

**VALUE CHAIN ANALYSIS OF WHEAT (*Triticum aestivum*): THE
CASE OF DEMBECHA DISTRICT, WEST GOJJAM ZONE,
ETHIOPIA**

MSc THESIS

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**Value Chain Analysis of Wheat (*Triticum aestivum*): The Case of
Dembecha District, West Gojjam Zone, Ethiopia**

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MASTER OF SCIENCES IN AGRICULTURE
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DEDICATION

This Thesis is dedicated to my beloved Mother, Tena Melaku and to my beloved wife, Bezawit Esubalew who committed their lives with strong prayers for the betterment and success of my academic life.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this Thesis is my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this Thesis. Any scholarly matter that is included in the Thesis has given recognition through citation.

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BIOGRAPHICAL SKETCH

Yonnas Addis, the author, was born on October 19, 1993 in Dembecha district, West Gojjam Zone of Amhara region of Ethiopia from his father Addis Miheretea and his mother Tena Melaku. He attended his Primary Education at Daba Primary School from 2001-2008 (grade 1-8) in Dembecha district. Then after, he attended his Secondary and Preparatory education at Dembecha Higher Secondary and Preparatory School, 2009-2012, Dembecha.

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ACRONYMS AND ABBREVIATIONS

AACCSA	Addis Ababa Chamber of Commerce and Sectoral Association
BOA	Bureau of Agriculture Office
CSA	Central Statistical Agency of Ethiopia
DA	Development Agent
DDLRL	Dembecha District Livelihood Report
DDTIDO	Dembecha District Trade and Industry Development Office
EAAPP	Eastern Africa Agricultural Productivity Project
FAO	Food and Agricultural Organization of the United Nation
GDP	Gross Domestic Product
GIS	Geographical Information System
LDC	Least Developing Countries
OLS	Ordinary Least Square
S-C-P	Structure-Conduct-Performance
UNIDO	United Nations Industrial Development Organization

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Value Chain Analysis of Wheat: The Case of Dembecha Districts of West Gojjam Zone, Ethiopia

ABSTRACT

Wheat market in Dembecha district experienced in poor market linkage, disproportional benefit share, and inadequate market supply and market alternatives. This study was aimed to analyze value chain actors' interaction and their role, wheat market structure-conduct and performance, factors affecting market supply and market outlet choices of smallholder wheat producers in Dembecha district of West Gojjam zone. The study used cross-sectional data collected from a sample of 130 farm households selected through two-stage sampling techniques. Additionally, thirty traders, two bakers, one processor, four cooperatives and ten consumers were used to collect the data. Descriptive statistics and econometric models were used to analyze the data. Result from functional and institutional approach of value chain analysis showed that input providers, producers, cooperatives, collectors, wholesalers, retailers, and processors were found to be important wheat value chain actors. Market concentration ratio (CR4) at district level was found to be 39.78 percent and there were observed barriers to entry into wheat market. These structural characteristics indicate oligopolistic market structure of wheat market at District level. Buying, selling, and pricing strategies, which are indicators of market conduct, showed deviation of wheat market from competitive market norms. Analysis of marketing margins indicated that from total gross marketing margin processors received the highest (39.72%) marketing margin and retailers received the least marketing margins (4.85%) in wheat value chain. Wheat market is also characterized by relatively good producers' share when they sale to consumers, collectors and wholesalers but they incurred high operating cost which reduces their profit level. Even though, wheat market in the study area deviate from competitive market norms as a result of oligopolistic market structure and conduct, profitability analysis of wheat market showed all market actors operated at profitable level. The results obtained from OLS regression analysis indicated that the quantity of improved seed varieties used, quantity of wheat produced, educational level of the household heads, lagged market price of wheat and frequency of extension contact were significantly affecting the market supply of wheat positively as expected. The multivariate probit model results also revealed that the quantity of wheat sold, distance from nearest market, sex of household head, ownership transport facilities, non/off farm income, cooperative membership and bargaining power determine a market outlet choice decision of wheat producers in the study area. Encouraging producers to use recommended improved seed, strengthening provision of education and infrastructural development, strengthening extension service and increasing farmer's awareness on different market outlet wheat produce to enhance producers benefit are recommended to strengthen wheat value chain development.

