheat in the household has good experience. As age is considered as a crucial factor since, it determines whether the household benefits from the experience of an older person or has to base its decisions on the risk-taking attitudes of younger farmers. The average family size of sample households of wheat market participation and non-participation were 4.68 and 3.9 respectively. The wheat market supply participation and non-participation in family size has negatively and significantly at 1 % significant level.

Table 5: Demographic characteristics of the sample households

Variable	Wheat market participation			wheat market non-participation		χ^2 -value
	Response	N	%	N	%	
SEX	Male	76	80.85	29	96.67	4.3843**
	Female	18	19.15	1	3.33	
Marital status	Single	1	1.06	1	3.33	1.6990
	Married	80	85.11	26	86.67	
	Widow	3	3.19	0	0	
	Divorced	10	10.64	3	10	
Variable		Mean	Std.dev	Mean	Std.dev	t-test
Age		57	10.18	53.1	11.71	-1.7603*
Family size		4.68	1.408	3.9	1.348	-2.6710***

Source: survey result, 2021/2022

4.1.2. Socio-economic characteristics of the sample households

4.1.2.1. Wheat production characteristics of the sampled households

The mean educational levels of wheat-producing sample households the market participation and non-participation were 5 level (in Table 6). This shows that the majority of wheat-producing farmers completed at least primary school. The average monthly annual income for the entire sample household of wheat market participation has 1928.7 birr and non-participation was 1956.6 birr. The average amount of wheat production market participation was 44.521 quintals and non-participation was 20.6 quintals. The market participation and non-participation of wheat production were negatively significant at 1% significant level. The mean vales of quantity sold of wheat in market participation and non-participation were 22.43 quintals and 0.1quintals respectively.

Table 6: Socio-economic characteristics of the sampled household

Variable	Wheat market participation		wheat market non-participation		t-test
	Mean	Std. dev.	Mean	Std. dev	
Education level	4.564	3.397	5.467	4.392	1.1770
Annual income	1928.7	1171.8	1956.6	1060.8	0.1162
Quantity sold of wheat	22.430	25.087	0.1	0.402	-4.8615

Source: survey result, 2021/2022

4.1.3. Farm characteristics of the sample household

The average wheat farm experience of the sample household of wheat market participation was 36.5 and non-participation was 36.26. This indicating that the responsible person for farm experience starting to wheat production up to know. Wheat farm experience indicated that the quantity supply of wheat marketed participation and non-participation negatively significant at 10 % significant level.

The land is the primary input and one of a factor of production and used as a measure of wealth in the district. The result (in Table 7) showed that the average landholding size of wheat market participation has 6.441 hectares and non-participation has 4.976 hectares. In this way the participation and non -participation of wheat marketed to the land holding size of t-value has negatively and significantly at 1 % significant level.

The average land allocated for the production of wheat by sampled wheat-producing respondents was 3.039 hectares with a corresponding standard deviation of 1.130 hectares. The participation and non-participation wheat market supply to the sample household, ttest value were negatively affected by Land allotted for wheat at 1% significant level. The average cultivated area of other crop to the wheat market participation and non- participation was 5.578 hectares with standard deviation 2.266 and 4.216 hectares with standard deviation 1.836 hectares respectively. The participation and non-participation wheat market supply to the sample household, ttest value were negatively affected by cultivated area for wheat at 1% significant level. The average quantity of wheat produce market participation was 44.521 quintals and non- participation was 20.6 quintals. The market participation and non-participation of wheat production were negatively significant at 1% significant level.

Table 7: Farm characteristics of the sample household

Variable	Wheat market participation		wheat market non-participation		
	Mean	Std.dev	Mean	Std.dev	t-test
Wheat Farm experience	36.5	11.72	36.26	11.61	-0.0951*
Land holding size	6.441	2.554	4.976	2.114	-2.8424***
Cultivated area	5.578	2.266	4.216	1.836	-2.9901***
Land allotted for wheat	3.039	1.130	2.183	0.6757	-3.9239***
Quantity of wheat produce	44.521	25.858	20.6	10.257	-4.9332***

Source: survey result, 2021/2022

4.1.4. Access to institutional services and physical factor

The result show that the average distance need for producer to nearest market place has 3.127 kilometre the wheat market participation and 4.4 kilometre wheat market non- participation. The two groups were statistically positively significant at 1%. Access to agricultural extension service is expected to have a direct influence on the production and marketing behavior of the farmers. The more extension contacts are the more likely it that farmers adopt new technology and innovation. The average frequency of extention service has 3 time per production season to the wheat market participation and 3 time per production season wheat non -participation.

Table 8: Access to Institutional services and physical factor

Variable	Wheat marketed participation		wheat market non-participation		t-test
	Mean	Std. dev.	Mean	Std. dev.	
Distance to the market	3.127	2.528	4.4	2.372	2.435***
Extension service	3.095	1.245	3.133	1.407	0.1394

Variable	Response	Wheat market participation		wheat market non-participation		χ^2 -value
		N	%	N	%	
Mobile availability	1, if access	70	74.47	24	25.53	0.3795
	0, otherwise	24	25.53	6	20	
Access to credit	1, if access	10	10.64	2	6.67	0.4104
	0, otherwise	84	89.36	28	93.33	

Source: survey result, 2021/2022

The source of credit in smallholder farmer in the study area is cooperative and Amhara credit and saving institution. Farmer obtain from seed and fertilizer with credit for crop season. The result in Table 8 show that 89.36 % has not access to credit in wheat market participation and 93.33% was not access to credit in what market non-participation. Other 10.64% have access to credit in wheat market participation remaining 6.67% also access to credit to non-participation. In the result (Table 8) show that the frequency of 74.47% of sample household have access to mobile availability. As the result show that the majority of sample household have access to mobile availability in wheat market participation.

4.1.5. Socio-economic characteristics of sampled traders

Socio-economic characteristics include financial assets such as initial capital, working capital and sources of capital. The average initial capital of the sampled wheat wholesaler, retailer and local collector was 20200, 18200 and 12600 birr within standard deviation 5788.87, 7823.04 and 4878.54 respectively. The minimum and maximum initial capital of the sampled wheat wholesaler, retailer and local collector was 10000, 10000 and 8000 birr minimum level of the sample trader respectively and the maximum level of the traders

30000, 26000 and 20000birr respectively. The average working capital of the wheat trader (wholesaler, retailer and local collector) was 79500, 60000 and 35600 birr within standard deviation 48559.8, 32403.7 and 14638.98birr respectively.

Table 9: Initial Capital and Working Capital sample Trader

Variable		Wholesaler	retailer	local collector
Initial capital	minimum	10000	10000	8000
	Maximum	30000	26000	20000
	Mean	20200	18200	12600
	Std.dev	5788.87	7823.04	4878.54
Working capital	Minimum	15000	30000	13000
	Maximum	200000	10000	50000
	Mean	79500	60000	35600
	Std.dev	48559.8	32403.7	14638.98

Source: survey result, 2021/2022

In The result (Table 10) showed that sample traders with respect to traders' source of working capital, Wholesalers about 35% of their capital from their gift, 10% from Loan and 5% own. Retailers are the only traders who about their working capital 10% from their own capital. The sources of working capital for local collectors are 15% from their loan and 5% gift and 5% share.

Table 10: Source of working capital of sample traders

Variable	Wholesaler		retailer		local collector	
Source of capital	N	%	N	%	N	%
Own	1	5	1	5	0	0
Loan	2	10	2	10	3	15
Gift	7	35	2	10	1	5
Share	0	0	0	0	1	5

Source: survey result, 2021/2022

4.2. Result of Market Chain Analysis

4.2.1. Wheat market chain actors and their functions

Wheat market actors form a link and create the channel beginning from producers until wheat reaches the final consumers. Five wheat marketing actors were identify in the study area. These are producer, wholesaler, retailer, local collector and consumer.

