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EXPLORING THE MARKET CHAIN ANALYSIS OF WHEAT IN ETHIOPIA: THE FARMERS BENEFIT PERSPECTIVE

MBA THESIS

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APPROVALS

We, the undersigned, hereby certify that we have read and fuly endorse the acceptance of the thesis submitted by Henok Tilahun titled "Exploring The Market Chain Analysis Of Wheat In Ethiopia: The Farmers Benefit Perspective". We recommend its approval as it meets the criteria for partial fulfilment of the requirements necessary for obtaining a Master's Degree in Business Administration from Addis Ababa University.

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Letter of Certification

I certify that Henok Tilahun has successfully completed his theses on the topic "Exploring The Market Chain Analysis Of Wheat In Ethiopia: The Farmers Benefit Perspective" under my guidance and supervision. I assure you that his work meets the necessary standards to be considered as a thesis for the Master of Arts in Business Administration.

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DECLARATION

I also declare that I am the author of this thesis entitled "exploring the market chain analysis of wheat in Ethiopia": the farmers benefit perspective. I received guidance from my advisor throughout this process. The content presented here is primarily my own work unless stated otherwise in the text. Furthermore, I confirm that this work has not been submitted, either wholly or partially, for any other academic degree or professional qualification.

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ACRONYMS

BoARD	Bureau of Agriculture and Rural Development
BoFED	Bureau of Finance and Economic Development
CC	Contingency Coefficient
CSA	Central Statistic Authority
ETB	Ethiopian Birr
ENS	Ethiopian Nutritional Survey
FGD	Focus Group Discussion
FTC	Farmers' Training Centre
GDP	Gross Domestic Product
GMMP	Gross Marketing Margin for producers
GMMUR	Gross Marketing Margin for Urban retailers
GMMWS	Gross Marketing Margin for wholesalers
FAO	Food and Agricultural Organization
ILRI	International Livestock Research Institute
IPMS	Improving Productivity and Market Success
MFI	Micro Finance Institution
NGO	Non Governmental Organization
NRC	National Research Council
OLS	Ordinary Least Square
S-C-P	Structure Conduct and Performance
SNNPR	Southern Nations Nationalities People Region
SPSS	Statistical Package for Social Science
TGMM	Total Gross Marketing Margin
VIF	Variance Inflation Factor
WOARD	Woreda Office of Agriculture and Rural Development

BIOGRAPHIICAL SKETCH

The author was born on August 1986 in Tiyo woreda qonicha Kebele and attended his primary and high school education at Assela secondary and high school respectively. He joined Bahirdar University in 2004/05 and graduated with B.Sc in mechanical engineering in 2008/09. Currently he is working in Ethiopian airlines as a captain on B777/787.

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LIST OF TABLES

List of tables **pages**

TABLE OF LIST OF APPENDIXES

APPENDIXES PAGES

Table of Contents

ABSTRACT

Value-adding to agricultural commodity is a means to increase farm incomes and to regenerate rural economy. Although farmers are the primary producers and actors of wheat, they were not able to share from the growing market benefit of the product in Ethiopia.This study was aimed at analyzing value chain of wheat in Agarfa district of Bale zone with the specific objectives of identifying wheat value chain actors and their respective functions, analyzing marketing margin of wheat value chain actors and identifyingthe determinants of wheatsoldvolume to the market by producers. The data were obtained from both primary and secondary sources. The primary data for this study were collected from 201 farmers, 68 wheat traders, 6 wheat processors and 15 wheat consumers following appropriate sampling procedures. Descriptive statistics and Two Stage Least Squares of econometric modelwere used to analyze the data. Margin analysis was used to estimate the share by each actor involved in wheat value chain. Value chain analysis result of the study showed that input suppliers, producers, assemblers, wholesalers, retailers, processors, cooperatives and consumerswere the main wheat value chain actors in the study area. Whereas, office of agriculture and natural resources, office of trade and industry, micro f inance institutions, cooperatives office, NGOs and bankswere the main supporting actors. Due to limited capital capacity of farmer primary cooperatives and union, producers are not governing the value chain. Hence, they are price takersand the whole wheat value chain is governed by processor.The results of margin analysis revealed that 22.29% and 26.80% share of margin and profit were captured by wheat producers and 36.63% and 34.76% share of margin and profit were captured by wheat processorsrespectively.This shows that the producers are not adequately benefiting from the further value adding profit. The rest actors (cooperatives, assemblers, wholesalers and retailers) were received sharemarginof8.89%, 9.99%, 12.21% and 9.99% respectively and profit margin of 4.87%, 6.82, 12.26%, and 15.46% in the same order. The result of Two Stage Least Squares indicated that quantity of wheat produced, sex, memberships to cooperative, lag price of wheat, family size and farming experience significantly influenced volume of wheat soldto market. Policy implications drawn from the study findings include the need to improve the input supply system, improving farmers' know how and experience on wheat production, encouraging females productivity,improving productivity of wheat, strengthening the linkage among wheat value chain actors, encouraging farmers to be member of cooperative,concerning bodies should provide last year price information inthe market,strengthening poor profit share and strengthening family planning programs to reduce the amount of wheat consumption at household level.

Key words: Value Chain Analysis, Volume of Wheat Sold, Marketing Margin, Two Stage Least Square, MarginAnalysis

1. INTRODUCTION

This chapter contains background of the study, statement of the problem, objective of the study, research questions selected in such a way, that the overall picture can be attained or verified, significance of the study, scope of the study.

1.1 Background

Wheat is an important staple food crop in Ethiopia, especially in urban areas. It is a staple food in the diets of several Ethiopian, providing about 15 percent of the caloric intake for the country's over 90 million population (FAO 2015a), placing it second after maize and slightly ahead of teff, sorghum, and enset, which contribute 10-12 percent each (Minot et al., 2015). Wheat is also the fourth largest cereal crop produced by close to 5 million smallholder farmers, which makes about 35 percent of all small farmers in the country. It accounts close to 17 percent of acreage of arable land and a fifth of all cereal food crops produced in the country in 2013/14 (CSA, 2013/14a). After South Africa, Ethiopia is the second largest wheat producer in sub-Saharan Africa (FAO 2015b).

In Ethiopia, wheat is one of the most cereal crops in terms of the area of land allocated (1.6 million hectares), volume produced (3.9 million tons) and the number of farmers engaged in its production (4.7 million farmers) with a productivity of 2.4tone per hectare (CSA, 2014; ATA, 2014). The highlands of the central, south-eastern and northwest parts of the country are the main wheat growing areas of Ethiopia; and regionally, wheat production comes from Oromia (57.4%), Amhara (27%), SNNP (8.7%) and Tigray (6.2%) of the national production (CSA, 2014). But nearly all wheat, except few governments owned large-scale (state) farms and commercial farms produced wheat in the country, is produced under rain-fed conditions predominantly by small scale farmers (Demeke and Di Marcantonio, 2013). Therefore, wheat is the most important cereal crops that need much emphasis on its production and marketing.

Wheat has many purposes, better than other cereal crops produced in the country. In Ethiopia, wheat grain is used in the preparation of a range of traditional food products such as the traditional staple pancake (“injera”), fermented bread (“dabo”), non-fermented bread (“hambasha/kitta”),boiled grain (“nifro”), roasted grain (“kolo”), snacks made from bread flour (“dabokolo”),cracked and boiled grain (“kinche”), porridge (“genfo”), local fermented beer (“tella”), distilled local spirit(“areki”), and several other local food items (Nigussie et al., 2015). This shows that wheat is an important market oriented commodity and a major source of income for many wheat growers in Ethiopia; it is crucial for improving their way of life through growing and selling. Thus, wheat marketing is a very important factor in economic development and lack of a well-functioning wheat market and marketing system severely hinders the increase of social welfare, income distribution, and food security of developing countries.

Since Oromia regions makes more than half of the production as cited above, Arsi zone Tiyo woreda is one of the many woredas in the Oromia region that are considered to be the wheat belt areas regarding the volume of production. The woreda is endowed with favorable climatic and natural resource conditions that can grow diverse annual and perennial crops required for household consumption and the market. Despite the fact that, the woreda produces agricultural products based on rain-fed, the presence of two perennial rivers, wolkessa, konicha and akiyya, can boost the production through irrigation. According to WOARD (2002), the major cereals crops grown in the woreda include maize, teff, wheat, potato, and barley.

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The production of wheat is tremendously of a subsistence nature and dominated by the numerous smallholder farmers that cultivate more of wheat for consumption and less of it for the market (Matouš et al., 2013). Of course, as discussed by Minot et al. (2015) and CSA (2013), it is produced by both small-scale and large-scale commercial farms. However, according to Demeke and Marcantonio (2013), except some government-owned large-scale and commercial farms, wheat is produced predominantly by smallholder farmers under rain feed conditions. It is clear that in the woreda small-scale wheat farmers dominate large-scale commercial farms, as a result this gives a bold insight in to the tremendous advantage that the small holder farmers can get from wheat market through an enhanced production and marketing.

Despite of its all importance, there are many problems that hinder marketing of wheat in the country. From these challenges lack of market information, low product quality, weak market linkage, unfair and fluctuated price, low bargaining power of producers and etc are the main challenges that were identified by different scholars. Besides these there are so many other problems that hinder marketing of wheat in the country. Therefore, this paper is focused on market exploring the market chain analysis of wheat in Oromia region Arsi zone Tiyo woreda.

1.2 STATEMENT OF THE PROBLEM

In Ethiopia, small-scale subsistence farmers dependent on low input, rain-fed mixed farming agriculture dominated with traditional technologies accounts for about 95% of the output (Pender *et al*., 2002). Agricultural production and productivity is very low and the growth in agricultural output has barely kept pace with human population growth. This small-scale subsistence agriculture remains by far the most important sector in Ethiopian economy and directly supports about 85% of the population in terms of employment and livelihood; contributes about 50% of the country's gross domestic product (GDP); and supplies around 73% of row material requirement of agro-based domestic industries. It is also the major source of food for the population and hence the prime contributing sector to food security. In addition, agriculture is expected to play a key role in generating surplus capital to speed up the country's overall socio-economic development, (Hassen, 2006).

Agricultural marketing is a very important factor in economic development; as a result, lack of a well-functioning agricultural market and marketing system severely hinders the increase of social welfare, income distribution, and food security of developing countries. Markets and marketing system should be organized deliberately to enable economic development and higher income. (Wolday, 1994).

Improved information and marketing facility enables farmers to plan their production more in line with market demand, to schedule their harvest at the most profitable time, to decide which market to sell their produce to and negotiate on a more even footing with traders and it also enables traders to move their produce profitably from a surplus to deficit market and to make decisions about the economics of storage, where technically possible. Thus the market information is critical to the law of one price and to the price discovery process (Khols and Uhl, 2002).

The efforts of increasing agricultural production and productivity have to be accompanied by a well-performing marketing system which satisfies consumer demands with an optimized margin between producers and consumer prices. Higher prices for producer can encourage farmers to adopt new technologies, increase production and better market system development (Woldy, 1994). However, there are external and internal problems that influence the marketing efficiency in Ethiopia. This has to do with lack of pertinent market information, development of marketing institutions and marketing infrastructure such as storage, transportation, weak market linkage, lower bargaining power of producers etc.

The possible increment in output resulting from the introduction of improved technology could not be exploited in the absence of well-functioning marketing system. An efficient, integrated, and responsive marketing system is of critical importance for optimal allocation of resources in agriculture and in stimulating farmers to increase their output (James, 1972, as cited in Andargachew, 1990). A well-functioning marketing system is not limited to stimulation but it also increases production by seeking additional output.

In Ethiopia, agricultural growth induces higher overall growth than non agricultural sectors since the country's economy is mainly based on agriculture. This leads to faster poverty reduction by generating proportionately more income for farm households who represent the bulk of the poor. From within agriculture, staple crops have stronger growth linkage resulting from more than proportionate increase in total GDP. Moreover, such growth linkage becomes stronger overtime (Diao *et al,* 2007).

Supply of agricultural crop in the study area is subjected to seasonal variation where surplus supply at harvest is the main feature. The nature of the product on the one hand and lack of properly functioning marketing system on the other, often resulted in lower producers' price.

Barley, teff, wheat and beans are the major cash crops grown in the study area mainly for market. However, marketing aspects of none of these were undertaken by any scholar so far in this area. Even if the agricultural marketing system throughout the country has the same draw backs as stated with many papers before at different places, at areas like this need special attention since it is one of the major source of wheat production and can show how significantly the existing market chain has affected the farmers specifically and the country as a whole. Moreover there is a need to explore and employ a market chain approach to fully understand and solve the problem of wheat market at all levels. Yet there is no such study which tries to look into the whole spectrum of marketing chain of wheat and determinants of its supply in Tiyo Woreda. This makes the undertaking of market chain analysis of wheat in the Woreda imperative. This study is designed to explore an optimum market chain that can enable farmers benefit from their product through a well planned market channel and stay competent throughout. In addition it addresses the prevailing information gap on the subject and contributes to proper understanding of the challenges and assist in developing improved market development strategies for the benefit of smallholder farmers.

1.3 OBJECTIVE

1.3.1 General objective

The overall objective of this study is to explore a market chain analysis of wheat in Arsi zone; Tiyo woreda aiming farmers will get the maximum benefit possible.

Specifically;

- ✓ To review the marketing actors and channels in Tiyo woreda.

- ✓ To review the marketing structure, conduct and performance of wheat in the woreda.
- ✓ To review the challenges and opportunities of wheat market in Tiyo woreda.

- ✓ To assess the determinants of marketed supply of wheat.
- ✓ To identify only the necessary actors in the market and create a shorter link.
- ✓ To enable smallholder farmers earn a better income and live a better life.