Keywords: Dembecha, Multivariate Probit, Ordinary Least Square, Value Chain, Wheat

1. INTRODUCTION

1.1 Background of the Study

Wheat (*Triticum aestivum*.) is one of a strategic food security crop that attempts to bridge the persistent food gap in Africa. It also plays an important role in the development of the agricultural sector and improvement in the income levels and livelihood situations of the farmers in developing countries. Today, wheat is among the most important crops grown in Ethiopia both as a source of food for consumers and as a source of cash income for wheat farmers. It is an important staple food in the diets of many Ethiopians, providing about 15% of the caloric intake of the country's over 90 million populations. This makes wheat the second-most important food, behind maize (19%) and ahead of *teff*, sorghum, and *enset* (10-12% each) (FAO 2015). In terms of the gross value of production, wheat is ranked fourth or fifth, after *teff*, *enset*, and maize and approximately tied with sorghum (ATA, 2015).

Production and marketing of wheat increasingly become as the means of livelihood for a million of smallholder households in Ethiopia and has grown significantly in the country in the past decade, rising from around 1.1 million tonnes in 1995-96 to 3.9 million tonnes in 2013. This represents an average annual growth of 7.5%. Marketing of wheat also becomes the largest sub-sector in the economy and nearly 20% of the productions are marketed annually, which makes it second next to *teff*. The contribution of wheat crop to national income was so large about 64% growth in total volume production in less than a decade (2006-2013) was achieved because of the wheat production sector (CSA, 2014). With regard to the area of cultivation, wheat is the fourth most widely grown crop after *teff*, maize, and sorghum (CSA, 2017).

A total amount 45,378,523.39 quintal of wheat is produced from 1,696,082 hectares (ha) of land in Ethiopia in 2016/17 production year and it shows 1.89% increment from 2015/16 total wheat production (CSA, 2017). However, this production level represent has smallest share from total world wheat production. According to FAO (2015), Ethiopia only represents 0.6 % of the 713 million tons of wheat produced globally. This is because wheat production in Ethiopia dominated by smallholder farmers and the remaining 8% comes from large state-owned farms and cooperatives (USDA, 2014).

The productivity of wheat is relatively small in Ethiopia with an average farm size holding is less than one hectare and thereby domestic production is insufficient to meet the domestic market due to income growth, urbanization, and trade liberalization (USDA, 2012). Wheat is mostly grown in the highland and mid highland areas of the country. Among nine regions of the country, Oromia and Amhara produce 59% and 27% of the country's total wheat production respectively; with an additional 9% coming from the Southern Nations Nationalities and Peoples Region (SNNPR) (USAID, 2016).

Wheat value chain analysis has been attracted considerable attention in recent years as a means to increase /stabilize farm incomes and to rejuvenate primary agriculture and rural economy. Value chain analysis on wheat can help to achieve win –win outcome for all participants and shrink the gap between market supply and demand AACCSA, 2017). Furthermore, value-added activities are born in the wheat value chain from the necessity to adapt to the wide-ranging changes affecting the agriculture and Agri-food industry. These changes stem from many interacting factors: shifting consumer preferences, changing demographics and income profiles, innovation in food and non-food uses of agricultural products and trade related issues and in an increasingly integrated global market (Gezahagn, 2010).

Dembecha is one of the naturally endowed areas to grow different cereal crops predominantly maize and wheat in the West Gojjam zone. Currently, the production of wheat increases from time to time just an example the estimated area coverage 2015/2016 production year cover about 10120 ha, while in the 2016/17 production year it reached about 10480 hectares. In the 2016/2017 production year about 534480 quintal has been harvested (DoANR, 2017). Having this potential the district is suffering from lack of effective pie-growing mechanisms among actors and thereby market supply is not adequate.