Producer: Producers are main actors as well as the first stage actors in the chain who perform most of the market chain functions right from farm inputs preparation on their farms or obtaining of the inputs from other sources to post-harvest handling and marketing. The major market chain functions that wheat producers perform include ploughing, weeding,

pest controlling, harvesting, and post-harvest handling. They transport wheat to the nearest markets using donkeys and sell to different market chain actors like local collectors, retailers, wholesalers, and consumers.

Wholesalers: These are market chain actors who purchase a large volume of wheat from different wheat market chain actors like producers and local collectors. Wholesalers are traders who resell wheat to retailers to the end consumers. They are the major actors in the market channel of wheat in the study area.

Local collectors: are farmers or traders in the chain who buy a small quantity of wheat from farmers in village markets during the period to resell it to wholesalers in the woreda market.

Retailers: Retailers are market actors operating at the last stage of the marketing channels selling to consumers. They buy from wholesalers and producers in their surroundings and directly sell wheat to consumers. They perform several activities such as buying, transporting, storing, and selling to end-users.

Consumers: These are the final actors of the chain who buy wheat for their consumption purpose. The wheat produced in the woreda passes through different channel actors to reach the hands of end consumers. According to the study, consumers purchased large amount of wheat from wholesaler and they do not perform reselling activities.

4.2.2. Wheat market channel

The analysis of marketing channels was intended to know the alternative ways that the product follows from the point of origin to the final destination. Based on the direction of flow and volume of wheat managed, five marketing channels were identified in the study area.

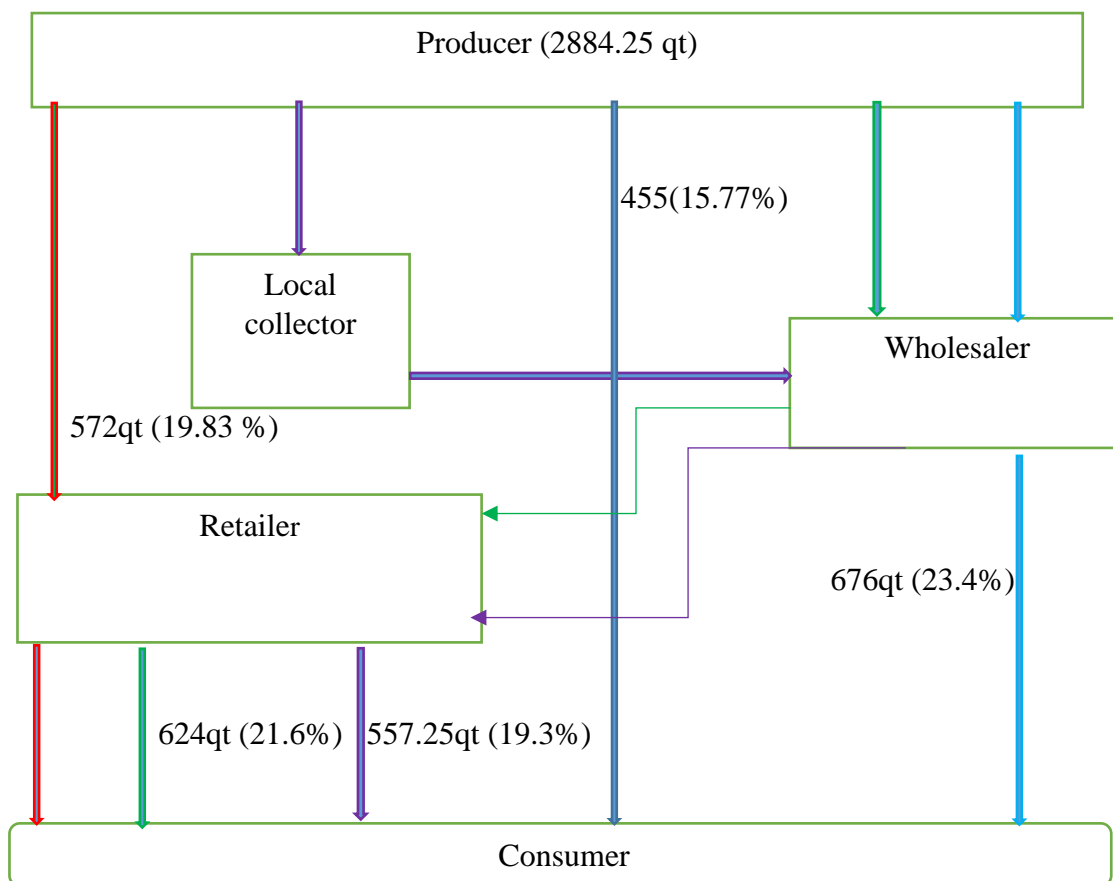
Channel I: producer → consumer 455 qt (15.77%)

Channel II: producer → retailer → consumer 572qt (19.83 %)

Channel III: Producer → wholesaler → consumer 676qt (23.4%)

Channel IV: Producer → wholesaler → retailer → consumer 624qt (21.6%)

Channel V: producer → local collector → wholesaler → retailer → consumer 557.25(19.3%).



Where

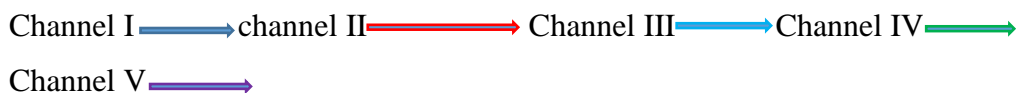


Figure 3: wheat market channels for different market actors

Source: Own sketch from survey result, 2021/2022.

4.3. Structure, Conduct, and Performance of Wheat Market

In this sub section the structure conduct and performance were presented and discussed in below.

4.3.1. Structure of wheat market

In this study the structure of the wheat market is characterized using indicators such as, market concentration and entry conditions.

4.3.1.1. Degree of market concentration ratio

Concentration ratio is interpreted as an indicator for the degree of competitiveness among wheat traders. The first four traders with the largest volume of wheat handled were used for

the calculation of market concentration ratio of wheat traders. CR4 indicated that the relative size of firm (top four firm) in relation to the wheat market as a whole. It is the combined market share of all the top four firm in the wheat market. Traders, purchasing of wheat from the sample of the respondents and outside of the farmer in the study area.

Four firms concentration ratio is the most typical concentration ratio for judging the market structure (Kohls and Uhl, 1985). In Table below indicated the result of CR4 shows that the top four wheat traders was 58.58% of the wheat traders such as wholesaler in the study area. This implies that the wheat market structure (wholesaler) in Hageremariyam Kesem Woreda was strong oligopoly.

Table 11: The concentration ratio of sampled traders (CR4)

Woreda					
No. of Traders (A)	cumulative traders (B)	quantity purchased (C)	total wheat purchased In quintal (D= A*C)	% share of purchased (Si=D/383080)	%Cumulative purchase
1	1	126000	126000	32.89	32.89
1	2	54000	54000	14.1	46.99
2	4	22200	44400	11.59	58.58
1	5	21600	21600	5.62	64.2
1	6	21000	21000	5.48	69.68
2	8	18000	36000	9.56	79.24
1	9	10800	10800	2.82	82.06
1	10	8280	8280	2.16	84.22
1	11	7920	7920	2.06	86.28
3	14	7200	21600	5.62	91.9
1	15	5950	5950	1.55	93.45
1	16	5580	5580	1.45	94.9
1	17	5550	5550	1.45	96.35
1	18	5400	5400	1.41	97.76
1	19	4680	4680	1.22	98.96
1	20	4320	4320	1.13	100
Total			383080	100	

Source: survey result, 2021/2022

Barriers to entry in wheat market: Barriers to entry is one of the indicators of market structure. If the barriers to entry are low, new traders can easily enter into wheat markets and compete with established traders. Under this issue working capital and licensing procedures were considered.