1.4 RESEARCH QUESTIONS

1: What is the main challenges farmers face with wheat marketing in general?
2: What does the existing market channel look like and who are the main actors?
3: What is the structure-conduct-performance of wheat in the study area?
4: How is it possible to create better and efficient wheat marketing system?

1.5 Significance of the study

This study focuses on the exploration of an optimum market chain analysis of wheat through deep sight in to major determinants of wheat market participants, credit condition for farmers, marketing margin and identifying opportunities and constrains of wheat marketing in Tiyo woreda.

The information is expected to point out an efficient market channel from where small holder farmers benefit better by closing the huge price gap and creating an easily accessible market linkage with the end users as much as possible. Moreover it will assist government officials and policy makers what level of emphasis they should give for the agricultural markets with respect to its advantage on the bigger picture.

1.6 Scope and limitation of the study

This study was undertaken in Oromia region, Arsi zone Tiyo woreda. The study emphasized different market levels, role and type of market actors in the marketing channel, market directions, producers bargaining characteristics, traders buying and selling strategies, storage, transportation, market information, and financial institution involved in the market and determinants affecting supply of wheat in the study area was also seen. The study was restricted to exploring the market chain analysis wheat in the above mentioned woreda. In addition, the shortage of logistics, time and budgets made the researcher unable to consider additional sample of wheat producing Kebele and other neighboring markets found in and out of the study area.

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews various literatures related to the research problem. These are basic concepts of markets, agricultural marketing and market chain, Benefit of Market Chain in Agricultural sector and wheat market chain status in Ethiopia. Additional literature information has also been presented to help have a bigger picture of the research and general information related to the market chain analysis of agricultural products.

2.2 Theories and Basic Concepts of marketing and Market Chain

2.2.1 Market

A market can be described as simple arrangements to facilitate exchange of one thing for another (Bain and Howells, 1988). The most observable features of a market are its pricing and exchange processes and it is more than a physical place. No need to meet physically for a market to operate especially in today's information and communication technologies.

2.2.2 Marketing

The word is the process of "creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large," according to the American Marketing Association. This process is done in a number of different ways; (Crammer and Jensen, 1997).

Purcell (1979) forwarded a broader definition i.e. marketing is the set of economic and behavioral activities that are involved in coordination the various stages of economic activities from production to consumption.

2.2.3 Agricultural marketing

The term agricultural marketing is composed of two words- agriculture and marketing. Agriculture, generally means growing and/or raising of crops and livestock while, marketing encompasses a series of activities involved in moving the goods from the point of production to point of consumption.

According to Thomson agricultural marketing comprises all the operations, and the agencies conducting them, involved in the movement of farm produced foods; raw materials and their derivatives, such as textiles, from the farms to the final consumers, and the effect of such operations on the farmers, middlemen and consumers.

2.2.4 Marketing system

The concept of marketing system includes both the physical distribution of economic input and products and the mechanism of process or coordinating production and distribution (cited RA Layton, 2017). Branson and Norvell (1983) define the marketing system in terms of what is otherwise known as marketing channel. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers. Marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final Consumers (Islam *et al*., 2001).

2.3. Basics Concepts Wheat Marketing structures in Ethiopia

Wheat is produced mainly for consumption in Ethiopia and its trend is increasing. Besides its consumption, it is also used for markets which contribute to 80% of the total marketed quantity of cereal production and there is a large demand-supply gap. Smallholder farmers market their wheat produce only 20% of the production and 80% of their total production are used for consumption whereas the per capital share of quantity consumed in pastoral areas, humid low highlands, small and large cities are 20%, 1%, 6% and 9% of all food consumptions respectively (World Bank, 2012, Berhane *et al*., 2011; FAO, 2013; USDA, 2013).

In Ethiopia, wheat is exported to and imported from abroad for gaining the advantage but the importing and exporting quantity and value are unbalanced. Currently importing wheat and distributing to millers in subsidized form is to stabilize the wheat price and finally to cease it by producing and selling more (Mamo *et al*., 2017). Therefore, promoting the commercial oriented wheat production is so as to increase its production and selling is crucial to cease imported subsidy. The following table shows the exported and imported quantity and its value.

2.3.1. Wheat marketing actors and their linkages

Wheat marketing actors are those who participate in production, processing, transporting, and marketing of wheat in the cereal markets. The chain actors can be categorized as direct/main actors (actors who are directly participated in the market chain) and indirect/supportive actors (actors who provide supports to the main actors either financially or none-financially). The main actors in the chain include producers, processor, assembler, wholesaler, retailers, consumers whereas the indirect actors are financial institutions, governments, NGOs (KIT, 2008; Solomon *et al*. 2017).

Producers: these are the main actors who participate in the production of wheat; and are the first link in the wheat market chain. Each activity in wheat producer market chain function associated with its costs, namely land preparation, planting activities, fertilizer application, weeding and harvesting. The main roles of the producers are producing the wheat produce and sell to the next actors in the nearest markets. According to different study, producers are supplying and selling their produce to the next different actors (either to processor or wholesaler or retailer or consumer etc.) since they are the first link in wheat market chain.

Wholesalers: are the actors who buy a large volume of wheat and its products to resell to the other next actors. They buy wheat grain mainly from individual farmers, some collectors/small traders and a few other wholesalers with in the country and sell grain to individual farmers, processors, collectors and other wholesalers (Sultan, 2016).

Retailers: these market actors are located at the end of marketing chain, directly servicing the ultimate consumers of the marketing system. They perform numerous marketing functions such as buying, processing, storing, selling and other functions related to marketing.

Consumers: are those who bought wheat and its products for consumption.

2.3.1 Marketing channel

Marketing channel is a business structure of interdependent organizations involved in the process of making the product or service available for consumption starting from product origin (Kotler and Armstrong, 2003). It is important to provide a systematic information/knowledge about the flow of goods and services starting from production to final destination.

Marketing Chain is a term used to describe the numerous links that connect all actors and transactions involved in the movement of agricultural goods from the farm or point of production to consumers or final destinations (CIAT, 2004).
Different scholar’s results showed that the marketing channels of wheat looks like the following:

Channel 1 producer consumer

Channel 2 producer retailer consumer

Channel 3 producer assembler retailer consumer

Channel 4 Producer assembler wholesaler processors consumers

Channel 5 Producers assemblers wholesalers retailers consumers

Channel 6 producers wholesaler retailers consumers

Channel 7 producers wholesalers processors consumers

Channel 8 producers wholesalers processors retailers consumers

Channel 9 producers cooperatives processors consumers

Channel 10 producers cooperatives wholesalers retailers consumers

2.4. The concept of market efficiency

Market efficiency refers to the degree to which market prices reflect all available, relevant information. If markets are efficient, then all information is already incorporated into prices, and so there is no way to "beat" the market because there are no undervalued or overvalued securities available.

Marketing efficiency is measured by comparing output and input values. Output values are based on consumer valuation of a good, and input values (costs) are determined by the value of alternative production capabilities (Crammer and Jensen, 1997). In such a case, markets are efficient when the ratio of the value of output to the value of input throughout the marketing system is maximized.

Effective and efficient marketing systems the one that will induce the production of those products and quantities which when sold to the consumer will result in maximum returns after the deduction of minimum marketing charges and farm production costs (Kohl's and Uhl, 1995). However, consumer's satisfaction cannot be measured directly, changes analyzed in terms of "technical" efficiency and "pricing" efficiency.

Technical efficiency: it is concerned with the manner in which physical marketing functions are performed to achieve maximum output per unit of input. Technological changes can be evaluated to determine whether they will reduce marketing costs per unit of output. New methods of packaging and processing, for example may reduce waste and prevent deterioration in quality (Abbot and Makeham, 1981)

Pricing efficiency: pricing efficiency is concerned with the accuracy, precision, and speed with which prices reflect consumers' demand and are passed back through the market channels to producer. Pricing efficiency is, thus, affected by rigidity or marketing costs and the nature and degree of competition in the industry. Activities that may improve pricing efficiency are improvement of market news and information and competition (Crammer and Jenson, 1982). The objective of price efficiency is to improve the operation of buying, selling and pricing aspect of the marketing process, so that it will remain responsive to consumer's preference (kohl's and Uhl, 1985).

2.5 Approaches to study marketing problems

The study of marketing involves various approaches. These include; the functional approach, the system or institutional approach and the individual or commodity approach (Mendoza, 1995; Branson and Norvell, 1983).

Functional approach

In this approach we took all the basic marketing activities (functions) that have to be performed in the agricultural commodities and at the marketing of inputs in to agricultural production. Functional approach studies marketing in terms of the various activities that are performed in getting farm product from the producer to the consumer. These activities are called *functions* (Crammers and Jensen, 1997).
Physical distribution (i.e. functions) and economic activity (i.e. buying, selling) are two dimensions of marketing carried out by institutions or people. An analysis of these two dimensions of agricultural marketing is intimately linked to the institutions created by law or by corporate standards or simply by established procedure, that have emerged as a result of the social and economic relation between the participants in the marketing process (middlemen, consumers, and producers).

And this approach helps to compare cost and benefits of different functions. The widely accepted functions are: a) exchange (buying and selling), b) physical (processing, storage, and transportation), and c) facilitating (standardization, financing, risk bearing, and market information). Most of these functions are performed in the marketing of nearly all commodities.

The institutional (system) approach

Institutional approach examines the activities of business organizations or people in marketing. The institutional approach focuses on the study of the various institutions, which perform the marketing activities. These organizations or people are middlemen who perform the operations necessary to transfer goods from the producer to consumer, because of the benefit of specialization and scale that exist in marketing as well as production (Cramer and Jensen, 1982).

Commodity (individual) approach

In a commodity approach, a specific commodity or groups of commodities are taken and the functions and institutions involved in the marketing process are analyzed. This approach focuses on what is being done to the product after its transfer from its original production place to the consumer (Kohls and Uhl, 1985). It helps to pinpoint the specific marketing problems of each commodity as well as improvement measures.

2.6 Structure conduct and performance analysis of wheat market

Note: The SCP paradigm states that market structure would determine firm conduct which would determine performance.

The development of stable and reliable marketing system has been an important element in commercialization and specialization in the agricultural sector. To study how markets are functioning, many researchers used the approach known as Structure-Conduct-Performance (S-C-P) approach.

The SCP paradigm states that market structure would determine firm conduct which would determine performance. Market structure can be measured by a number of factors, such as the number of competitors in an industry, the heterogeneity of product and the cost of entry and exit. Conduct refers to a number of specific actions taken by a firm, which include price taking, product differentiation, tacit collusion and exploitation of market power. The performance of the firm can be measured from a number of indicators such as productive efficiency, allocative efficiency and profitability. (Yong Tan, in 2016)

Figure 1

2.6.1 Wheat market structure

Market structure refers to how different industries are classified and differentiated based on their degree and nature of competition for services and goods.

The four popular types of market structures include perfect competition, oligopoly market, monopoly market, and monopolistic competition. Market structures show the relations between sellers and other sellers, sellers to buyers, or more. (CFI.Corporate finance institute, 2019).

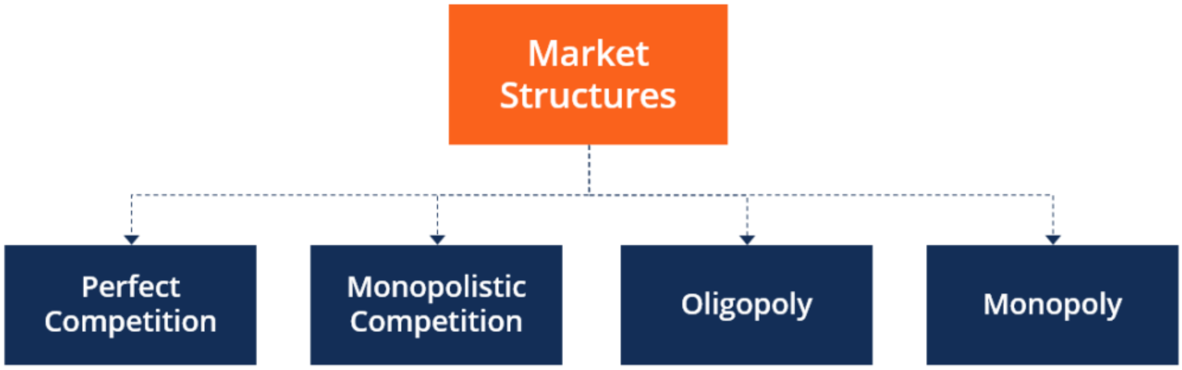

Figure 2

The four salient aspects of market structures include the degree of seller concentration, the degree of buyer concentration, the degree of product differentiation, and the condition of entry (Koch, 1980, cited in Scott, 1995).

(a)Degree of buyers and sellers concentration;-refers to the number and size distribution of buyers and sellers in the market. According to Khuls and Uhl (2004), market concentration, the portion of the industry sales made by the largest firms, is another source of imperfect competition. Successful competitors frequently eliminate their rivals or discourage new firms entry, contributing to more concentrated market. In general, the higher the level of market concentration, the less perfectly competitive the market is. The common methods of measuring market concentration are the following.

(i) Market concentration ratio (c)

$$C=\sum_{1}^{n} s_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (1)$$

i=1, 2, 3………..N

Where Si =the percentage market share of ith firm and n =the number of largest firms for which the ratio is going to be calculated. Very recently the concentration ratio was the numerical index most widely used by industrial organizations for measuring the size of distribution of firms in market (Shughart, 1990; cited in Admasu, 1998).

(ii) Hirschman Herfindahi Index (HHI):

HHI=$\sum_1^n s_i^2$ .... (2)

Where Si, is the percentage market share of ith firm, and n is total number of firms. This index takes into account all points on the concentration curve. A very small index indicates the percentage of many firms of comparable size, whilst an index of one or near one suggest that the number of firms in small and /or that they have very unequal shares in the market (Scarborough and Kydd, 1992; cited in Admasu, 1998).
This method is limited in its application for it imposes additional burden in so far as more data must be collected (Admasu, 1998).