In general, all these facts listed above can tell us there is immense potential for improving the life and income of individuals in the area if value chain analysis efficiently and effectively undertaken. Therefore, this study investigated wheat value chain principally on actors and their roles, existing market channels and market performance, factors that influence wheat market supply and outlet choice decision of wheat producers using different approaches in Dembecha district of West Gojjam zone.

1.2. Statement of the Problem

The increased competition because of globalization has resulted in lower returns for actors in African agriculture, including farmers and agro-processors, as they have continued to lag behind their competitors in innovation and the ability to set their products apart. This may be due to the absence of vertical and horizontal coordination among value chain actors, with lower demand for superior and differentiated products as a result value added cost and price. Therefore, value chain analysis of various crops is important to create understanding on value adding activities, market performance, to develop pie-growing and pie-sharing tendency between actor, and to reduce constraints and to increase the competitiveness of smallholder farmers (Kaplinsky and Morris, 2001).

In Ethiopia, an agricultural product from small scale or family farming is marketed in very small volumes, low return and a wide range in quality. According to Degye *et al.* (2009) revealed marketing system of wheat in Ethiopia is not well-integrated and not performing well. This may be due to the existence of poor coordination among chain actors, poor information flow, inadequate market outlet alternatives and absence of well-integrated extension service in the product value chain. Value chain analysis is looked-for addressing market issues such as product supply, quality and consistency of raw product in the chains and shrinks the gap between demand and supply. It also provides an important means to improve the actor relationships and mechanisms to increase market supply of a commodity (Bryceson, 2008; Mohammed *et al.*, 2015).

Smallholder farmers dominate the production wheat in Ethiopia and production is still remains subsistence oriented, low productivity, entirely dependent on weather with little investment in irrigation and characterized by the traditional market system. Despite the many promises held via decision makers to support growers to solve their farming constraint, they still talk of dissatisfaction to the extent of support delivered to their pressing issues including; lack of adequate improved seed supply from seed enterprises, insufficient credit facilities, delayed pesticide delivery, lack of sufficient farm mechanization service provider, impracticality of research outcomes to growers first hand challenges. Many of the manufacturing sub-sector activities in Ethiopia faced market supply problems due to ineffective value chain approaches of the participants, which led to lengthened investment returns and below capacity factory performances (AACCSA, 2017).

Although there is a huge investment by the Ethiopian government in agricultural extension programs but, studies indicate growing of wheat supply deficit in the coming decades. This suggests the need for increased and efficient investment not only in wheat production, but also in wheat marketing and processing (Samuel *et al.*, 2017). Moreover, gap between wheat demand and supply has been increasing from time to time in Ethiopia due to changes in population size, urbanization and growing number of wheat processing industry (Zewdie *et al.*, 2016).

Linkage between value actors and volume of wheat market supply is not still good-looking and advanced in Ethiopia due to lack of relevant market information, limited/absence of coordination between the upstream and downstream actors, inadequate marketing alternatives, poor infrastructure facilities and limited/absence of bargaining power for producers. Value chain analysis is a key strategy to improve market structure, and to reduce exposure to volatility of product supply and help to set coordinated linkages during product movement (Kirimu *et al.*, 2011; ILO, 2012).

Even if land allocated to wheat and total production of wheat in Dembecha district is increasing, the downstream actors namely consumers, local alcohol producers (*areqi* and *tella*) and local bread (*ambasha*) sellers sometimes constrained by inadequate market supply (DDBoA, 2017; DDTIDO, 2017). Moreover, full information about the overall potential of this subsector in general and comparative advantages and existing bottlenecks/constraints across the value chain did not been well studied and documented for better understanding of the wheat value chain and assess possible improvement strategies to upgrade wheat value chain for the benefit of smallholder farmers, existing and new processors, traders, and other wheat value chain actors. This study, therefore, attempted to investigate the value chain of wheat, with a view to filling the existing gap, in Dembecha district of North Western Ethiopia.