Capital: According to the survey result (in Table 12) show that about 60 % of wheat traders reported that their lack of capital, whereas only 40 % of the traders reported that they had their capital to run the business. As a result, most traders were obliged to sell wheat grain

within a week time. Also, the sample traders reported that access to credit in the woreda has been the single most critical constraint in the start-up and expand the existing business. This implied that a lack of capital hinders entry of traders into the wheat market in the study area.

Licensing procedure: License is one of the requirements to participate in trading. The rule of the district office in trading is very restrictive and takes administrative measure on those who do trading activities without having license. The survey result in (Table 12) shows that about 40% of traders responded that getting a license. Sample traders reported license procedure as a problem in entry of wheat market. Therefore, as compared to perfectly competitive markets where there is free entry and exist, wheat market structure in Hageremariam Kesem woreda was somewhat deviated in that it showed strong oligopoly.

Table 12: Major problem of wheat sampled traders

Variable	frequency	percentage
License procedure	8	40
Lack of starting capital	12	60

Source: survey result, 2021/2022

4.3.2. Conduct of wheat market

In this subsection, the conduct of wheat traders is analyzed in terms of the producers and trader's price setting, and selling strategies. The survey result in (Table 13) show that 55.6 % of wheat price was set by trader, while only 19.4 % of wheat price was set by producer 24.4 % was not sell in the wheat market and 1.6 % of wheat price was set by negotiation of farmer with trader.

Table 13: Price setting strategies of small holder farmer and traders

Variable	N	%
No sell	29	24.4
Traders	69	55.6
Producers	24	19.4
Negotiation of farmer with trader	2	1.6

Source: survey result, 2021/2022

4.3.2.1. Selling strategies of small holder farmer

According to the survey result shown in the below table 1.6% of wheat producers sell their product within village. 4.8 % of wheat smallholder farmer sell their product out side village and 70.2 % of wheat producer sell their product within district. 23.4 % of wheat producer were not sell their product. The majority of wheat producer sell their product within district because of sholagebeya is the central market at all direction and the main town in the woreda.

Table 14 : Place of sellers of sampled respondents

Variable	frequency	percentage
Place of sell		
No sell	29	23.4
Within village	2	1.6
Outside village	6	4.8
Within district	87	70.2

Source: survey result, 2021/2022

4.3.3. Performance of wheat market

The performance of the wheat market was evaluated by considering different marketing costs, production costs, and marketing margin.

4.3.3.1. Marketing cost of sampled traders

Marketing cost is compared to have a better understanding of the profit share of different actors who participated in the wheat market chain. Wholesaler incur the highest cost that was 306 birr/quintal due to its higher wholesaler cost than other traders while, retailer incur lowest cost that was 167 birr /quintal than wholesaler and local collector incur lowest cost that was 100 birr/quintal than wholesaler and retailers.

Table 15: Wheat average marketing cost of sampled traders

Cost of marketing	Traders		
	Local Collectors	Retailers	Wholesalers
Wheat purchase price	3550	3700	3750
Sack	30	30	30
Loading/unloading	30	30	30
Transportation	20	20	50
Storage	20	20	0
Tax	0	10	10
Wage for permanent employee	0	0	0
Personal travel	0	23	24
Total marketing cost	100	133	144
Selling price (birr/quintal)	3750	4000	4200
Profit (birr/quintal)	100	167	306

Source: survey result, 2021/2022

4.3.3.2. Production cost, marketing costs, and profit of smallholder farmers

To know the performance of wheat in the study area, the profitability of farmers was undertaken based on average wheat sampled farmers produced listing out all the associated costs for wheat production and marketing in the study area during the survey year. Wheat producers incur average production and marketing costs of 586.2birr/quintal and sell a quintal of wheat Average weighted price of 3950 birr/quintal, which implies wheat producers get a gross profit of 3363.8 birr/quintal.

Table 16: Costs and profit of sampled wheat producers

Cost item	Cost in ETB
Production costs	
Fertilizer URES AND NPS	11,717
Improved seed (Kg)	2,733
Herbicide, Fungicide and insecticide	4,381
The total cost of production per hectare	18831
Average quintal produced per hectare	38.73
The total cost of production per quintal	486.21
Transport cost	50
Other costs of marketing (loading and unloading)	50
Total marketing cost	100
The total cost of production and marketing per quintal	586.2
Weighted average price of wheat per quintal	3950
Gross Profit (birr/quintal)	3363.8

Source: survey result, 2021/2022

4.3.3.3. Marketing margin

Wheat producer's gross profit was highest when they directly sold to consumers in channel I (Producers-consumers) which was 3363.8 birr/quintal while they take the lowest gross profit when they sell to local collector which accounts 2963.8 birr/quintal. This implies producers are more profitable if they sold directly to consumers. Wholesalers gained the second-highest profit 306 birr/quintal in channel III (Producers-wholesalers-consumers), channel IV (Producers-wholesalers-retailer-consumers) and channel V (producer-local collector-wholesaler-retailer-consumer) when they directly bought from producers and local collector they sold to retailers and consumers.

Wheat retailer profit was 167 birr/quintal in channel II (producer-retailer-consumer) This implies that wholesalers and retailer received the highest profit from wheat marketed in the study area while local collector get the lowest profits shares from traders in the study area from wheat market. As long as a given actor/trader engaged in different channels, estimating

of profits for a given actor (especially for farmer) across different channels of participation should be presented and compared.

Total gross marketing margin (TGMM) is highest in channel V (producers-local collector-wholesalers-Retailer-consumers) which has 22.6 % and lowest in channel II (producers-retailers-consumers) which has 7.5 %. The maximum producers share (GMMp) is highest in channel II which was 92.5% from the total consumers Price, and lowest in channel (V) which was 77.4 % (in Table below). The survey result also shows that the lowest gross marketing margin was taken by local collector in channel V (producers- local collector-wholesaler -retailers-consumers) which was 5.3%. The gross marketing margin of wholesaler in channel III, IV and V was 10.7 %, 10.7% and 10.7% respectively. This implies the share of market intermediaries in the consumers' price was substantial and there was a need to reduce market intermediaries to minimize the marketing margins and thereby enhance the producers' income.

Table 17: Wheat marketing margin for different channels

Actors		Wheat marketing channels				
		I	II	III	IV	V
Producers	production cost	486.2	486.2	486.2	486.	486.2
	Marketing cost	100	133	144	144	100
	Selling price	3950	3700	3750	3750	3550
	Profit	3363.8	3080.8	3119.8	3119.8	2963.8
	GMMp	100	92.5	89.3	82.7	77.4
Local Collectors	Purchasing price					3550
	marketing cost					100
	Selling price					3750
	Profit					100
	GMMlc					5.33
Retailer	purchasing price		3700		4200	4200
	Marketing cost		133		139	139
	Selling price		4000		4500	4500
	Profit		167		161	161
	GMMr		7.5		6.6	6.6
Wholesaler	purchasing price			3750	3750	3750
	Marketing cost			144	144	144
	Selling price			4200	4200	4200
	Profit			306	306	306
	GMMw			10.7	10.7	10.7
TGMM (%)		0	7.5	10.7	17.3	22.6

Source: survey result, 2021/2022

4.4. Econometric Results

This section presents the econometric model outputs of the study. Thus, the determinants of the volume of wheat marketed and wheat producers' market outlets choice decisions were discussed.