2.6.2 Conduct of the market
The structure and the conduct of market participants have a direct implication for the nature of production price relationships between different marketing levels and the direction of causality.
Conduct of the market refers to the strategies that firms pursue with regard to price, product and promotions, and the linkages/relationships between and among firms. The market behavior of firms will determine whether or not they compete and whether they are acting innovatively to improve market efficiency. Informal association between even a small numbers of firms (collusion) can cause price distortions, and seemingly independent firms can have joint ownership (subsidiaries).

Market conduct refers to the practices or strategies of traders in maximizing their profits. Among these practices are the use of regular partners, long-term relations with clients, and suppliers, the use of intermediaries, and trade within personalized networks (Wolday, 1994)

2.6.3 Performance of the market

Performance of the market is reflection of the impact of structure and conduct on product price, costs and the volume and quality of output (Cramers and Jensen, 1982). If the market structure in an industry resembles monopoly rather than pure competition, then one expects poor market performance.

performance (technological progressiveness, growth orientation of marketing firms, efficiency of resource use, and product improvement and maximum market services at the least possible cost) of agricultural marketing system in developing countries (Meijer, 1994).

Here, the researcher used the structure-conduct-performance (SCP) approach to analyze the wheat market performance of Tiyo woreda.

2.7 Methods of Evaluating Market performance

Market performance can be evaluated by analysis of costs and margins of marketing agents in different channels, and market integration. A commonly used measure of system performance is the marketing margin or price spread. Margin or spreads can be useful descriptive statistics if used to show how the consumer's food price is divided among participants at different levels of the marketing system (Getachew, 2002).

2.7.1 Marketing costs and margins

Marketing costs: Marketing costs refers to those costs, which are incurred to perform various marketing activities in the shipment of goods from producers to consumers. These are: Handling cost (packing and unpacking, loading and unloading putting inshore and taken out again), transport cost, product loss (particularly for perishable fruits and vegetable), storage costs, processing cost, capital cost (interest on loan), market fees, commission and unofficial payments (Heltberg and Tarp, 2001).

Marketing margin: A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. 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 retail price and farm price (Crammers and Jensen, 1982).

2.7.2 Market integration

Distortions introduced by governments are in the form of policies either at the border, or as price support mechanisms that weaken the link between the international and domestic markets. Apart from policies, domestic markets can also be partly insulated by large marketing margins that arise due to high transfer costs. High transfer costs and marketing margins hinder the transmission of price signals, as they may prohibit arbitrage (Sexton *et al*., 1991).

2.7.2.1 Market concentration of wheat in Ethiopia

Market concentration is the number and size of distribution of sellers and buyers in the market (Kohl and Uhl, 2002; Solomon *et al*., 2017). In determining degree of market concentration, the objectives of the firm, barriers of entry, economics of scale and assumption of the rival firm's behavior are important (Scherer, 1980). For an efficient market, there should be sufficient number of firms (buyers and sellers) and firms of appropriate size are needed to fully capture economies of size, there should be no barriers to entry into and exit from the market and should have full market information (Tadesse, 2011).

To measure the wheat market concentration, CR4 ratio, Herfindahi Hirschman index, Gini coefficient methods can be used. But using concentration ratio (CR4) is better so that in order to measure the market concentration of wheat in this review, CR4 is focused. A CR4 of over 50% is generally considered as strong oligopoly; CR4 between 33% and 50% is generally considered a weak oligopoly and a CR4 of less than 33% is un-concentrated market (Kohl and Uhl, 1985). In contrast to these, Hailu Negash (2010) found that the market concentration ratio (CR4) of wheat in Mekele market, Tigray, was 22.31%, indicates competitive market. Besides this other study reveal that the average market concentration was 27.54%, indicated that the market structure was weakly competitive markets (Gebremeskel *et al*., 1998).

Table 1: market concentration distribution in Ethiopia

Number	Wheat market(1998)	CR4	Wheat market(2017)	CR4
1	Addis Ababa	16.06%	Eteya	26.8%
2	Assosa	20.62%	Assela	37.7%
3	Adama	47.26%	Adama	41.4%
4	Shashemene	49.38%	Addis Ababa	42.9%
5	Enchini	20.65%		
6	Hosanna	11.24%		
Average		27.54%		35.8%

Source: Gebremeskel *et al*., 1998; Amentae *et al*, 2017

The market concentration ratio of wheat in Ethiopia is about 31.67%, which indicates the market structure is weakly competitive market.

3.0 RSEARCH METHODOLOGY

3.1 Description of the study area

Figure 3

Tiyo is one of the districts in the Oromia Region of Ethiopia. Part of the Arsi Zone, Tiyo is bordered on the south by Munesa, on the west by Batu Dugda, on the northeast by Hitosa, and on the southeast by Digeluna Tijo. The administrative center of the woreda and Zone is Assela and is one of the most fertile woreda in Arsi zone and known for its wheat production. The Woreda has 18 Kebele. Furthermore, according to the socio-economic activity and geo-ecological location criteria, Tiyo woreda is categorized as a hotspot for climate change impacts. Tiyo woreda is mid and highland and many of the districts are located in the Great Rift Valley and have been plagued by frequent climatic impacts, and still the Woreda is one of the wheat belts in Arsi zone.

Mount Chilalo is the highest point in this woreda. Rivers include the Katar, Kulmsa, Gonde, Dosha and Walkesa. A survey of the land in this woreda shows that 40% is arable or cultivable (32% was planted

with cereals), 23.1% pasture, 8.7% forest, and the remaining 28.2% is considered swampy, mountainous or otherwise unusable.
There are 15 Farmers Associations with 13,704 members and 9 Farmers Service Cooperatives with 426 members. Tiyo has 16 kilometers of dry-weather and 46.5 of all-weather road, for an average road density of 98 kilometers per 1000 square kilometers.

3.2. Data Sources and Requirements

In this study both the primary and secondary data have been collected.
Primary data: its source were smallholder farmers randomly selected from eight different rural Kebele, farmers service cooperative association (Union) and traders at different levels ranging from farmer traders to regional level wholesales. The data have been collected formally by the method of individual interview using pre-tested semi-structured interview schedule questionnaire and informally through focus group discussion with key informants using checklists. In this study primary data were collected focusing on prices, volume and direction of trade, identification of market participants, relationship among marketing agents, role of marketing agents, number of buyers and sellers in the market, marketing functions, facilities and services, production and marketing costs, production and marketing support services, major constraints and opportunities, and other socio-economic variables of wheat producers and traders were collected.
Secondary data: these data were collected from reviewing documents of secondary sources namely Tiyo woreda office of agriculture and rural development, office of Small scale trade and industry, tax office and woreda marketing agency, Central Statistical Authority (CSA), Bureau of Agriculture and Rural Development, and Bureau of Finance and Economic Development of Oromia. Beside the published and unpublished reports, the researcher browsed websites and bulletins to generate relevant secondary information focusing on wheat marketing.

One of the most significant issues investigators have to consider when designing a project concerns the type and number of the respondents who will be included in the study. Sampling enables the researcher to study a relatively small number of units in place of the target population, and to obtain data that are representative of the whole target population. (Sarandakos, 1997)

An important decision that has to be taken while adopting a sampling technique is about the size of the sample. Appropriate sample size depends on various factors relating to the subject under investigation like the time aspect, the cost aspect, the degree of accuracy desired, etc (Rangaswamy, 1995; Gupta and Gupta, 2002). If sample is too small, it might be difficult to achieve the objectives of analysis. But if it is too large, it may result in resource wastage when dealing with the sample. Sample error will arise because of not studying the whole population. Whenever sampling, it is usual to miss some helpful information about the population (Levin, 1989; Kothari, 1990). The higher the desired precision or the level of confidence, the larger (more costly) will be the sample (Browen and Starr, 1983). Sampling theory is of little help in arriving at a good estimate of the sample size in any particular situation (Gupta and Gupta, 2002).

A two stage sampling procedure was used to select the rural Kebele and sample households. In the first stage, out of the 18 rural Kebele of Tiyo woreda 4 rural Kebele were selected purposively and randomly, based on the relative better production potential of wheat. Before selecting household heads to be included in the sample, wheat grower household heads of each rural Kebele were identified in collaboration with experts in the department of grain production and Protection of WOARD, Kebele leaders, key informants and development agents of the respective rural Kebele.

In the second stage, 113 farm household heads were selected from identified wheat producer lists using systematic random sampling technique taking into account probability proportional to size wheat producers in each of 4 selected rural Kebele. As a result, the survey was administered and data were collected and analyzed on 113 respondents of wheat producers. Accordingly, the number of respondents in each rural Kebele was as shown in the Table 2.

Table 2 Number of sample respondents taken from each PAs

Grain type	Name of selected PAs	Number of wheat producing HHH	Number of sample HHs taken
Wheat	Dhankaka	146	30
	Abosara Alko	122	27
	Odadhawata	138	29
	Hamsagasha	127	27

Source- WOARD 2007

Contrary to farmers, sampling of traders is not an easy task for the researcher; this might be due to the nature of their mobility and complexity of the work. But it was tried as much as possible to capture all possible level of representative while doing questionnaire pre-test, rapid market appraisal (RMA), as well as collecting data. The total sample size of traders was 52. The wheat traders were selected using systematic random sampling. In addition to regional and rural markets, following the roots of wheat market chain, traders from terminal market such as Finfine, Adama and Arsi Negelle were also selected using systematic random sampling technique. The sample included licensed and unlicensed market participants. The trader's study focused on all market segments of wheat market. Moreover, while doing pre-test and RMA, the trader fixed the date at which the final formal interview with traders who are selected based on systematic random sampling technique would be held and in doing so the data was collected. All these procedures made collecting data from traders much extended, time consuming and tiresome.

Table 3 : Sample size of wheat traders at different market.

Variables	Tiyo woreda markets				Other markets			Total
	Dhankaka	Abosara alko	Anadha wata	Hamsa gasha	Finfine	Adama	Arsine gelle	
Farmer traders	6	1	1	3	0	2	2	15
Urban assemblers	0	1	2	1	0	0	0	4
Wholesalers	3	3	2	1	1	1	0	11
Regional Retailers	2	0	0	3	1	1	1	8
Urban retailers	5	4	3	1	0	0	1	14
Total	16	9	8	9	2	4	4	52

: Source survey result 2017.

3.3. Method of Data Collection

The data that is going to be collected here needs to be accurate which there is no doubt about it. Since this has to be achieved throughout my data collection each household must be well convinced of the objective and advantage of the research that is brings to them while the confidentiality of each householders data has been promised to be kept secret.

Firstly, the farmers' interview schedule was tested at the farm level on 8 randomly selected farm households. In the light of pre-testing, essential amendments were made on such things as ordering and wording of questions and coverage of the interview schedule. Furthermore, the pre-test enabled to know whether farmers had clearly understood the interview schedule.
After pre-testing and prior to the final administration of the interview schedule, enumerators were given training and briefings on the objective, contents of the interview schedule and were also acquainted with the basic techniques of data gathering and interviewing techniques and on how to approach farmers. Then using the amended structured interview schedule, primary data were collected by using personal interview technique from sampled farmers. In order to increase the reliability of the survey data and to reduce technical and linguistic problems at the farm level; the researcher (author) spent much of his time with enumerators during all survey days. At last, to fill gaps observed during personal interviews, focused group discussions were conducted with group of farmers in each selected rural kebeles.

Regarding trader respondents, independent interview schedule questionnaire was designed to collect data and enumerators who were working as data collector in the site for CSA were recruited and trained on basic data collection principles. During the course of field visit in the study area, the interview schedule questionnaire was tailored to all market conditions. The semi-structured formal interview guidelines were written up in the form of a formal interview schedule questionnaire. Before collecting traders' data the interview schedule questionnaire was pre-tested. Eventually, the survey was made formally interviewing randomly selected traders using the pre-tested semi-structured questionnaire in the market place where traders are located.

3.4. Methods of Data Analysis

In these study two types of data analysis, namely descriptive statistics and econometric analysis were used for analyzing the data collected from wheat producers and traders.

3.4.1. Descriptive statistics

This method of data analysis refers to the use of ratios, percentages, means, and standard deviations in the process of examining and describing marketing functions, facilities, services, household characteristics, role of intermediaries; market and trader characteristics, the structure of production costs, profitability, and major constraints and opportunities of production and supply. The following indicators are used in this type of analysis.

3.4.1.1 Structure Conduct Performance (s-c-p) model:

The model examines the causal relationships between market structure, conduct, and performance, and is usually referred to as the structure conduct and performance (S-C-P) model. In agricultural economics, the most frequently used model for evaluating market performance is based on the industrial organization model. Wolday (1994) also used this model to evaluate food grain market in Alaba Siraro district. Thus, this study used S-C-P model to evaluate how efficiently wheat market of the study area is functioning. Identification of wheat marketing channels, and the role and linkage of marketing agents in this study; the S-C-P framework was used to meet this objective.

a) Structure of market

Structural characteristics like market concentration, industry maturity, government participation, product differentiation, barriers to entry, and diversification, will be some of the basis to be considered. The perfect competition model will be used as a standard to study the structure of the market.

Market concentration

Market concentration which refers to number and size distribution of sellers and buyers in the market, the firm's objectives, barriers to entry, economies of scale, and assumptions about rival firm's behaviors are relevant in determining the degree of concentration and behaviors and performance (Scherer, 1980).