4.4.1. Determinants of wheat marketed volume

In this section factors that influence wheat market volume were analyzed and discussed. Before executing the Tobit model econometric model both Heckman selection and double hurdle model were tested against Tobit model. Accordingly, Heckman selection model was not appropriate for this data set since inverse mills ratio is insignificant and also double hurdle not appropriate for this data set sigma and variable is not significant. Log-likelihood ratio test was used to check the relevance of the Tobit model. This was made by testing the Tobit model specification using joint decision criteria of log likelihood test. Tobit maximum likelihood estimates, marginal effects and change in probability of participation in wheat market volume are presented below table. The probability function of the model (LR chi2 (13) =79.21, Prob > chi2 =0.0000) indicating the model is adequate because coefficients are jointly significant.

Table 18: Tobit model of determinants of wheat market supply

Variable	coefficient	standard Error	Marginal effect ^a	Marginal effect ^b	Change in probability
Sex	11.693*	6.528*	7.306*	5.127*	0.189*
Age	0.782**	0.345	0.489**	0.343**	0.012**
Education	0.780	0.763	0.487	0.342	0.012
Family size	2.410	2.368	1.506	1.056	0.039
Land holding size	0.584	1.016	0.365	0.256	0.0094
Farm experience	-0.373	0.304	-0.233	-0.163	-0.006
Income	0.001	0.002	0.0007	0.0005	0.00001
Credit	-14.238*	8.014	-8.896*	-6.242*	-0.230*
Extension service	2.102	2.361	1.313	0.921	0.0340
Distance	-0.432	1.411	-0.270	-0.189	-0.007
Lagged price	0.0149***	0.002	0.009***	0.006***	0.0002***
Mobile availability	-1.882	5.507	-1.176	-0.825	-0.030
Cons	-100.05	24.458			
Pseudo R2=	0.0821			number of observation=	124
Log likelihood =	-443.082			left censored observations=	28
LR chi2 (12) =	79.21			uncensored observation=	96
Prob>chi2=	0.0000			right censored observation=	0

***, ** and * are statistically significant at 1%, 5% and 10% respectively.

Source: survey result 2021/22

- a) The effects of change in explanatory variable on the expected value of the dependent variable among the whole.
- b) The change in volume of wheat market with respect to a change in explanatory variable among participant.

Age of household: - This variable affected the intensity of wheat market supply significantly and positively at 10% level. The marginal effect age of the household were 0.315 quintals among the whole sample and by 0.232 quintals between among the participant group. The study result in line with study by Samuel (2019) which indicated that the Age of the household head the market supply of coffee at positively and statically significantly. As the Ages of household increase by one years, the likelihood of farmers being participant in the market would increase by 0.7%, other factors being constant.

Sex of the household: As expected, sex affected the volume of wheat market supply positively at 10% significance level. The marginal effect for being male-headed household against that of female-headed would increase the intensity of wheat market supply by 7.306 quintal among the whole sample and by 5.127 quintal among the participant group. The result supports the study of Mamo et al. (2014) in that being male headed household was related with volume of milk value added positively. This variable would also increase the probability of wheat market supply significantly by 18.9%. These implied that conditions of volume of wheat market supply are favourable for male headed than female headed farmers.

Access to credit: This variable affected the volume of wheat market supply negatively at 10 % significance level. The marginal effects for this variable revealed that those who have got credit access would decrease the volume of wheat market supply by 8.896 quintal among the whole sample and by 6.242 among the participant group. Credit access increases the likelihood to participate in wheat market supply decrease by 23 %. These explain that credit is a financial instrument to break the low level of wheat market supply problem.

Lagged price of wheat (2021/2022): - : This variable also affected wheat market supply positively at 1% significance level. As farmers lagged price for wheat is attractive, the volume of wheat market supply would increase by 0.009 quintal among the whole sample and by 0.006 quintal among the participant group. The study result is line with the study by Samuel (2019) result which indicated that lagged price hurt the variable affects supply of Coffee to the market positively and significantly. Lagged price of wheat increased by one birr the probability of farmers being participant increased by 0.02 %, others factors being constant.

4.4.2. Determinants of wheat producers market outlets choice

A multivariate probit model was used to identify factors affecting the choice of Market outlets such as local collector, wholesalers, retailers and consumers which are dominant market chain actors in the study area. In the Woreda, wheat is produced for both consumption and sale but due to the provision of the high price for wheat than other crops majority of the production is used for sale at farm household level.

Wald chi2 test of independence was used to test the overall significance of the model. Wald chi2 test was used to test the overall significance of the model. The Wald test (χ^2 (28) =52.4, Pr = 0.0034) is significant at a 1% significant level, which indicates that the coefficient of the model is jointly significant and that the explanatory power of the factors included in the model is satisfactory; thus, the MVP model fit the data reasonably well. The simulated maximum likelihood test (LR χ^2 (6) =25.248 Prob> χ^2 = 0.0003) of the null hypothesis of independence between market outlets choices (Likelihood ratio test of $\rho_{21} = \rho_{31} = \rho_{41} = \rho_{32} = \rho_{42} = \rho_{43} = 0$) is significant at 1% significant level. Therefore, the null hypothesis that all the (actor's matrix) values are jointly equal to zero is rejected, indicating the goodness of the fit of the model and the decision to choose four wheat market outlets choices were interdependent. Thus, the use of the MVP model is valid to determine factors that affect the market outlets choice in table below.

The rho values in the log-likelihood ratio test indicate the degree of correlation between each pair of dependent variables. The rho21 (correlation between wholesaler and local collector outlets) is negatively interdependent and significant at a 10% significant level. This shows wheat producers who deliver to wholesalers are less likely to supply to local collector. This in turn indicates that there was competitive behavior between wholesalers with local collector. The rho31 (correlation between retailers and local collector outlets) is negatively interdependent and significant at a 10% significant level. This shows wheat producers who deliver to retailers are less likely to supply to local collector. This in turn indicates that there was competitive behavior between retailers with local collector.

On the other hand, rho42 (correlation between the consumers and wholesaler outlets) are negatively interdependent and significant at a 5% significant level. This result also shows that wheat producers who supply to consumer are less likely to supply to the wholesaler this in turn indicates that there was competitive behavior between consumers with wholesaler. The rho43 (correlation between the consumer and retailer outlets) are negatively

interdependent and significant at a 5% significant level. This result also shows that wheat producers who supply to consumer are less likely to supply to the retailer.

According to the MVP model result, the probability that wheat farmers would select local collect outlets, wholesalers' outlets, retailer outlets and consumers outlets was 6.94%, 10.7%, 9.8%, and 50.4%, respectively. The findings indicate that selecting local collector outlets has a lower probability (6.94%) when compared to selecting wholesaler outlets (10.7%), retailer outlets (9.8%), and consumer outlets (50.4%). The result also shows that the joint probability of using all outlet choice was 0.001% for success and 31.5% for failure of joint probability to use all outlets.

Table 19: MVP estimation for determinants of wheat producers' market outlets choice

Market outlets								
Variable	local collector		Wholesaler		Retailer		Consumer	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Education	-0.656*	0.370	0.145	0.242	-0.073	0.265	0.106	0.176
Family size	- 0.4344	0.338	0.086	0.170	-0.095	0.231	0.104	0.118
Credit	-3.773	371.2	-0.324	0.722	-4.339	300.13	0.722	0.475
Extention service	-0.209	0.545	0.278	0.467	-0.801*	0.440	0.109	0.311
Distance	- 0.172	0.163	0.140	0.104	-0.243**	0.126	-0.012	0.068
Market infon	0.140	0.525	0.153	0.420	-0.677*	0.49	0.011	0.278
Quantity produce	0.038***	0.010	0.022***	0.006	0.020***	0.007	-0.012**	0.005
Cons	0.432	2.015	-3.814	1.414	0.073	1.645	-0.297	0.934
Predicted probability	0.0694		0.107		0.098		0.504	
Joint probability (success)							0.00001	
Joint probability (failure)							0.315	
Number of draws (#)							5	
Numbers of observations							124	
Log-likelihood							-154.009	
Wald chi2 (28)							52.48	
Prob > chi2							0.0034	
Correlation matrix of residuals:								
		rho1		rho2		rho3		rho4
rho 1		1						
rho 2		-0.345*		1				
rho3		-0.455*		-0.1392		1		
rho4		0.282		-0.412**		-0.514**		1
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0: chi2(6) = 25.248 Prob > chi2 = 0.0003								

***, ** and * are statistically significant at 1%, 5% and 10% respectively.

Source: survey result, 2021/2022

Education level (EDLEV): It negatively and significantly influences on local collector at 10 % significant level. The negative relationship between education level and selling retailer of market outlet can be explained by the fact that being educated enhances the capability of farmers in making informed decisions concerning the choice of marketing outlets to sell their farm produce based on the marketing margin and marketing cost.

Frequency of Extension service (EXT_SRV): Frequency of extension contact had a negative and significant effect on the choices of retailer on wheat market outlets choice at 10% significant level. Nefisa (2018), who found that the probability of wheat producers choosing retailer market outlets was influenced negatively by the frequency of extension contact.

Distance nearest to the market (DNM): It influences negatively the likelihood of choosing retailers market outlets at a 5% significant level. Those households whose residences are far away from the market place are less likely to sell their product to retailer due to high transport costs and product loss in the way. This result is consistent with the finding of Nefisa (2018) and Sultan (2016), who found the distance to the nearest market, affected the probability of wheat producers using wholesalers' market outlet negatively significant.

Access to market information (MKTINFO): it has negatively and significantly association with retailer at 10% significant level. Access to market information to producers helps to analyze price differences in different locality and different market outlet choices and finally improves decision-making ability on what to produce and to whom to sell that increase the probability of choosing retailers outlets or other market outlet.

Quantity produced: It has positively associated with local collector, retailers and wholesalers market outlets choice at 1% significant level while negatively associated with consumers' market outlet choice at 5 % significant level. This result reveals that those wheat producers who produce and supply of wheat were more likely to sell their product to wholesalers, retailer and local collector market outlet than a consumer's market outlet choice. This result is consistent with the finding of Addisu (2016), who found a quantity of wheat produced vegetables supplied to the market was positively, affected wholesalers, retailer and local collectors and negatively affected consumer market outlet choices.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary and Conclusion

This study was conducted in Hageremariam Kesem district, North Shewa Zone Ethiopia as the area is known for its potential in production of wheat. It was aimed to identify the S-C-P of wheat market, identifying the factors that determines marketed supply of wheat and to identify factors affecting market out let choice by wheat smallholder farmers in Hageremariam Kesem district. For this study, both qualitative and quantitative types of data were collected from primary and secondary sources. Data from the primary source were obtained from 124 wheat producers from three random selected kebeles and 20 wheat market chain actors like traders such as local collectors, retailers and wholesalers collected through a survey. Data from secondary source were obtained from different unpublished and archival sources such as articles/literatures, CSA report data, internet and district agricultural office. Descriptive statistics and econometrics model were used to analyze the collected data.

The results of descriptive statistics showed that from the total sampled respondent, 80.85% were male and the remaining 19.15% were female headed households. From the sample respondent the average Education level were 5 level. This shows that the majority of farmers has completed at least primary school. The average age of household headed were 57 years. The wheat market supply participation and non -participation in family size has negatively and significantly at 1 % significant level. The average wheat farm experience of the sample household of wheat market participation were 36.5 and non-participation were 36.26. The participation and non -participation of wheat marketed to the land holding size, Land allotted and cultivated area of t-value has negatively and significantly at 1 % significant level respectively. The market participation and non-participation of wheat production were negatively significant at 1% significant level.

Five wheat marketing actors namely farmer, wholesaler, retailer, local collector and consumer with creating five major channels were identified. The structure-conduct-performance approach was used to analyze performance of wheat market in the study area. Four firms concentration ratio, barriers to entry, traders price setting strategy, marketing margin and costs were employed to analyze wheat market structure, conduct and performance in Hageremariam Kesem district. CR4 shows that the top four wheat traders handled 58.58 % of the wheat purchased by all sampled traders in the study area. This implies

that the wheat market structure of wholesaler in Hageremariyam Kesem district was strong oligopoly.

Tobit model indicted that the determinant of wheat market volume were significantly affecting by Age, Sex and Lagged price positively significant, while access to credit has negatively significant. Multivariate model for the determinants of producer market outlet choice decision were used for data analysis. Education, Access to market information, Extention service Distance to the nearest market and wheat production were affected negatively and positively significant to the producer market outlet choice.

Generally, the structure conduct performance of Hageremariyam Kesem district wheat market indicated that somewhat being inefficient. Tobit model was used to examine factors influencing wheat marketed volume in the study area. Therefore from these results the following recommendations are drawn so as to make an intervention in wheat market.

5.2. Policy Recommendations

The following recommendations were suggested to be taken into consideration in the future intervention strategies that are intended to increase market competitiveness and to increase producers to wheat market supply in the woreda.

The district's wheat market has a strong oligopolistic structure, and it behaves differently from other markets in terms of competition. The market performance in the research sector is inefficient as a result. Therefore, it is necessary to increase the bargaining power of wheat producers through the creation of cooperatives and remove market entry restrictions in order to encourage potential traders to enter the wheat market and increase market competition.

Sex of household head: The results of econometric analysis indicated that wheat market participation is positively and significantly affected by being male household head. This indicates male headed households are more likely to participate in wheat market than female headed households. This may be due to female headed households have limited resources and also they are unable to plough land due to social norms and may be requirement of more energy. Therefore, there is a need to support male headed households through different policy initiatives and interventions to boost their production and increase market participation so as to improve their livelihood.

Lagged price stimulate the volume of wheat marketed: It was anticipated to have a positive impact on the intensity of wheat market supply. The volume of wheat market supply will decrease until the price rises if producers are not interested in selling their wheat at the lagged market pricing. Therefore government, trader and office of agriculture and natural resource the price of wheat should be fair.

The decision of which market outlet to select is initially greatly influenced by the distance to the closest market. Therefore, setting up wheat gathering facilities in potential producing regions motivates wheat farmers. Government engagement is also required to improve equal access to road and transportation infrastructure in order to support the efficient sale of wheat through all channels. The finding of this study were policy aiming at offering farmers a fair price and targeting gender inclusive strategy (paying attention to women) were recommended.