The concentration ratio (market ratio) was calculated using a formula

$$MSi = \frac{v_i}{\sum v_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Where MSi - market share of buyer i

Vi - amount of product handled by buyer i

ΣVi - Total amount of product handled.

$$C = \sum_{i=1}^{r} S_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

Where C - concentration ratio

Si - percentage share of the ith firm

r - Number of largest firms for which the ratio is going to be calculated.

Kohl's and Uhl (1985) bring into play as a rule of thumb, four largest enterprises' concentration ratio of 50% or more (an indication of a strongly oligopolistic industry), 33-50 % (a weak oligopoly) and less than that (competitive industry). The problem associated with this index is the arbitrary selection of r (the number of firms that are taken to compare the ratio).

Barriers to entry

A barrier to entry is simply any advantage held by existing firms over those firms that might potentially produce in a given market. Potential entry barriers will be investigated based on: demand conditions, product differentiation and price elasticity, control over input supplies, legal and institutional factors, scale economies, capital requirement, and technological factors.

B) Market conduct
There are no agreed up on procedures for analyzing the element of market conduct. Market conduct defines the conditions which make possible exploitive relationship between sellers and buyers. It is a systematic way to detect indication of unfair price setting practices and the conditions under which practices are likely to prevail. Moreover, they cover the following topics: The existence of formal and informal marketing groups that perpetuate such practices; Formal and informal producer groups that affect bargaining power; The distance from major market and its impact on prices; and the feasibility of utilizing alternative market out lets.
c) Market Performance
Marketing efficiency is essentially the degree of market performance. It is defined as having the following two major components: (i) the effectiveness with which a marketing service would be performed and (ii) the effect on the costs and the method of performing the service on production and consumption. These are the most important because the satisfaction of the consumer at the lowest possible cost must go hand in hand with maintenance of a high volume of farm output (Ramakumar, 2001).
The two approaches to measure marketing performance are: marketing margin and the analysis of market channel efficiency. A large number of studies have analyzed the marketing margins for different types of commodities to examine the performance of agricultural products marketing (e.g., Wohlengenant and Mullen, 1987; Schroeter and Azlam,, 1995; Holt, 1993) and (Sexton, Zharg and Chalfant, 2005 as cited on Jema, 2008) argued that even though variations in the margin over time might be attributable to marginal marketing costs under perfect computation, additional factors such as seasonality, technological changes, and sales volume may also explain the variations in the margin.

Marketing Margin- In a commodity subsystem approach, the institutional analysis is based on the identification of the marketing channels. When there are several participants in the marketing chain, the

margin is calculated by finding the price variations at different segments and by comparing them with the final price to the consumer. The consumer price is then the base or the common denominator for all marketing margins. Comparing the total gross marketing margin is always related to the final price or the price paid by the end consumer and then expressed as a percentage (Mendoza, 1995).
The size of marketing margins is largely dependent upon a combination of the quality and quantity of marketing services, and the efficiency with which they are undertaken and priced. The quality and quantity of marketing services depends on supply and demand of marketing services and/or the degree of competition in the market place. The costs of service provision depend on both exogenous and endogenous factors and the efficiency is determined by the extent of competition between marketing enterprises at each stage.
Large gross margins may not express high profit; this is because size of marketing margins largely depends upon a combination of the quality and quantity of marketing services, and the efficiency with which they are undertaken and priced.
Marketing margin was calculated taking the difference between producers and retail prices. The producers' share is the commonly employed ratio calculated mathematically as, the ratio of producers' price (ex-vessel) to consumers' price (retail). Mathematically, producers' share can be expressed as:

$$\text{PS} = \frac{P_x}{P_r} = 1 - \frac{MM}{P_r} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

Where: PS = Producers' share
Px = Producers price of wheat
Pr = Retail price of wheat which is consumer price
MM = marketing margin
The above equation tells us that a higher marketing margin diminishes producers' share and vice versa. It also provides an indication of welfare distribution among production and marketing agents.

The total marketing margin is given by the formula shown below

TGMM = $\frac{consumer\ price - Farmers'\ price}{consumer\ price} \times 100$.....................6

Where TGMM-Total gross marketing margin.

GMMp = $\frac{Price\ paid\ by\ the\ consumer - Market\ gross\ margin}{Price\ paid\ by\ the\ consumer} \times 100$....7

Where GMMp-Producers' participation (farmers' portion)

The marketing margin was compared with marketing service costs and the results were interpreted. Margins at each stage were calculated and the shares also were compared.

3.4.1.2. Factors affecting market Supply

Tomek and Robinson (1985) suggested that careful definitions of terms are essential. Total supply in a specific period may depend not only on current production but also on carryover stocks and imports. It is not possible to include an exhaustive set of variables that could affect the household level of marketable supply of the product. But, in this particular study, an attempt was made to estimate determinants of marketable supply of wheat production in Tiyo woreda. In the course of identifying factors influencing wheat supply, the main task is to analyze which factor influences and how? Hence, potential variables which are supposed to influence the quantity of wheat supply need to be explained. Accordingly, the main variables expected to have influence on quantity supply of wheat are explained.

However, before fitting important variables in to the multiple regression models, it is necessary to test multicolinearity problem among continuous variables and check associations among discrete variables, which seriously affects the parameter estimates. According to Gujarati,

(2003) indicates, multicolinearity refers to a situation where it becomes difficult to identify the separate effect of independent variables on the dependent variable because existing strong relationship among them. In other words, multicolinearity is a situation where explanatory variables are highly correlated.
There are two measures that are often suggested to test the existence of multicolinearity. These are: Variance Inflation Factor (VIF) for association among the continuous explanatory variables and Contingency Coefficients (CC) for dummy variables.
Thus variance inflation factor (VIF) is used to check multicolinearity of continuous variables. As R^2 increase towards 1, it is a co linearity of explanatory variables. The larger the value of VIF, the more troublesome or collinear is the variable Xi. As a rule of thumb if the VIF greater than 10 (this will happen if R^2 is greater than 0.80) the variable is said to be highly collinear (Gujarati, 2003). Multi co linearity of continuous variables can also be tested through Tolerance. Tolerance is 1 if Xi is not correlated with the other explanatory variable, whereas it is zero if it is perfectly related to other explanatory variables. A popular measure of multicolinearity associated with the VIF is defined as:

VIF $(X_j) = \left(1 - R_j^2\right) \wedge 2 \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots$..8
Where, R_j^2 is the multiple correlation coefficients between explanatory variables, the larger the value of R_j^2 is, the higher the value of VIF (X_j) causing higher co linearity in the variable (X_j).
Contingency coefficient is used to check multicolinearity of discrete variable. It measures the relationship between the raw and column variables of a cross tabulation. The value ranges between 0 - 1 , with 0 indicating no association between the raw and column variables and value close to 1 indicating a high degree of association between variables. The decision criterion (CC < 0.75) is that variables with the contingency coefficient is computed as follows

CC = $\sqrt{\frac{X^2}{N+X^2}}$ ……………………………………………9

Where, CC is contingency coefficient, X^2 is chi-square test and N is total sample size.
As cited in Paulos (2002), if the value of CC is greater than 0.75, the variables are said to be collinear. Statistical package SPSS version 14 was used to compute both VIF and CC. In order to explain farmer's wheat market participation, continuous and discrete variables were identified based on economic theories and the findings of different empirical.
In this study, multiple linear regression model was fitted to survey data to generate information about determinants of wheat supply. Based on literatures, wheat supply model to be estimated in this study would take the following form
$Y_i = X_i\beta + U_i$……………………………………………10
Where Y_i = market supply of wheat for each model
X_i = a vector of explanatory variable, and '**i**' is 1, 2, 3… n
β= coefficient of i_{th} independent variable
U_i = unobserved disturbance term.
The main hypothesized variables expected to influence marketable supply of wheat in the study area are explained in the following manner:

Dependent Variable:
Quantity Supplied (QT_SUPP): It is a continuous variable which represents dependent variable; the amount of wheat actually supplied to the market by household in the year 20018/19 which is measured in quintals.

The Independent Variables:
The following explanatory variables were hypothesized to influence the marketable supply of wheat in the study area.
Lagged price (PRC-LAG): The variable market price of the product (wheat) was measured in Birr per quintal. Tomek and Robinson (1985) argued that the product price has direct relations with marketable supply and hence it was expected to affect the household marketable supply of wheat positively in such a way that prices of 2017/18 can stimulate production of wheat, and thus marketable supply for 2018/19.

Quantity produced (QUANPROD): It is an economic factor and continuous variable that can affect the household level marketable supply and measured in quintals per hectare. The variable is expected to have positive contribution in smallholder marketable supply of wheat As Tomek and Robinson (1985) argued, quantity produced is assumed to affect the marketable supply positively, because a farmer that obtains high yield can supply more to the market than a producer who had fewer yields.

Size of landholding (FARMSIZE): This variable was a continuous variable measured in terms of number of hectares allocated to wheat and was expected to affect the household level of wheat marketable supply positively (Tomek and Robinson, 1985). This is because, producers who own large area holding can produce more than a producers who own less area and thus to supply more to the market.

Family size (FAM-SIZE): It is a continuous variable measured in adult equivalent (Stock *et al*., 1991) i.e. the availability of active labor force in the household, which affects farmer's marketable supply. Since production is the function of labor, availability of labor assumed to have positive relation with volume of supply. However, family size is expected to have positive impact on volume of sales, but larger family requires larger amount for consumption which reduces marketable surplus. A study by Singh and Rai (1998) revealed that marketed surplus of buffalo milk to be negatively related farm family size. However, a study conducted by Wolday (1994; as cited by Rehima, 2007) identified that family size has significant positive effect on quantity of wheat marketed and negative effect on quantity of maize marketed. From this context, family size is expected to have positive or negative impact on volume of sale.

Extension service (EXT_SRV): The variable extension service has been measured as a dummy taking value of 1 if wheat producing household head has contacted with a development agent (DA) and 0 otherwise. Extension is expected to have positive effect on volume of marketable supply of wheat through its stimulation of production and productivity. Farmers that have frequent contact with DAs will have better access to information and could adopt better technology that would increase their marketable supply of wheat.

Access to credit (CRED_ACC): Access to credit was measured as a dummy variable taking value of 1 if wheat producing farmer had access to credit and 0 otherwise. This variable is expected to influence the marketable supply of wheat positively on the assumption that access to credit improves the financial capacity of wheat producing farmers to buy modern inputs, thereby increasing production which is reflected in the marketable supply of wheat.

Education level of HHH (EDU-LEV): This variable was measured using formal schooling of the household head and hypothesized to affect marketable supply positively. It has taken dummy values 1 if the household head attended any formal education 1and 0 otherwise. This is due to the fact that a farmer with good knowledge can adopt better practices than illiterates that would increase marketable supply. Holloway *et.al*, (1999) argued that education had positive significant effect on quantity of milk marketed in Ethiopian highlands.

Access to market information (MKT-INFO): This is measured as a dummy variable taking a value of 1 if wheat producing farmer had access to market information and 0 otherwise.
The general idea is that maintaining a competitive advantage requires a sound business plan. Again, business decisions are based on dynamic information such as consumer needs and market trends. This requires that an enterprise is managed with due attention to new market opportunities, changing needs of the consumer and how market trends influence buying (CIAT, 2004).

Price of other crops (HOR-PRICE): it is a continuous variable that can affect the marketable supply and measured in birr per quintal. An increase in price of other crops produced in the farm is expected to have negative effect on marketable supply of wheat. In this case, price of barley was taken as variable since it is important and potential substitute crop grown in the study area.

Age of household head (AGE): It is a continuous variable and measured in years. This may be the fact that age is a proxy measure of farming experience of household. Aged households are believed to be wise in resource use, and it is expected to have a positive effect on marketable surplus.

Sex of the household head (SEX): In mixed farming system, both men and women take part in crop production & management. Generally, men contribute more labor input in area of land preparation, planting, weeding, harvesting and sale of wheat. However, obstacles, such as lack of capital, and access to institutional credit, access to extension service, may affect efficiency in wheat production (Tanga *et al*., 2000). Therefore, it is not possible to tell a prior about the likely sign of the coefficient of sex in sales volume.

Table 4: Description of dependent and independent variables used in the model

variables	Explanation	Category	Value
QT-SUPP	Quantity supplied	Continuous	Quintal
		Independent Variables	
PRC-LAG	Lagged market price	Continuous	Birr
QUANPROD	Quantity produced	Continuous	Quintal
FARMSIZE	Size of land holding	Continuous	Hectare
FAM-SIZE	Family size of HHH	Continuous	Man equivalent
EXT-SRV	Access to extension service	Dummy	0=NO 1=YES
CRED-ACC	Access to Credit	Dummy	0=NO 1=YES
EDU-LEV	Education level of HHH	Dummy	0=NO 1=YES
MKT-INFO	Access to market information	Dummy	0=NO 1=YES
HOR-PRICE	Price of other crops	Continuous	Birr
AGE	Age of the HHH	Continuous	Number of years
SEX	Sex of the HHH	Dummy	0=Female 1=Male

4. RESULTS AND DISCUSSION

This chapter summarizes the major findings of the study. Both descriptive statistics and econometric analysis were used to analyze the primary data. Descriptive statistics were employed to describe the demographic characteristics of sample farmers and traders. Moreover, the cost structure and profitability (price) of wheat, production and marketing support services, structure, conduct and performance were studied to measure efficiency.
Econometric analysis was used to identify factors affecting supply of wheat and efficient marketing channel establishment in the study area.

4.1. Socio-demographic characteristics

This section focuses on describing; (a) socio demographic characteristics of farmers, including personal and demographic characteristics, land size and land use, farming and non farming experience, income, access to service, farm inputs utilization, production and storage, resource ownership, etc.; and (b) traders' demographic characteristics, and resource ownership such as physical and financial resources.

4.1.1. Farmer's demographic characteristics

The variables used to describe demographic characteristics of sample farmers were household heads' sex, age, religion, marital status, education level, family size and ethnicity. The results of the study (Table 7) indicated that 88.3% of wheat producing sample households was male headed households. The remaining 11.7% of wheat sample households were female headed households. In terms of marital status, 91.65% of wheat producing sample households was married, while only 8.35% of wheat producing sample households was single. Furthermore 52.46% of the wheat producing sample households was Orthodox Christians while 47.54% of wheat producing farmers was Muslims.

Table 5: Demographic characteristics of sample farmers

Variables		Wheat producers	
		N=113	%
Age of HHH	Mean	41.36 (11.54)	
Sex of HHH	Male	100	88.3
	Female	13	11.7
Religion	Orthodox	59	52.46
	Muslim	54	47.54
Marital status	Single	104	91.65
	Married	9	8.35
Education Level	Mean	2.68 (3.24)	
Family Size	Mean	5.71 (1.879)	

Numbers in parenthesis show standard deviations, N represents sample population. Source- own survey 2021.

As Table7 depicts the overall mean age of wheat producing sample respondents was 41.36 years.
The educational background of the sample household heads is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. More educated farmers are expected to adopt new technologies to increase their land and labor productivity. The average number of years of schooling completed by wheat producing respondents was 2.68. Based on categorization of education, the data indicated that 50.83% of the sample respondents were illiterate, 18.38% attained formal education ranging from grade 1 to 4, while 20.79% had formal education from grade 5 to 8. The remaining 10% attained education level ranging from grades 9 up to 10.

4.1.2. Land size and land use

Land is perhaps the single most important factor of production and measure of wealth in the study area. The average land owned by wheat producers was 3.24 hectare (Table 6). Cultivated land used for the production of crops covered 67% of the total land holdings of wheat producing sample household on average. The remaining land represents land used for pasture, homestead farm, fallow land and land rent-in and rent-out.

Table 6: Land owned and farmers' purpose of allocation (average)

Land Use (hectare)	Wheat Producers	Total Sample
Total owned land	3.24 (1.32)	3.24
Cultivated Land	2.72 (1.26)	2.72
Pasture Land	0.31 (0.19)	0.31
Home stead farm	0.26 (0.12)	0.26
Fallow Land	0.09 (0.19)	0.09
Land Rent In	0.54 (0.91)	0.54
Land Rent Out	0.21 (0.14)	0.21

Own survey 2021, numbers in parenthesis represent standard deviations

The survey results indicate that the cultivated landholding of wheat producing sample households ranged from 0.65 to 9 hectares with standard deviation of 1.26 hectare. The average cultivable landholding of wheat producing sample respondents was 2.72 hectares. This figure is a bit higher than the national average, which is 1.65 hectare. This implies that there was relatively higher land holding in the study area.

However, the key informant farmers indicated that fragmentation of land is causing social as well as economic problems in the woreda.
The average cultivated land allotted by wheat producing sample households for the production of major crops such as maize, wheat, barley, and potato was 0.81, 0.67, 0.44 and 0.39 hectare respectively. Proportionally, of the total cultivated land wheat producers owned 25% of cultivated land used for the production of wheat. (Refer appendix table 4).

Table 7: Experience and income of respondents

Variables	**N=113** **Wheat Producers**
Production Experience(years)	17.87 (12.1)
Annual Farm Income (birr)	434,500 (12276)
Non Farm Experience (yes, %)	12
Non Farm Experience (years)	0.76 (2.64)
Annual Non Farm Income (birr)	3200 (967)

Source- own survey 2021, numbers in parenthesis represent standard deviations

The average farm production experience of wheat producing respondents was 17.87 years (Table 9). The result shows that farming is the main source of households' income for wheat producing sample households. The average annual farm income of wheat producing sample households was Birr 434,500 birr. The higher income of wheat producing respondents was resulted from price escalation of mainly barley and potato since wheat producing sample kebeles were also potential barley and potato producers and suppliers to the market.

4.1.3. Access to markets and other services

Access to different services has important contribution in improving production and productivity and thereby increasing marketable surplus and ultimately for increasing the income of smallholder farmers. The most important services that are expected to promote and facilitate production and marketing of wheat in the study area include proximity to markets, access to credit, access to extension service, and access to market information.

Proximity to markets

Regarding the distance taken to travel from home to the nearest market place where they sold their product, wheat producing farmers reported that they had to travel an average of 57.13 minute with corresponding standard deviations of 29.12 minute. The minimum and the maximum distance that sample wheat producing respondents had to travel to access nearest market centers were 10 and 120 minutes.

Access to market information

The amount of marketable surplus primarily depends on access to market information and the willingness and ability of farmers to use the information. The role of market information in decision making process is to reduce risks and uncertainties related to market and enable farm households to make the right decision in sales and price of the product produced and inputs used in the production process. Access to market information is extremely limited in the Ethiopian grain market. At the producer level, farmers have very limited information on price prevailing even in nearby markets (Wolday, 1994). It is assumed that producers and traders with access to market information can make better decision on how much to produce and market. However, there was no organized market information system to support farmers in the study area. According to Table 8, about 95% of wheat producing sample households revealed that they search the price information of nearby market before they sell their product. About 3.75% of wheat producers had obtained price information from the central market before selling their produce.

Table 8: Farmers' access to price information

Variables	N=113 Wheat
Nearby Market Information (yes, %)	95
Central Market Information (yes, %)	3.75
Sources Of Information	
Traders %	94.1
Billboard %	2.8
Brokers %	2.5
Telephone %	0.6

Source: own computation 2021.

Sample respondents were also asked the source of the price information. About 94.1% of wheat producing sample households revealed that they obtained price information from traders. Beside traders, respondents indicated that brokers, mobile telephone, and billboards displayed in the market place with the support of IPMS were information sources contributing to less than 7% of price information obtained for wheat producing farmers (Table 10).

Table11 Access to credit and extension services

Variables	N=113 Wheat
Credit Support (yes, %)	12.6
Extension Contact (yes, %)	37.7

Source: Own survey 2021

Access to extension services

Access to agricultural extension services is expected to have direct influence on the production and marketing behavior of the farmers. The higher access to the extension service, the more likely that farmers adopt new technology and innovation. The effort to disseminate new agricultural technologies is influenced by the efficiency of

communication between the development (change) agent and the farmers at grassroots level.
Table 8 depicts that out of the total respondents of wheat producing sample households, only 37.7% of wheat producers had access to extension services provided by development agents of the Woreda Office of Agriculture and Rural Development. The remaining 62.3% of sample households responded that they did not receive any extension services from development agents. The result of this study questions the efficiency and effectiveness of the government extension program.

4.1.4. Production, storage and marketing of wheat

Following red pepper, the production of wheat is the main source of cash for farmers in the study area. Production of wheat in the study area is a rain-fed with only once in a year harvest.

Table 9: Area cultivated, production and productivity of teff and wheat

Variables	N=113 Wheat
Area Cultivated (ha)	0.534 (0.41)
Quantity Produced per HHH (qt)	158.3 (9.75)
Productivity Per ha (qt)	31.6 (5.54)
Amount Marketed Per HHH (qt)	16.2 (9.3)

Numbers in parenthesis indicate standard deviations. Source, survey result 2021

Table 9 depicted that the average land allocated for the production of wheat by wheat producing respondents was 0.534 hectares with corresponding standard deviation of 0.41 hectares. The minimum and maximum land allocated by sample respondents to the production of wheat was 0.133 and 5 hectare. The average quantity of wheat produced per sample households was 158.3 quintals but the average productivity of wheat per hectare was 31.6 quintals (Table 9).

4.2. Wheat marketing participants, their roles and linkages

In this study, different stakeholders were involved in bringing wheat from the point of production (farm gate) till it reached the final destination (consumers). According to the data obtained market participant identified in the transaction process of wheat in the study area include farmers/producers, farmer traders, urban assemblers, regional wholesalers, retailers, processors (millers, flour mill) and commission agent. The market participants involved in different activities (wholesale, retail, assembly etc), in the study area were categorized into different categories.

Producers/farmers: these are marketing agents who participate both in production as well as marketing of surplus commodities they produce. As the same time, they transport wheat to the nearest markets (village market) or regional markets by themselves, either using pack animals, or else medium-size Isuzu trucks, over an average distance of 1.05 hours by wheat producers. They have several options to sell their product, selling directly or selling through broker to assemblers (rural and urban assemblers) and regional wholesalers which include a very small number of producers. Mainly, they sell to urban assemblers known as who assemble wheat from large number of farmers.
Farmers also sell their products directly to regional wholesalers in regional markets.

Farmer trader/rural assemblers: Farmer traders/rural assemblers are farmers or part-time traders in the assembly markets who used to buy small quantity of wheat from farmers in village markets during slack period for the purpose of reselling it to consumers or regional wholesalers in either in rural or regional market. They use their financial resources and their local knowledge to buy wheat from the surrounding area.

Urban assembler: The assemblers play important role in the system of assembly. They consolidate the produce of individual farmers produce and prepare it for marketing. Assemblers not only know the areas of surplus well, but also speak the local language well. They also relieve their customers of the burden of quality by controlling the small quantities wheat typically offered by farmers.

Brokers: these agents are middlemen who facilitate trades (buying and selling) between farmers and traders (wholesalers, urban assemblers, retailers), but does not usually physically handle products. These agents are not permanent brokers rather their main economic activity is farming during production season of the year. Brokers obtain their reward based on the amount they facilitate transaction usually 1 to 2% per total sel.

Wholesalers: Wholesalers are major market participants of the marketing system who usually buy wheat of larger volume than any other actors in the marketing system and resell the products to urban retail merchants and processors than ultimate customers. Wholesalers reside in woreda market town and purchase wheat either through broker most of the time or directly from farmer or farmer trader or urban assemblers. Commodities bought from different sources put together in one place (store) to be processed so that uniformity of the product will be attained. Moreover, the processed commodities will be supplied to the deficit terminal markets (Adama, Finfine,) for sale either directly or through commission agents to the buyer.

Retailers: these market actors are located at the end of marketing chain, directly servicing the ultimate consumers of the marketing system. They perform numerous marketing functions such as buying, processing, storing, selling and other functions related to marketing. Based on their location of existence are classified as regional and urban retailers.

Regional retailers: these are market actors in the final link of the market chain and reside on the woreda town. They buy wheat from farmers' customer directly or through broker in the market and on their purchasing and selling verandahs on the days other than the market days.

Urban Retailers: Retailers are persons or company that sells commodity to end users (consumers and processors). They reside in the terminal market and buy the product either from wholesalers or urban assemblers or regional retailers. Terminal market retailers are characterized by owning verandahs on which buying and reselling functions are undertaken.

Cooperatives: these are farmers' service cooperative associations that supply agricultural inputs to farmers in time of production and buy farmers' agricultural output at harvest. Although existing service cooperatives received enough credits from Bureau of regional rural fund with interest rate of 1.5 percent, they are not efficient enough in terms of timely provisions of agricultural input, buying of their harvested products and financial management.

Demographic characteristics of traders

Age is one of the demographic factors that is useful to describe traders experience and networking. The age of sample traders ranged from 20 to 68 years. The average age of wheat sample traders was 40.3 years and its standard deviation was 11.33 years. With respect to the sex, unfortunately all respondent traders were male.

Table10 depicted that 85.7% of sample traders were married. The number of married wheat traders is (88.2%) the rest are single. Moreover, 52% of sample traders were orthodox Christians and 44% of them are Muslim and the rest are protestant; others were orthodox and protestant Christians.

Table 10: Demographic characteristics of traders

Variables	Wheat Traders	$\frac{t}{x^2}$ $test$
Age in years Mean	43.29 (10.3)	-1.072
Sex Male	45	
Marital status % married single	85.7 14.3	2.337
Trade experience in years Mean	15.3 (7.6)	-0.237
Family size Mean	4.74 (2.98)	-0.186
Religion Mean Orthodox Muslim Protestant	37.3 56.1 6.6	-1.249
Educational level Mean	5.8 (3.5)	0.555

Numbers in parenthesis indicate standard deviation,
Source own survey result 2021

Experience plays an important role in improving trading activities and marketing efficiency. The trading experience of sample traders ranges from 2 up to 34 years (Table 10). The average trading experience of sample traders' respondents was 11.51 years and the standard deviation was 8.35 years.

4.3. Fixed assets and working capital of Traders

The evaluation of fixed and liquid assets is important for smooth functioning of the marketing activities and comparing the income of traders versus farmers. This section attempts to discuss issues related to ownership of fixed and liquid assets of traders involved in wheat trading activities and the financial growth rate of market actors as compared to the producers.

Table 14 clearly depicts that 59.34% of the traders own some of majorly required fixed assets like storage, transport, office and etc and a working capital of 12589.47 br in average to start trading wheat from this area and which they manage to uplift their capital as of the day this data was collected to 734,866.18 br on average while 40.66% do rent their fixed assets which they periodically make payment for it and only own 7543.90 br as a working capital in average at the beginning of their engagement in the business and which has at an average grown to 399,270.10 br.

Table 11: Working capital of traders within 13 years

Variables	Time Period				
	2001	2002-2005	2005-2008	2008-2011	2011-2014
WC1(br)	12589.47 (11.2)	25,580.27 (12.05)	133,399.09 (10.22)	342,635.13 (10.39)	734866.18 (12.03)
WC2(br)	7543.90 (9.76)	13,827.77 (10.43)	78,741.99 (11.06)	192,644.21 (11.4)	399,270.10 (11.71)

Source survey result 2022, figures in parenthesis is standard deviations from the mean. Here the fixed assets has been neglected from the table because its significance has been evaluated and found to be not that much relevant to the intended goal of the research.