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7. APPENDIX

7.1. Appendix Tables

Appendix Tables 1: Tobit model

quants	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
sex	11.69365	6.528436	1.79	0.076	-1.241609	24.62891
age	.782774	.3452666	2.27	0.025	.0986724	1.466876
educ	.7809028	.763887	1.02	0.309	-.7326414	2.294447
familysize	2.410408	2.368521	1.02	0.311	-2.282511	7.103328
landholding	.5841914	1.016429	0.57	0.567	-1.429733	2.598116
wheatexperianc	-.3738089	.3046391	-1.23	0.222	-.9774123	.2297945
incom	.0012002	.0022788	0.53	0.599	-.003315	.0057153
credit	-14.23815	8.014747	-1.78	0.078	-30.11834	1.642046
extn	2.102509	2.361245	0.89	0.375	-2.575996	6.781013
distanc	-.432849	1.411073	-0.31	0.760	-3.228709	2.363011
Laggprice	.0149224	.0025252	5.91	0.000	.0099191	.0199257
mobileave	-1.882104	5.507313	-0.34	0.733	-12.79414	9.029932
_cons	-100.0557	24.45868	-4.09	0.000	-148.5175	-51.59397
var(e.quants)	548.4567	79.50064			411.5382	730.9279

Appendix Table 2: Marginal effect on observed variable censored and uncensored

	Delta-method				[95% Conf. Interval]	
	dy/dx	Std. Err.	z	P> z		
sex	7.306607	4.103096	1.78	0.075	-.7353129	15.34853
age	.4891049	.2179016	2.24	0.025	.0620256	.9161842
educ	.4879358	.4791675	1.02	0.309	-.4512153	1.427087
familysize	1.506109	1.483127	1.02	0.310	-1.400766	4.412983
landholding	.3650235	.634896	0.57	0.565	-.8793498	1.609397
wheatexperianc	-.2335691	.1915362	-1.22	0.223	-.6089732	.1418351
incom	.0007499	.0014278	0.53	0.599	-.0020486	.0035484
credit	-8.8965	5.035785	-1.77	0.077	-18.76646	.9734575
extn	1.313722	1.473945	0.89	0.373	-1.575158	4.202602
distanc	-.2704594	.8805036	-0.31	0.759	-1.996215	1.455296
Laggprice	.009324	.001278	7.30	0.000	.0068193	.0118288
mobileave	-1.176005	3.439296	-0.34	0.732	-7.916901	5.564891

Appendix Table 3: Marginal effect on observed variable given uncensored

	Delta-method					[95% Conf. Interval]	
	dy/dx	Std. Err.	z	P> z			
sex	5.127288	2.877132	1.78	0.075	-.5117882	10.76636	
age	.3432211	.1527228	2.25	0.025	.0438899	.6425523	
educ	.3424007	.3361338	1.02	0.308	-.3164095	1.001211	
familysize	1.056886	1.040494	1.02	0.310	-.9824441	3.096216	
landholding	.256149	.4455127	0.57	0.565	-.6170398	1.129338	
wheatexperianc	-.1639031	.1343381	-1.22	0.222	-.427201	.0993947	
incom	.0005262	.0010018	0.53	0.599	-.0014372	.0024897	
credit	-6.242968	3.531218	-1.77	0.077	-13.16403	.6780919	
extn	.921882	1.034244	0.89	0.373	-1.105199	2.948963	
distanc	-.1897903	.6179098	-0.31	0.759	-1.400871	1.021291	
Laggprice	.006543	.000901	7.26	0.000	.004777	.0083089	
mobileave	-.8252416	2.413489	-0.34	0.732	-5.555593	3.90511	

Appendix Tables 4: Marginal effect on probability of being uncensored

	Delta-method					[95% Conf. Interval]	
	dy/dx	Std. Err.	z	P> z			
sex	.1893659	.1066239	1.78	0.076	-.019613	.3983448	
age	.0126762	.0056743	2.23	0.025	.0015547	.0237977	
educ	.0126459	.0123957	1.02	0.308	-.0116493	.0369411	
familysize	.0390339	.0384912	1.01	0.311	-.0364075	.1144753	
landholding	.0094603	.0164807	0.57	0.566	-.0228412	.0417619	
wheatexperianc	-.0060534	.0049494	-1.22	0.221	-.0157541	.0036472	
incom	.0000194	.0000369	0.53	0.598	-.0000529	.0000918	
credit	-.2305713	.1310349	-1.76	0.078	-.4873949	.0262524	
extn	.0340478	.0383543	0.89	0.375	-.0411252	.1092209	
distanc	-.0070095	.0228602	-0.31	0.759	-.0518147	.0377957	
Laggprice	.0002417	.0000451	5.36	0.000	.0001533	.00033	
mobileave	-.0304786	.0892192	-0.34	0.733	-.205345	.1443878	

Appendix Tables 5: Multivariate probit model

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
COLLECTOR						
edul	-.6562181	.3706166	-1.77	0.077	-1.382613	.0701771
famsz	-.4344781	.3386353	-1.28	0.199	-1.098191	.229235
credit	-3.773277	371.2099	-0.01	0.992	-731.3314	723.7848
exts	-.2094881	.5454381	-0.38	0.701	-1.278527	.859551
dism	-.1724221	.163234	-1.06	0.291	-.492355	.1475107
mrtinfo	-.1403968	.525791	-0.27	0.789	-1.170928	.8901346
production	.0389165	.010607	3.67	0.000	.0181273	.0597058
_cons	.4322726	2.015425	0.21	0.830	-3.517887	4.382433
WHOL						
edul	.1455551	.242683	0.60	0.549	-.3300948	.6212049
famsz	.0869063	.170133	0.51	0.609	-.2465483	.4203609
credit	-.3245146	.7225281	-0.45	0.653	-1.740644	1.091614
exts	.2789101	.4672998	0.60	0.551	-.6369808	1.194801
dism	.1404198	.1046299	1.34	0.180	-.0646511	.3454907
mrtinfo	.1533277	.4209294	0.36	0.716	-.6716788	.9783342
production	.0226349	.0065892	3.44	0.001	.0097203	.0355496
_cons	-3.814557	1.414363	-2.70	0.007	-6.586658	-1.042456
RETAILER						
edul	-.0737311	.2650815	-0.28	0.781	-.5932812	.4458191
famsz	-.0958769	.2318791	-0.41	0.679	-.5503516	.3585977
credit	-4.339241	300.1386	-0.01	0.988	-592.6002	583.9217
exts	-.8010589	.4406624	-1.82	0.069	-1.664741	.0626236
dism	-.2433143	.1265014	-1.92	0.054	-.4912526	.004624
mrtinfo	-.677104	.4097684	-1.65	0.098	-1.480235	.1260273
production	.020286	.0073698	2.75	0.006	.0058414	.0347306
_cons	.073569	1.645258	0.04	0.964	-3.151077	3.298215
consumer						
edul	.1068278	.1760261	0.61	0.544	-.238177	.4518326
famsz	.104563	.1185055	0.88	0.378	-.1277036	.3368296
credit	.7225454	.4751254	1.52	0.128	-.2086833	1.653774
exts	.109635	.3113852	0.35	0.725	-.5006688	.7199388
dism	-.0122295	.0686689	-0.18	0.859	-.146818	.122359
mrtinfo	.0119334	.2783889	0.04	0.966	-.5336988	.5575657
production	-.0125452	.0056244	-2.23	0.026	-.0235688	-.0015215
_cons	-.2973121	.9347197	-0.32	0.750	-2.129329	1.534705