4.4. Wheat marketing channel

According to Mendoza (1995), marketing channel is the sequence through which the product in this case the wheat passes from farmers to consumers. Exploring the marketing channel was intended to provide a systematic knowledge of identifying an optimum channel in terms of profitability for the flow of goods and services from its origin of production to the final destination of ultimate consumers. During the survey, the following wheat marketing channels were identified.

During the Maher production season of the year, the estimated total production of wheat in the study area was 101,355.4 quintals respectively (CSA, 2007). Out of this total production of wheat, the marketed was 43,271(42.7%) quintals. As clearly depicted in the figure4 wheat market channels constructed based on the data collected from seven different markets. The survey result obtained revealed that ten marketing channels of wheat were identified. Although the actual marketing channels are more complicated, the main marketing channels of the seven different markets based on quantity flow of wheat from producers to consumers through different intermediaries for both commodities are described.

Wheat passes through ten different channels on the way to reach the ultimate consumers. As one can see from the figure 4, the main receivers of wheat from the farmers are wholesalers and urban assemblers who received the estimated percentage of 40.7 and 38.02 respectively. The remaining 11.1 percentage was received by farmer traders, regional retailers and directly from farmers to consumers.

The identified ten different wheat marketing channels are listed below as follows

Channel 1 producers-consumer

Channel 2 producers-regional retailers-consumers

Channel 3 producers-wholesalers-urban retailers-consumers

Channel 4 producers-wholesalers-processors

Channel 5 producers-urban assemblers-wholesalers-urban retailers-consumers

Channel 6 producers-urban assemblers-wholesalers-urban retailers-processors

Channel 7 producers-urban assemblers-urban retailers-consumers

Channel 8 producers-urban assemblers-urban retailers-processors

Channel 9 producers-farmer traders- wholesalers-urban retailers-consumers

Channel 10 producers-farmer traders-wholesalers-urban retailers-processors.

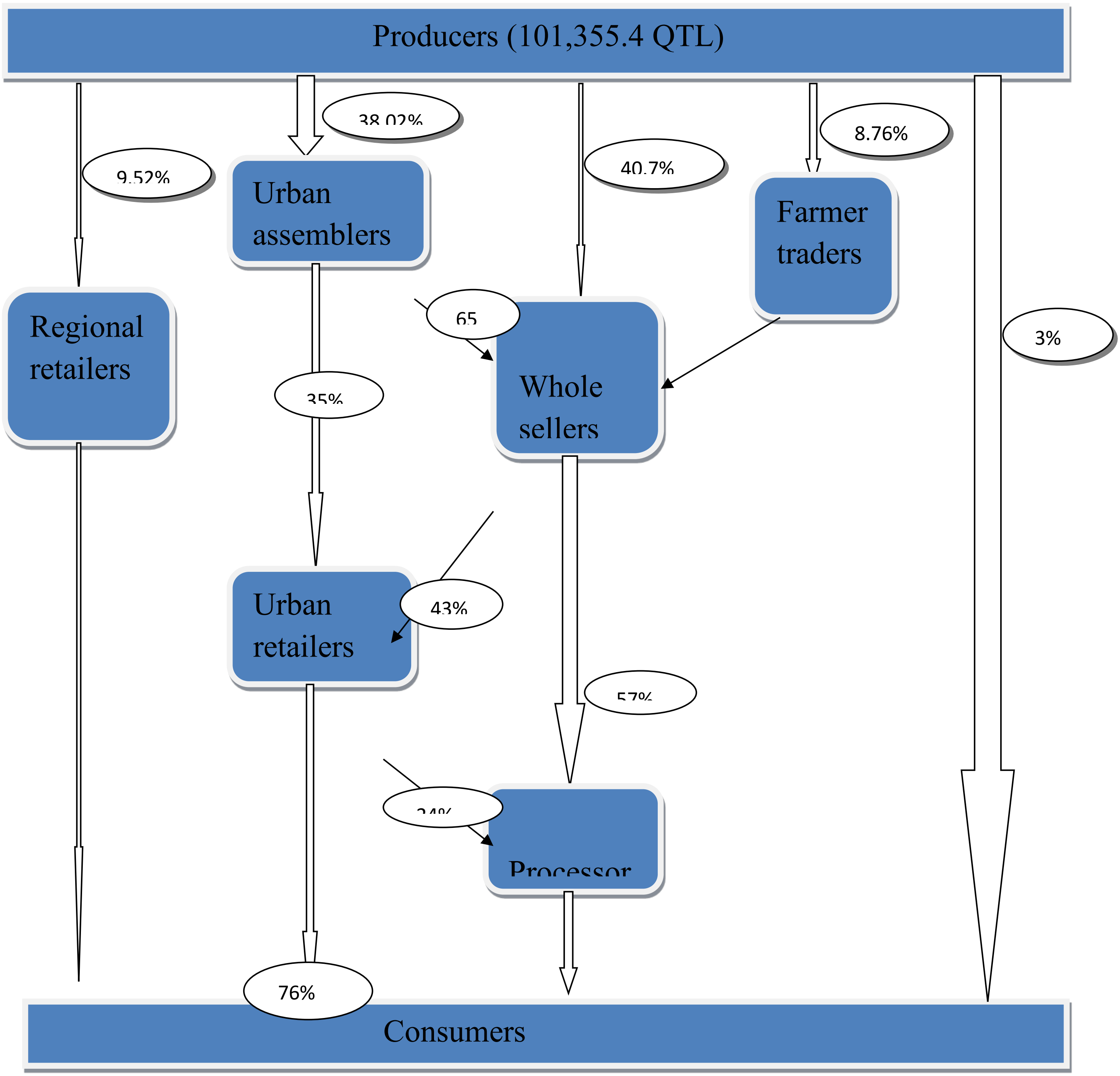

Figure 4 Wheat marketing channels

Source survey result 2021/22

4.5. Analysis of structure conduct and performance of wheat

4.5.1. Structure of wheat market

The structure of wheat marketing system should be evaluated in terms of the degree of market concentration, barrier to entry (licensing procedure, lack of capital and know how, and policy barriers), and the degree of transparency (**Pender et al**. (**2004**)). In this study the structure of wheat market is characterized using the following indicators: market concentration, the degree of transparency (market information) and entry conditions (licensing procedure, lack of capital and know how).

4.5.1.1. Degree of market concentration

According to Kohls and Uhl (2004) Market concentration, the portion of the industry sales made by the largest firms, is another source of imperfect competition. Successful competitors frequently eliminate their rivals or discourage new firms entry, contributing to more concentrated markets. In general, the higher the level of market concentration, the less perfectly competitive the market is.

The concentration ratio is expressed in terms of CRx, which stands for the percentage of the market sector controlled by the biggest X firms. Four firms (CR4) concentration ratio is the most typical concentration ratio for judging the market structure (Kohls and Uhl, 1985). A CR4 of over 50% is generally considered as strong oligopoly; CR4 between 33% and 50% is generally considered a weak oligopoly and a CR4 of less than 33% is non concentrated market.

Wheat market in the study area showed concentrated buyers. The analysis of the degree of market concentration was carried in Arsi Assela market, where wholesales of wheat were significantly involved. Concentration ratio was estimated by taking annual volume of wheat purchased in 2018/19 by sample traders (Arsi Tiyo woreda). The survey result revealed that in Assela market wheat trading was dominated by few traders (Table 12).

Table 12: concentration ratio for Assela market

Sample market	commodity	Concentration index top four traders
Assela market	Wheat	72

Source survey result 2021/22

Table 12 depicted that the four largest wheat traders possess 72 % of the total volume of purchase in Assela market respectively. Based on the rule thumb of market structure criteria suggested by Kohls and Uhl (1985) the wheat market in Assela showed an oligopolistic market, indicating the existence of market imperfection.

4.5.1.2. Degree of market transparency

It is widely accepted that, accurate and timely market information enhances market performance by improving the knowledge of buyers and sellers concerning supply and demand. Exclusive access to market information or the control or concentration of information asymmetry and concentration of capital at the disposal of very few traders is important sources of monopoly which affects the nature of horizontal and vertical relations. More balanced knowledge of the markets provides a fair distribution of the gains from efficient market price formation (Timers *et al,* 1983).

However, even though information plays such a crucial role in improving the marketing system, there was no organized system to provide reliable market information to all market participants in the study area. Hence, traders used different approaches to access market information. According to the survey result, about 58% of sample traders obtained price information through telephone and from other traders in the market respectively. The remaining 42% of traders reported that they obtained price information through telephone, brokers, discussion with other traders, and personal observation. Although, Medias such as television and radio play the greatest role in provision of market information in shortest possible time over larger area of coverage, its effect in addressing grain market information to users was very limited. Despite the fact that about 76% of traders showed their willingness to pay for the information cost provided that there are well organized and transparent information providing centers, they still complained that, market information is one of the major problems they faced in trading wheat in the study area.

4.5.1.3 Barrier to entry

Licensing: In Tiyo woreda, all traders had trade license with the exception of traders residing in small rural markets of gonde, Itaya and Huruta, markets. According to the information obtained some key informants in Assela Town Small Scale, Trade and Industry Office, there were 72 traders licensed on the bases of the amount of initial capital they possessed. There are two types of licenses in this woreda; those who have an initial capital of 25,000 Birr classified as wholesalers. They can purchase wheat in regional markets and transport it to the deficit terminal markets (Adama, Shashemene, and Finfine) etc). Those who received a license with initial capital of 3000 Birr are licensed as retailer/urban assemblers and can purchase and sell grain within the regional markets only. However, from the sampled respondent 75% of wheat traders (all traders residing in the town) have grain-trade license where as the remaining 25% of the sample farmer traders who reside in rural markets had no grain-trade license. According to the survey result all traders having grain-trade license and residing in the town reported that it is very simple to get grain trade license, so long as they fulfill the required initial capital not verified by the office. Although, theoretically it is compulsory to have license to enter in to the grain market, the simplicity to have grain license and absence of strong restriction to enter into the grain market with respect to licensing made grain marketing relatively free to enter. Thus, entry in to wheat trading is easy.

4.5.2.1. Producers Price setting strategy

According to the survey result, about 23% of sample farmer respondents reported that market price was set through negotiation and haggling with traders. And 53.5% respondents reported that price was set by the market. The remaining 18.5% and 5% of farmer respondents reported that the selling price of their produce was set by themselves and traders respectively. The survey further confirmed that, about 51.6% of sample respondents face problem of low price after they took the product in to the market. And 43.4% of sample respondent farmers reported that they took their product back to home and waited till next market day. The other 37.2% of sample respondents sold their product with the existing price. The remaining 19.4% put their produce in homes of their relatives on market place to be sold some other day other than the market day. The majority of farmers identified that price was the major determining factor that affect their decision as to whom and which market to sell their produce. Hence, there existed absence of competitive pricing system, indicating the deviation of market from the competitive market norms.

4.5.2.2. Buying and selling strategy of traders

Generally, grain trading is based on eye appraisal of the commodities and exchange takes place on bargaining. The strategies of traders in maximizing profit and develop bargaining power include the use of regular partner, long term relation with clients or suppliers, the use of intermediaries, trading with personalized network, availability of market information and its impact on price, feasibility of alternative market outlets and price setting practices etc.

Based on the data from sample trader's survey, about 58.2% and 24% of respondents reported that buying price was set by the market and discussion with other traders respectively. The rest 10.3% and 7.5% of sample traders reported that market price was set by negotiation with suppliers and by traders themselves respectively.

According to the survey result, the number of market visited per week by the sample traders during purchase ranges from 1 to 3 markets. And the average number of markets visited per week by all traders was 1.53 with standard deviation of 0.64. As clearly presented in Table… urban assemblers visited the highest average number of market per week (2.43) followed by wholesalers (1.67).

Table 13: market number visited by traders

Trader Type	Average market number visited per week
Whole sellers	1.67
Farmer Traders	1
Urban assemblers	2.43
Urban retailers	1
Regional retailers	1
Total	1.53

Source survey result 2021

On other hand, the survey result revealed that about 64.1% of traders responded that selling price was set by negotiation with buyers of the product they offered. While the rest 21.5% and 14.4% of the respondents said that selling price was set by buyer and the market respectively. Moreover, about 86% and 14% of sample traders consider supply and demand and nearby market prices to determine the purchase and selling price of the market respectively.

4.5.3. Analysis of market performance

Marketing performance of wheat market was analyzed by estimating the marketing margin, by taking into consideration associated marketing costs for key marketing channels. Based on production costs and purchasing prices of the major market participants along the chain, margins at farmer, urban assemblers, wholesalers and urban retailer's levels were estimated and analyzed.

Marketing margin

Marketing margins are the difference between prices at two market levels. The term market margin is most commonly used to refer to the difference between producer prices of an equivalent quantity and quality of a commodity. The margin covers costs involved in transferring produce from one stage to the next and provides a reasonable return to those doing the marketing. It can be interpreted as a cost of providing a mix of marketing services.

Therefore wheat marketing margin was analyzed based on the average selling price of different marketing agents in the marketing channels of producers, urban assemblers, wholesalers and urban retailers. To give detail information on analysis of marketing margin of wheat, analysis of the marketing margins of the commodity was carried out in detail which has a result the following figures.

Table 14 depicts that the different marketing margins of wheat marketing channels described as follows.

Table 14: marketing margin (%), selling price, marketing cost, and profit (birr/qt)

Marketing actors	Selling price	Marketing/Production Cost	%Gross marketing margin	Profit
Producers	2750	450	75.9	1783
Urban assemblers	3050	67.3	7.6	232.7
Whole sellers	2975	57.9	5.6	167.1
Urban retailers	3125	33	10.94	342

Source survey 2021

TGMM (along all marketing channels) =24.1%

GMMua=7.6

GMMws=5.6

GMMur=10.94

GMMp=100%-TGMM=100%-21.1%=75.9 %(producers participation)

According to Table 16, the total wheat gross marketing margin that was added to wheat price, while passing through marketing system to reach final destination (consumers) was 24.1%. And out of the total gross marketing margin of wheat, urban retailers received the highest of all marketing agents which is 10.94%. The remaining 7.6% and 5.6% of marketing margin were received by urban assemblers and wholesalers respectively along different channels. Furthermore, wheat producers share in consumer price was 75.9%.

Table 15: profit margin of regional retailers

Marketing actors	Selling price	Production/Marketing cost	GMM %	profit
Producers	2775	750	72.9	2025
Regional retailer	3115	125	6.9	215

Source: own calculation 2022

Urban retailers prefer to buy from whole sellers due to a better quality assurance with an increased price since their direct customers are consumers.

Table 16: profit margin for whole sellers

Marketing actors	Selling price	Production/ marketing cost	GMM %	profit
Producers	2750	450	83.6	2300
Whole sellers	2975	57.9	5.6	167.1

Source: own calculation 2022

A whole seller preference in terms of profit margin is the producer but the main obstacle is learned to be dependability and lack of infrastructure.

Table 17: profit margin for urban assemblers

Marketing actors	Selling price	Production/ marketing cost	GMM %	profit
Producers	2750	450	83.6	2300
Urban assemblers	3050	67.3	7.6	232.7

Source: own calculation 2022

Urban assemblers make a higher profit margin which is 7.6 than whole sellers which was 5.6 that shows it is not recommended way for farmers to channel their product through besides the fact that urban assemblers mostly prefer producers than any other market actors.

Table 18: urban retailers profit margin analysis

Marketing actors	Selling price	Production/ marketing cost	GMM %	profit
Producers	2750	450	83.6	2300
Urban retailers	3125	33	10.94	342

Source: own calculation 2022

The tendency of these market actors shows to buy wheat from whole sellers for the sake of quality since most of the time producers will not do much on winnowing their product.

Table 19: farmer traders profit margin analysis

Marketing actors	Selling price	Production/ marketing cost	GMM %	profit
Producers	2675	450	83.6	2300
Farmer traders	2855	24.7	8.6	180

Source: own calculation 2022

Farmer traders as depicted above will buy from producers with much less price than any other market actor and deliver to the next actor with no value added to the wheat but at a higher price than the farmers.

4.6 Analysis of profitability

4.6.1. Producers' profitability analysis

Whenever profitability analysis of any activity is under taken, production costs and revenues (benefits) obtained must be included in the analysis. In this case production costs are costs related to production and production process. In economics terms these costs are termed as either fixed or variable costs a farmer incurred in the production and production process of and wheat. Fixed costs are costs that do not change with a change in output (production). On the other hand fixed costs simply mean costs incurred regardless of the presence or absence of production. Land rent, oxen rent are some of the fixed costs a farmer incurred in the study area. However, variable costs are costs that are liable to change with a change in production. These are costs of fertilizer, seeds, chemical herbicides, labor costs etc.

First, in order for sample farmers understood well the detailed production cost structure and profitability of wheat production, data were collected on the bases of 'timad' unit which is equal to quarter of a hectare. Later on for the purpose of data analysis and readers understanding the 'timad' units were converted in to hectare so that it can fulfill the standard unit of measurement**.**

As presented in Table 16, the survey result indicated that the average productivity of wheat production in the survey area was 7.9 and 31.6 quintals per hectare respectively. The average cost of production per hectare was Birr 3555 (450 ETB per quintal). The major costs incurred by sample farmers in the woreda for production was land rent (16.36%), fertilizer purchase (10.44%), seed purchase (52.4%), fertilizer.

The total revenue obtained from the production per hectare was simply estimating the amount of wheat produced multiplied by a corresponding average price a farmer received in the production year. The total revenue a sample farmer owned from a hectare of land from production of wheat was 86,900br. Subtracting the average production costs from the value of total revenue it would reach positive net revenue of Birr 56,342.8 (1783 ETB per quintal). This shows how profitable would this sector be if it could have been handled professionally and higher productivity and profitability made wheat production more competitive implying that the need for encouragement of wheat production in the study area from economic as well as food security perspective.

Table 20: Cost structures and profitability of sample farmers (Birr per ha)

List of expenses	Sample of respondents	%Total
Land rent	5000	16.36
Plowing	1500	4.9
Seed	16000	52.4
Fertilizer	3200	10.44
Herbicides	450	1.47
Winnowing	350	1.15
Transportation	1360	4.45
Loading/Unloading	1232	4.03
Harvesting	1465	4.8
Total cost	30557	100
Average qt produced Average price/qt Total revenue	7.9 2750 86900	
Net Revenue	56,343	

Source survey result 2021

4.6.2. Profitability analysis of traders

Table 17 clearly depicted analysis of profitability of the different traders namely farmer traders/rural assemblers, urban assembler, regional wholesaler, regional retailer, and urban retailers described in detail across the markets. During analysis of profitability, the average purchased price of a quintal of wheat and the different average transaction costs associated with the marketing process of a single quintal till it reached the next dealer was assessed.

As a survey result shows, the amount of average transaction costs incurred across traders varies. Accordingly, the total costs incurred by farmer traders, urban assemblers, regional wholesalers, regional retailers, and urban retailers of were Birr 38, 67.3, 57.9, 53.05 and 33.0 respectively. Since buying and selling of the product by farmer traders had taken place on their nearby village market, they were not liable to different costs associated with marketing process. As a result, Farmer traders exercised lowest average transaction costs per quintal than any other traders. The survey result also indicated that the amount of transaction costs per quintal incurred by urban assemblers and regional wholesalers was registered to be the highest which is 67.3 and 57.9 respectively. Urban assemblers and Wholesalers transaction cost was higher than any other sample trader type. This could be due to higher costs related to transportation of the product and storage loss during product preparation.

With respect to the profitability of the two commodities, the overall average profitability across the different markets indicates that at every stage of transaction, trading business was profitable. However, Table 14 revealed that urban retailers were traders who obtained the highest net profit per quintal than that was 342 br/qt. Regional retailers obtained least net profit per quintal. This might be due to wider and higher transaction costs associated with the marketing process. Nevertheless, their lower net profit could be compensated through transaction of higher volume of commodities.

Table 21: Analysis of profitability of traders (Br/Q)

List of average costs	Farmer traders	Urban assemblers	Whole sellers	Regional retailers	Urban retailers
Purchase price	2500	2782.7	2807.1	2715	2742
Sack price	2.75	2.75	2.75	2.75	2.75
Fill, weigh &stitch	10.5	14.75	13.05	13.05	3.0
Loading/Unloading	5.0	7.0	5.0	5.0	5.0
Transportation	10.0	15.0	10.0	7.75	6.25
Processing	-	8.15	2.75	-	-
Storage	-	5.75	2.65	7.25	2.60
Losses during storage	4.75	5.25	7.85	7.50	6.40
Permanent and temporary worker	5	7	8	8	2.5
Other costs	1.50	4.40	5.85	1.75	4.5
Selling price	2675	3050	2975	2875	3125
Net Profit	137	200	110	107	350

-Indicate nil (zero), Source own data computation 2021

4.7. Major problems and opportunities

4.7.1 Marketing problems of farmers

The farm problems of sample farmer households are usually associated with unstable and relatively lower prices and incomes. Despite the current volume of wheat produced and offered to the market, farmers face a number of problems in the marketing process. Based on farmers' perception the major marketing problems reported were access to credit, poor extension support services, poor infrastructure, bureaucracy, unfair pricing and scaling (weighing), lack of market information providing institutions, and multiple taxation. (Table19).

Unfair pricing and cheating of traders during weighting: farmers in the study area were frequently liable to cheating in weighing scale while selling their product in the market. The case was particularly intense at time of peak supply or harvesting season, where sample farmers sell in bulk. In the mean time, the price traders offered to farmers was low, without actual interaction of supply and demand in the market.

Lack of market information providing institutions: the presence of market information providing institution is important in increasing the efficiency and effectiveness of marketing activities. Provision of market information plays a greater role in farmers' decision making process. This will help farmers to reduce risks and uncertainties associated with the market and make them to take the right decision. However, the absence of this information providing institution in the study area made farmers pay price for marketing.

Table 22: Marketing problems of farmers (%)

List of problems	N=113 Sample respondents
Higher fertilizer prices	67
Poor credit access	83
Unfair pricing and scaling	100
Lack of market information	94
Multiple Taxes	43
Poor Infrastructure	87
Lesser bargaining power	100
Higher input price	69
Unfair land distribution	54
Poor transportation	86
Lack of storage	72

N= Farmers' sample size. Source own survey 2021

Multiple Taxes: according to the report of sample respondents, beside taxes related to farm production, the presence of municipality tax made farmers to incur additional cost while offering the harvested product to the market. Of the total sample respondents 43% of respondents reported that municipality taxation was one of the marketing problems they faced during provision of products to the market.
Higher input price: the increasing price of agricultural inputs in the woreda is not only the production but it is also marketing problem farmers faced while buying agricultural inputs in the market prior to production. Thus 69% of the total sample respondents reported that they face higher input price.

4.7.2. Marketing problem of traders

The major marketing problems sample traders faced in the study area were capital shortage, credit access, poor product quality of the commodity, lack of market information, multiple taxation, higher transportation cost, lack of demand and unfair competition with unlicensed traders.

Table 18 clearly depicts that about 78.4% of sample traders faced capital shortage to conduct and expand their trading activities. Capital shortage was mainly due to lack of credit access. Provision of quality products by farmers to the market were followed by better prices, however, about 67.1% of sample traders reported the presence of products quality problem in the study area. This was particularly due to absence of extension support after harvest. Thus, the problem made farmers to accept lower prices unlike the neighboring farmers producing the some product. Attention to integrated extension system that can accommodate grain marketing is very important. The other traders' problem in the study area was absence of road service in rural markets. In the woreda, village markets are connected to town markets by dry weather poorly paved roads. As a result, only pack animals are the most frequently used transport means to transport larger loads when the weather is bad. Almost all of the roads to the village markets are difficult for vehicles during rainy season. About 72.4% of sample traders reported the existence of transportation problem. Village markets of Assela and Shashemene are very rugged and inaccessible to vehicles during rainy seasons. It is only Isuzu trucks that best adapted to the existing road to move goods from place to place. About 80.2% of the sample traders reported that poor road access made them to incur higher transportation cost.

Lack of access to credit was one of the marketing problems limiting operation and expansion of trading activities in the woreda as reported by sample traders. The other reasons were absence of collateral, high interest rate of MFI. In addition, absence of municipality for traders having collateral in the market place of Assela and Shashemene is one reason for traders not taking loans from banks as collaterals confirmed by municipality are conditions to access credit from banks. Because of these reasons, about 92.3% of sample respondents did not obtain any credit from financial institution.

Table 23: Major marketing problems of traders

List of problems	N=45 Sample respondents
Capital shortage	78.4
credit access	92.3
Poor product quality	67.1
Market information	54.5
Infrastructure	80.2
Multiple Taxation	64.9
Transportation cost	72.4
Lack of demand	48.3
Unfair competition with unlicensed traders	62.6

N= sample size, Source own survey result 2021/22

As presented in Table 18 about 64.9% of sample traders reported that that they incur municipality charge and inland revenue, multiple and double tax. And about 48.3% of sample traders lacked demand due to limited number of buyers, quality problem, and poor road and transportation problems. Market information is a market facilitation function that plays greater role in improving marketing decisions of traders through avoiding or reducing of information asymmetry. However, about 54.5% of traders face lack of market information providing institution although they were willing full to pay for the required information. Lack of uniform controlling mechanism to enforce unlicensed grain traders to have license is marketing problem in the woreda. About 62.6% of sample traders reported that there is absence of government control on unlicensed traders (Table 18).

4.7.3. Opportunities

The study area has not only problems associated with the marketing there is also diversified opportunities that need to be exploited. Consequently, marketing efficiency and effectiveness could be increased. Among the different opportunities that prevailed, the majors are tried to be mentioned as follows.

Suitability of the area for production; it is the area endowment with fertile soil type for agriculture, peoples ready to accept new technologies, the presence of perennial rivers for irrigation, farmers having better land holding than the average Ethiopian farmer, and plain topography are some of natural endowment opportunities the woreda had. These opportunities are important for the growth of grain crops, vegetables and other perennial crops like fruits.
Furthermore, as a mixed farming experiencing area the above mentioned opportunities also have potential contribution for livestock production.

The other potential opportunity of the area is its proximity to highly populated and newly booming towns like Assela, Shashemene, Eteya and other surrounding nearby towns as bokoji creates a potential demand for the products produced in the area. Obviously the increased demand would be followed by better farm price for producers. As a result farmers will have an incentive to expand their output. Furthermore, the increasing food processing plants in and around Assela and Adama town is creating additional demand for agricultural commodities like wheat. Consequently, this contributes for commercialization of rural economy and creates many off-farm jobs opportunities.
Government suitable agricultural policies designed to support farmers at the grass-root level is the other opportunity dimension. Administrative decentralization and the deployment of development agents at each PAs based on their academic background are also important policy dimensions. Furthermore, provision of infrastructure facilities like roads, telecommunication (mobile, wireless, and optic fiber), power supply and financial institutions as Banks and MFI are the infrastructural advantages that facilitate the production and marketing of wheat in the study area.
The other opportunity the area possess is the presence of NGOs working on development projects like IPMS/ILRI played key role in identifying potential agricultural commodities grown in the area, giving training and creating linkage among different marketing stakeholders, establishing knowledge centre that facilitate knowledge sharing among peoples of different background, and displaying weekly market price information

on notice board at different markets. Moreover, marketing researches and development practices under taken by post graduate students funded by the project are worth to mention.