Appendix Tables 6: Heckman two stage model

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
quants						
sex	10.3231	6.990111	1.48	0.140	-3.377266	24.02346
age	.8119133	.3470543	2.34	0.019	.1316993	1.492127
educ	.8284534	.8014699	1.03	0.301	-.7423988	2.399306
familysize	3.361471	2.454182	1.37	0.171	-1.448638	8.17158
landholding	.4929443	1.027178	0.48	0.631	-1.520288	2.506176
wheatexperianc	-.4049316	.303368	-1.33	0.182	-.999522	.1896588
incom	.0019725	.0023624	0.83	0.404	-.0026578	.0066028
credit	-15.13067	8.016965	-1.89	0.059	-30.84364	.5822891
extn	1.464913	2.587327	0.57	0.571	-3.606155	6.53598
distanc	.7410492	1.57719	0.47	0.638	-2.350187	3.832285
Laggprice	.0008952	.0067215	0.13	0.894	-.0122787	.014069
mobileave	.5136343	5.661788	0.09	0.928	-10.58327	11.61053
_cons	-52.87627	35.70861	-1.48	0.139	-122.8639	17.11132
participat						
sex	14.50433	21.94048	0.66	0.509	-28.49822	57.50687
age	-.2157793	.5010153	-0.43	0.667	-1.197751	.7661926
educ	.4189844	.8052561	0.52	0.603	-1.159289	1.997257
familysize	1.056524	3.925781	0.27	0.788	-6.637865	8.750912
landholding	-.1301271	.4952987	-0.26	0.793	-1.100895	.8406405
wheatexperianc	.1653761	.398266	0.42	0.678	-.615211	.9459632
incom	-.0006891	.0017487	-0.39	0.694	-.0041164	.0027382
credit	7.106329	19.60501	0.36	0.717	-31.31879	45.53145
extn	1.915539	2.244432	0.85	0.393	-2.483467	6.314546
distanc	-2.003593	2.436464	-0.82	0.411	-6.778974	2.771788
Laggprice	.0064765	.009154	0.71	0.479	-.011465	.024418
_cons	-21.40355	35.36336	-0.61	0.545	-90.71446	47.90737
/mills						
lambda	3.111898	22.00647	0.14	0.888	-40.01999	46.24378
rho	0.13448					
sigma	23.140063					

Appendix Table 7: Double hurdle model

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Tier1						
sex	163.5018	4114.12	0.04	0.968	-7900.025	8227.029
age	-6.105148	210.4806	-0.03	0.977	-418.6395	406.4292
educ	-2.310135	207.7324	-0.01	0.991	-409.4581	404.8379
familysize	8.20258	1595.279	0.01	0.996	-3118.487	3134.892
landholding	13.68021	624.9822	0.02	0.983	-1211.262	1238.623
wheatexperianc	2.902332	160.5914	0.02	0.986	-311.851	317.6557
incom	-.0468715	1.243179	-0.04	0.970	-2.483457	2.389714
credit	-114.4043	3405.805	-0.03	0.973	-6789.659	6560.85
extn	-42.49888	983.9971	-0.04	0.966	-1971.098	1886.1
distanc	-3.476104	535.4552	-0.01	0.995	-1052.949	1045.997
laggprice	350.2084	7758.701	0.05	0.964	-14856.57	15556.98
mobileave	14.21815	1333.685	0.01	0.991	-2599.757	2628.194
_cons	101.8985	5845.96	0.02	0.986	-11355.97	11559.77
Tier2						
sex	277.8533	544.3229	0.51	0.610	-788.9999	1344.707
age	14.08461	25.99282	0.54	0.588	-36.86039	65.02961
educ	18.60624	38.06621	0.49	0.625	-56.00216	93.21464
familysize	49.76561	98.25777	0.51	0.613	-142.8161	242.3473
landholding	17.60601	39.1854	0.45	0.653	-59.19595	94.40798
wheatexperianc	-5.257063	11.10895	-0.47	0.636	-27.03021	16.51608
incom	.0293483	.0692355	0.42	0.672	-.1063507	.1650474
credit	-598.1261	1185.282	-0.50	0.614	-2921.237	1724.984
extn	38.44092	92.16949	0.42	0.677	-142.208	219.0898
distanc	-3.428183	34.75018	-0.10	0.921	-71.53729	64.68092
Laggprice	.0186241	.1240005	0.15	0.881	-.2244125	.2616607
mobileave	-26.4478	133.5691	-0.20	0.843	-288.2385	235.3429
_cons	-1986.517	3819.445	-0.52	0.603	-9472.491	5499.457
sigma						
_cons	107.6442	107.8358	1.00	0.318	-103.71	318.9984

7.2. Questionnaires

HOUSEHOLD SURVEY QUESTIONNAIRE ON MARKET CHAIN ANALYSIS OF WHEAT, IN HAGEREMARIAM KESEM WOREDA, NORTH SHEWA ZONE OF AMHARA REGIONAL STATE OF ETHIOPIA

This study is conducted to find out the factors that determinants of market supply of wheat and market out let choice among wheat producer households in hageremariam kesem woreda Ethiopia. The information provided will assist in the formulation of policies and programs that will improve wheat marketing in the district. The information will be treated with strict confidentiality.

1. General Information

1. Name of Kebele _____

2. Household Characteristics

1. Name of household head _____

2. Sex of household head; 1= Male 0= Female

3. Age of household head_ years 1/ <18 years 2/ 19-29 years 3/30-50years 4/above 50

4. Education level of household head 1.illiterate 2.primary 3.secondary 4. Diploma 5.degree

5. Marital status of the household head; 1. Single 2.Married 3.Divorced 4. Widows

6. Family size___ 1/ <3 member 2/ 4-6 member 3/ 7-9 member 4/above 9 member

3. Resource ownership Landholding size and Farming characteristics

7. Total land holding owned _____ (ha)

A. Cultivated area _____ (ha)

B. Land allotted for wheat _____ (ha)

8. What is the rental value of one timed of land? _____ Birr.

9 .When did you started wheat production (wheat farming experience) ____ (years)

10. Amount of wheat you produced in 2013/14E.C? _____quintal/chinet/.

4. Source of Income

Farm income

11. An estimate of annual cash income from

a) Sale of crops _____Birr/year

b) Sale of livestock _____Birr/year

c) Sale of livestock products (milk, butter, egg...) _____Birr/year

d) Off-farm income _____Birr/year

e) Other sources _____Birr /year (specify) _____

5. Access to credit services

12. Do you have access to credit? 1. Yes =1 2. No=0

13. Have you received formal credit in 2014 E.C? 1. Yes =1 2. No=0

14. From where did you get the credit service? 1. Cooperatives 2. Micro finance 3. Local money Lender 4. Saving and credit Association 5. Others (specify) _____

15. What was the precondition to get credit? 1. Membership 2. Personal guarantee 3. Land holding 4. Others (specify) _____

16. for what purpose you used? 1 crops inputs purchase. 2. Livestock purchase 3. Household consumption 4. Land rent 5. Others (Specify) _____

17. What problem do you perceive in taking formal credit? 1. Inadequacy of supply 2. High interest rates 3. Restrictive procedures 4. Others (specify) _____

6 Extension Services

18. Did you have an extension access in 2013/14? 1. Yes =1 2. No=0

19. What type of extension service did you get? 1. Technical advice 2. Price information 3. Input use 4. Credit use-making 5. Other _____

How many the frequency of extension service in one years? 1. Two 2. Three 3. Four 4. Five 5. Six 6. Above six

7. Marketing aspect and distance

20. What is the total amount of wheat you sold in 2013/14 ___/___qt, in 2013/14 _____ birr/kg?

21. To whom did you sold? 1. Direct to consumers 3. To rural collectors 4. To urban assemblers 2. To wholesalers 5. To retailers

22. What was the Price per kilo gram? 1. in 2013/14 ___/___Birr/kg.

23. Do you have your own transportation means equines (donkey, horse, and mule)? 1. Yes=1 2. No=0.

24. How many kilometres you need to travel to get? 1. The nearest market for selling wheat _____ Km (walking minutes....) 2. The district market _____ Km

25. Where do you sale/market place? 1. within village 2. Outside village 3. Within district 4. Outside district

Place of sale	Price when the product is sold to			
	Producer	Retailers	L. collectors	Wholesalers
within village				
Outside village				
Within district				
Outside district				

8 Price information

26. What is the trend of a wheat price for the past two years? 1. Increasing 2. Decreasing 3. Stable

27 do you have the attractiveness of wheat selling price in2013/2014? 1. Yes =1 2. No= 0

Years	2013	2014
Average price per 100kg in birr		

28. Who decides on price during selling? 1. Traders 2. Producers 3. Brokers 3. Negotiation of farmers with traders 4. Others (specify)

29. If broker/middlemen negotiate on price, who will pay for him? 1. Farmer 2. Trader

If farmer, how much do you pay for him per quintal _____ birr/qt.