4.8. Analysis of Econometric Results

The econometric analysis was planned to investigate factors affecting, volume of wheat supply to market and relates the identified factors influence on farmers income.

4.8.1. Determinants of wheat market supply

In the study area, production of wheat is mainly for market and is important cash commodity next to potato. Data collected from sample respondents indicated that 49.2% of wheat produced in the year was supplied to the market. According to the survey report, all sample respondents were potential market suppliers during the survey period. Several variables are hypothesized to influence the volume of market supply of wheat by sampled producers.

There are several determinants that influence farmers' marketable supply. Different researchers described these determinants depending on the purpose of their study and listed relevant variables to be considered. In this study the independent variables thought to have relationship with marketable supply of wheat are described as sex of the household head, age of the household head, family size, quantity produced, farm size, lagged price, access to credit, access to market information, price of other crops (pepper), and access to extension service. The relationship of these variables with marketable supply of wheat is discussed in the following section.

Prior to running the OLS regression model, all the hypothesized explanatory variables were checked for the existence of multi-co linearity problem. The study used Variance inflation factor (VIF) to investigate the degree of multi-co linearity among continuous explanatory variables and contingency coefficient (CC) among discrete (dummy) variables. A statistical package known as SPSS14.2 was

employed to compute the VIF and CC values. The result of values of VIF ranges 1.175 to 3.986 (see appendix table 2). Likewise, the values of CC ranged from 0.092 to 0.374 (see appendix table 1). Hence, multi-co linearity was not a serious problem both among the continuous and discrete variables.
The overall goodness of fit of the regression model is measured by the coefficient of determination (R^2). It tells what proportion of the variation in the dependent variable, or regress and, is explained by the explanatory variable. R^2Lies between 0 and 1, the closer it is to 1, and the better is the fit. Hence, the overall model goodness of fit represented by model count R^2 for wheat is very good that it is 84.5 for wheat indicating 84.5% of wheat sample households were correctly predicted out of 113 sample household heads of each commodity.

4.8.2. Econometric results of the OLS model

Estimates of the parameters of the variables expected to determine the marketable supply of wheat is displayed in Table 20. For wheat producers, among a total of 11 explanatory variables (8 continuous and 3 dummy) included into the econometric model only four variables were found to significantly influence marketable supply of wheat positively. These are sex of the household head, quantity of wheat produced, access to market information and access to extension services. The remaining seven variables were found to have no significant effect on marketable supply of wheat.
Sex of the household head (SEX): since both men and women take part in production and management of crops, previously the likely sign of the coefficient of sex on sales volume was not hypothesized. However, sex of the household head influenced the marketable supply of wheat positively and statistically significant at 10% significant level. The positive sign implies that if the household is male headed the probability of wheat to be marketed increased by 47.6%.
This can be explained by the fact that males have relatively better labor (ME) advantage to produce and supply more volume. Secondly, males are subjected to different expenditure. The need of cash for expenditure

made them to supply higher volume of wheat to the market. Earlier study by Dawit (2010) also revealed that sex of the household head is one of the factors that affect the probability of marketable supply of poultry positively in Alamata and Atsbiwomberta woredas of Tigray.

Quantity of wheat Produced (QUANPROD): as hypothesized the multiple linear regression output variable was significant at 1% significant level, a positive coefficient implies that an increase in quantity of wheat produced increases volume of marketable supply of wheat by farmers. It indicates that households who produce more quantity of wheat had also supplied more to the market. The result shows that a one quintal increase in the wheat production causes a 0.803 quintal increase in the volume of marketable supply of wheat. This is in agreement with previous studies conducted by Wolday (1994), Wolelaw (2005), Rehima (2006), Kindie(2007), Bosena (2008), found that the amount of grain, rice, red pepper, sesame, cotton and honey respectively, produced by household affected marketable supply of each of the commodities significantly and positively.

Access to credit (CRD-ACSS): As the multiple regression model result indicates, the variable access to credit had positive and significant influence on volume of marketable wheat supply at 5% significance level and increases the chance of market penetration. From this result it can be stated that those farmers who have access to formal credit, are more probable to supply marketable wheat and have more bargaining power than those who have no access to formal credit. This in turn will increase the chance of eliminating mediators in between. In the study area, access to credit is determined by availability of cash on hand.
As indicated in the descriptive part, the agricultural Office that distributes improved seed and fertilizer on credit requires a down payment to provide credit. In this case, only those farmers who possess cash on hand can benefit from formal credit.

Table 24: OLS estimation result of determinants of wheat market supply

Variables	Coefficient	Standard Error	t-ratio	P-value
Constant	2.355	4.819	0.467	0.643
SEX	-0.290	1.498	-0.194	0.847
AGE	-0.006	0.050	-0.126	0.900
EDU-LEV	0.153	0.219	0.689	0.494
FAMISIZE	-0.043	0.263	-0.161	0.872
FARMSIZE	0.030	0.424	0.071	0.943
QUANPROD	0.646	0.056	11.596	0.000***
PRLAGGD	0.014	0.013	1.086	0.283
HOR-PRC	-0.016	0.009	-1.704	0.095*
CRD-ACSS	4.466	1.766	2.529	0.015**
ACCMKINF	1.967	2.281	0.863	0.393
EXT-ACSS	0.672	1.091	0.616	0.541

Dependent variable amount of wheat sold in quintal. N=113 R^2=84.5 Adj. R^2=81.6
***, **, and * show the value statistically significant at 1%, 5% and 10% respectively.
Source survey result 2021/22

Price of other crops (HOR-PRC): Here price of potato was taken for comparison since it is the predominant cash and competent substitute crop grown in the study area. As hypothesized previously price of potato influenced volume of wheat marketed negatively and significantly at 10% level of significance. The implication is that the increase in price of potato by one birr reduces marketable supply of wheat by 0.016 quintal. The increase price of other crops (potato) made producers to shift and engage in the production of potato that have better price.

5. CONCLUSION AND RECOMMENDATION

5.1. Summary and conclusion

The study was conducted in Tiyo woreda located about 185 km in South of Addis Ababa. The area is known for its surplus production of agricultural commodities. However, analysis of market chain of agricultural crops in general and wheat in particular are not well understood. The study attempted to explore and analyze marketing chain of wheat in the area. Selection of wheat was mainly based on its relative importance and marketability.

The study was conducted in order to identify optimum market chains and marketing support services, structure-conduct-performance of the market, determinants of supply of wheat in the area.

Production of wheat in the study area is mainly for market. Hence, the commodity is important source of cash for smallholder farms', following potato. Nationally, the area is known for its surplus production. In the area, the average land allocated for the production of wheat per household was 0.83 hectare. The average production of wheat per hectare was 31.6 quintals.

In the study area, during the year under the study, out of the total wheat produced by sample farmers 53.4% (420,112 quintals) of wheat were supplied to the market. The remaining 46.6% of wheat hold by farmers for consumption, repayment for borrowed seed and as source of seed for the next production year.

The estimated farmers average production cost per hectare was 14,220 ETB. The major costs incurred by the farmers in the study area in order of importance the costs incurred for the production of wheat in order of importance were 52.4% for seed purchase, 16.36% for land rent and 10.44% for fertilizer purchase. The average profitability of farmers per hectare was 56,343 ETB.

Unfair pricing and weighing, lack of institutions providing market information, multiple taxes, poor policy if any, bureaucracy, security and lack of infrastructures were farmers marketing problems.

The study also identified the main marketing agents through which wheat was channeled from producer to final consumers, such as farmer traders, urban assemblers, wholesalers, regional retailers and urban retailers.
Accordingly, producers supplied 40.7% of their produce to wholesalers, and 38.02% to urban assemblers.

Regarding structure of the market, the four firm's concentration ratio (CR4), that is the share of the largest four wholesale traders in the total volume wheat purchased at Assela and Adama regional market, hold 65% and 71.5% of the total volume purchased respectively, in the year 2020/21, indicating that the market has strong oligopolistic market structure.
Barrier to entry in terms of licensing and years of trade experience did not hinder entry into wheat market, but capital requirement did. Market information system is not transparent among farmers and traders. However, all traders have information from different informal sources. Concerning conduct of wheat market, generally, trading is mainly on eye-appraisal and exchange takes place on bargaining. Traders are highly mobile and purchased from different market per week. The average number of market visited per week by all traders was 1.67. The frequency of market visit by urban assemblers (2.43) was the highest of all traders followed by wholesalers (1.67).

The result of marketing costs, margins, and profitability analysis indicated that farmer traders incurred the smallest transaction cost per quintal. This was due to absence of costs related to transportation since they sale the product in their village market. The average transaction cost per quintal incurred by whole sellers is 67.1 ETB which was higher than any other traders. This could be due to higher costs associated with transportation of the product and storage loss during product preparation. With respect to profitability, urban retailers received the highest net profit rate per quintal which is 342 ETB for. Urban assemblers obtained lowest net profit per quintal due to higher transaction cost for the later associated with product preparation and transportation. However, wholesalers' lower net profit per quintal could be compensated through transaction of higher volume of the commodities relative to urban retailers. Capital shortage, lack of credit access, poor product quality, lack of market information, market infrastructure, multiple taxation, transportation cost, lack of demand and unfair competition with unlicensed traders were some of marketing problems faced by traders.

Results of econometric model indicated the relative influence of determinants of different variables on marketable supply of wheat in the study area. A total of eleven (8 continuous and 3 discrete) explanatory variables were included in the model independently. Of the total 11 variables, four variables had shown significant relationship with marketable supply of wheat.
Accordingly, quantity of wheat produced, and access to credit were found to influence marketable supply of wheat positively and significantly. Contrary to this, price of other crop (potato) had shown negative and significant relationship with volume of wheat marketed.

5.2. Recommendation and policy implication

Contribution of wheat to household's nutrition, income and food security is tremendous. It also provides job opportunities for youth and the landless and for traders and poor urban dwellers engaged in its processing activities. Regardless of its contribution, however, its productivity and marketing system is still low and slow compared to world and regional average.
As a result, institutional support provided to the sector such as access to credit, market information and extension services were below the expected level. These factors together with several household personal, demographic and socio-economic factors greatly affected the marketable supply and flow of wheat and consequently the productivity and marketing of the sector. Based on the research findings of this study, the following points are recommended to improve marketing chains of wheat so as to enhance its flow and increase the producers income.

The wider range difference among farmers in exploring market information having the right awareness of wheat market chain has exposed the farmers for intermediate mediators and wrong flow of their product in the market, causing lesser income and higher cost. This problem has arisen partly due to the non existence of government policy and administration oriented farmer associations, information generating systems, poor government policies which have made the farmers vulnerable to unnecessary cost and hopeless trade trend.
Lack of financial capacity of farmers in addition has had its own negative effect in overcoming the transport challenge the farmers face each day and the infrastructures also are mainly least demand fulfilling works which makes it difficult for farmers with lower capital. Therefore establishing farmer associations with well trained staff, market information centers, positive and encouraging policies, strict monitory system on this four market agents, improving infrastructures will greatly help farmers get access to this dependable agents, get more bargaining power, force intermediary agents out and fulfill their legal obligations. Moreover, improving access to credit and reconsidering the existing bureaucratic input administration procedure are also crucial to allow easy access to promote investment and trade. Furthermore, revisiting the previous research recommendations is highly important.
The enhancement of wheat producers' bargaining power through cooperatives is the best measure that should target at reducing the oligopolistic market structure in the Tiyo woreda regional market. The measure also favors the sustainable supply of wheat at reasonable price to consumers.
The result of this study has shown that access to market information affected the quantity of wheat supplied positively and significantly. Farmers in the study area do not get timely market information up on which to base their marketing decision. They depend on traders and other farmer friends for price information. Therefore, there has to be an institution that can convey reliable and timely market information required by all stakeholders simultaneously. This would make the marketing system to operate efficiently and harmoniously. The availability of timely and precise market information increases

producers’ bargaining capacity to negotiate with buyers of their produce. In order to obtain this advantage there is a need to improve extension system which focused on market extension and linkage of farmers with markets is necessary to ensure a reliable market outlet for producers of the study area.

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7. APPENDIX

Table 25: Contingency coefficient of wheat dummy variables

Variables	Credit access	Access to price information	Sex of HHH	Credit access
Credit	1 (1)			
access	0.092 (0.712)	1 (1)		
Access to	0.141 (0.708)	0.294 (0.708)	1 (1)	
price				
information	0.374 (0.710)	0.172 (0.713)	0.269 (0.711)	1(1)
Sex of HHH				

Figures in parenthesis indicate contingency coefficient of wheat sample respondent. Source own survey data computation 2021

Table 26: Multi-co linearity test result for continuous variables

No	Variables	Collinearity statistics	
		Tolerance	VIF
	Constant		
1	Lagged wheat price	0.640	1.563
2	Education level of HHH	0.625	1.601
3	Family size of HHH	0.745	1.441
4	Farm size of HHH(ha)	0.530	1.725
5	Amount of wheat produced (qt)	0.551	1.877
6	Price of other crop(potato)	0.620	1.688
7	Age of HHH	0.608	1.673

Source own survey 2022.

Table 27: Conversion factors used to estimate man equivalent

Age group	Male	Female
<10	0	0
10-13	0.2	0.2
14-20	0.5	0.4
20-55	1	0.8
>55	0.7	0.5

Source Bekele Hundie 2004

Table 28: average cultivated land owned and its purpose of allocation (ha)

Land allocation	Producers n=113	
	Mean allocation	percent allocation
Cultivable land	2.84 (1.18)	100
Land for potato	(0.23)	10.5
Land for wheat	(0.54)	53.4
Land for barley	(0.25)	20.2
Land for pea	(0.05)	5.5
Land for haricot bean	(0.07)	4.2
Land for maize	(0.19)	6.2

Numbers in parenthesis represent standard deviation, N= total sample size.

Source own survey result 2022