9. Market information

30. When do you sell last year's wheat produce? 1. Immediate after harvest 2. One month later 3. More than two months

31. If you sell immediately after harvest, why you did that? 1. Better price 2. Storage problem 3. Fear of price fall 4. Bulk of production 5. Others (specify) _____

32. What do you consider to supply your wheat to the market? 1. Assess price information and supply if better 2. When we need money, we supply 3. Others (specify) _____

33. Do you get market information before supplying your product to market? 1. Yes=1 2.No =0

To whom get information 1. Traders 2. Friends/neighbour 3. Media 4. Others (specify_____)

10. Wheat production

Input Supply

34. Have you used agricultural inputs (fertilizer, chemicals, improved seeds, etc.) for the production of wheat? (√) 1. Yes,2. No 0

Type of input	Did you use for wheat? 1. Yes,=1 2. No =0	Price (Qt/Lit)	Source: 1.Own2.Government, 3.Cooperative 4.Private
Improved seed(Kg)			
Fertilizer NPS			
UREA			
Herbicide, Fungicide and insecticide			
Others (specify)			

Marketing constraints

No.	Constraints	1. Yes =1 2. No= 0	No Rank according to the severity of the problem
1	Low price		
2	Less/no market information		
3	Low bargaining power		
4	Price instability		
5	No buyer or lack of market		

35. What are the major wheat production constraints?

No.	Constraints	Rank (according to importance)	Rank
1	Broadcast sowing		
2	Low soil fertility		
3	Weed		
4	Shortage of improved variety seed		
5	The high price of inputs		
6	Shortage of rain		
7	High rainfall		
8	Others		

2. Questionnaire for traders on “Market chain analysis of wheat in hageremariam kesem woreda, Amhara Regional state of Ethiopia”

Name of Market _____

I. Socio-demographic characteristics of traders

1. Name of trader _____

2. Age of trader _____ Years old.

3. Sex of trader 1. Male 2.Female

4. Marital status of the household head; 1. Single 2.Married 3.Divorced 4. Widows

5. Total family size _____

6. Educational level of trader? 1. Illiterate 2. Primary School 3.Secondary School 4.diploma

5. Degree

7. Major businesses you engaged? 1. Wholesaler 2. Urban assembler 3. Rural collector 4. Retailer 5. Processor

8. For how long have you been in this business? _____ Years

9. With whom you trade wheat? 1. Alone 2.With family 3. With partners

10. When did you do your business? 1. Year round 3. Once in a week 2. When purchasing price is low 4. During holiday only 5. Others (specify) _____

II. Capital

11. How much your initial working capital when you started the business? _____Birr

12. How much was the amount of your working capital in 2014? _____ Birr

13. What was the source of the working capital in? 1. Own 2. Loan 3. Gift 4.Share 5. Others (specify) _____

14. If it was loan, from whom did you borrow? 1. Relative/family 2. Other traders 3. Friends 4. Private money lender 5. Banks

15. What was the reason behind the loan? 1. To build store 2. To purchase a car 3. For working capital 4. Others (specify) ____

III. Purchase practice

16. How much amount of wheat did you purchase? In 2014/15_____Birr/kg

17. How much amount of wheat did you sold? In 2014/15_____ Birr/kg

18. Who purchase wheat for you? 1. Myself 2. Friends 3. Through brokers 4. Family members 5. Commission agent 6. Others_____

19. Who were your major buyers? 1. Wholesalers 3.Retailers 5. Urban assembler 2. Millers/processors 4.Urban consumers' 6.Gov't organizations 7. Others _____

20. Who were your major suppliers? 1. Wholesalers 2. Village collectors 3.Retailers 4. Urban assemblers 5. Farmers 6. Gov't organizations 7. Others _____

21. How was the supply of wheat in 2013/14 compared to the previous year? 1. Increased 2. Decreased 3. No change.

22. What is the reason behind your response? 1. _____

2. _____

23. What is your mode of buying and selling strategy? 1. in cash 2. In credit 3. In combination of both cash and credit.

24. What was the major problem to enter wheat trade? 1. License 2.Lack of starting capital
3. Government policy 4. Trading experience 5. Other (specify) _____

25. What are the main criterias to be licensed wheat traders? 1. Initial capital 2. Interest 3.
Wheat trading experience 4. Others (specify) _____

26. How do you see the procedure to get the license? 1. Complicated 2. Easy

27. How much amount Birr is required to get the license? _____ Birr.

V. Selling

27. To whom do traders sell wheat grain? _____

28. Where do traders sell (place/s)? _____

29. Average price per kg when reselling _____ birr

30. Do traders have longstanding customers for selling wheat they bought?

31. Do they (processors) have specific criteria for your products? 1. Yes 2. No

32. What are the requirements of buyers in terms of quality? _____

33. Who is the price maker in the wheat market? _____

34. Factors affecting the price of products and services in the area _____

IV. Costs.

Marketing cost component	Cost per quintal
Sack price (packaging materials)	
Loading& unloading	
Processing	
Transportation	
Storage	
Permanent and temporary workers	
Wage for permanent employee	
Personal travel	
Total cost	

35. How did you get information on supply, demand & price of grains in other markets?

From: 1.Other traders 2. Media 3.Others (specify) _____

Consumers Interview

General Information

1. Name of Respondent: _____
2. Zone _____; Woreda _____; Kebele _____; Village _____
3. Sex; 1=Male 2=Female
4. Marital status 1=single 2= Married 3= Divorced 4= widowed (widower)
- 5 .Age of respondent _____
- 6 .Education level _____
7. Means of income; 1= Farming 2= Trade 3=Employment 4=others (specify) _____
8. Source of wheat 1=Own produce 2=purchase
9. Distance from nearest town _____
10. Means of income generation _____
11. Income earn per monthly _____
12. Experience in wheat consumption _____
13. Total family size _____
14. Linkage with commercial wheat market chain actors: (√) (Multiple responses are possible)
1. [] local collectors 2.[] Farmers 3. [] Retailers 4.[] Wholesalers 5. [] Brokers 6.[]
Cooperatives 7. Others (specify) _____
15. Do you think traders of wheat marketing are efficient and competitive? Yes 1. No 0

Purchase of Wheat

1. As a buyer, do you have difficulty in obtaining sufficient supplies? (√) 1. Yes 0. No
2. As a buyer, do you have a particular seller? (√) 1. Yes 0. No
3. If the answer to Q. 2 is yes, how many farmers could be your potential sellers?
4. Do you consider any quality requirements to purchase Wheat? (√) 1. Yes 2. No
5. If yes for Q.4, what quality requirement do you consider?
6. Do you know the benefits of consuming wheat products? (√) 1. Yes 2. No
7. What should be done to increase wheat product consumption? _____
8. Do you think that the price of wheat reduced if the value chain actors' linkage is improved?
(√) 1. Yes 2. No.

Thank you