1.3. Research Questions

This study tried to answer the following research questions:

1. Who are the actors in the wheat value chain in the study area? What are their roles? How they interact to each other?
2. What does structure-conduct-performance of wheat market look like in the study area?

3. What factors determine the marketed surplus of wheat at a farm household level in the study area?
4. What factors determine farmer's choice of one market outlet over the other?

1.4. Objectives of the Study

The general objective of the study was to analyze wheat value chain in Dembecha district of West Gojjam zone.

The specific objectives of the study were:

1. To identify actors, their role and interaction in the wheat value chain;
2. To analyze the structure-conduct-performance of the wheat market in the study area;
3. To analyze the determinants of wheat market supply at the household level; and
4. To identify factors affecting market outlet choice decisions of wheat producers in the study area

1.5. Significance of the Study

There is a sense of necessity in the country to improve the livelihoods of the destitute mass. The priorities of the national policies, sector strategies and programs of the government are primarily targeted to promote rural and agricultural development and poverty reduction. Sustainable livelihood improvement, however, cannot be achieved without undertaking effective and efficient value chain analysis of agricultural commodity because the performance of agriculture sector directly affects income, food security and nutrition. This requires relevant value chain study that is essential for policy makers, development practitioners and farmers.

The outcome of this study is expected to be useful for governmental and non-governmental institutions who are involved in the process of reducing vulnerability of the rural poor to the adverse effect of inefficient market and maintain household food security. To bring more insights on value chain analysis that are crucial to cope with ineffective chains, this study also investigates points that help to improve value chain performance through identifying and supporting the weakest part of value chain for the benefit of all stakeholders in the wheat value chain and for maximizing the welfare of all chain actors through effective pie- growing mechanisms.

1.6. Scope and Limitations of the Study

This study focused on the entire wheat value chain from input supplier to the consumer within Dembecha district. Important information relevant for this study were collected from sample households and marketing actors involved in the marketing of wheat in the study area. The major value chain participants (producers, traders and consumers), supporting institutions were in relation to the different marketing mix in the production and marketing of wheat (marketing channels, market direction, price formulation , buying and selling strategies).

The limitations of the study begin related with objective of the study. This study focused on identifying chain actors and their role, structure-conduct-performance, determinants of wheat market supply and market outlet decision at household level in Dembecha district of northwestern Ethiopia. The second limitation relates to selection of crop namely wheat is selected for this study due to its importance for both consumption and market. The other limitation is refers to geographical coverage as it covers only one district of the zone due to limited budget. On the other hand, the limitation of this study is related to nature of data collected. The study was mainly based on the information generated from the sample household survey during a single production season using across-sectional data due to the limitation of time.

1.7. Organization of the Thesis

The thesis is structured in five main chapters. The first chapter describes the introduction part of the study. Chapter two presents theoretical perspectives and empirical evidences of the thesis. Chapter three discusses the methodological approach of the study that includes the method of data collection, analysis and hypothesis of the study. The fourth chapter presents the results of the study and discusses it in comparison with the results of similar studies. The final chapter presents the main findings, summary, conclusions and recommendations made based on the study.

2. LITERATURE REVIEW

2.1. Basic Concepts and Definition

Value chain: Porter (1985) defines —value chain’ as a representation of a firm’s value adding activities based on its pricing strategy and cost structure. It is also the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Vermeulen *et al.*, 2008). Value chain in different study includes activities performed by input suppliers, producers, processors, traders, intermediaries’, consumers and possible relationship in the chain.

Value addition: It describes what value the actors add to the product to increase the customer value offered from the product. Value addition is importance for the farmers to bring bargaining power and to create competitive advantage by differentiating (adding value) to their product. As a result, there are needs of value addition in each stage which help to differentiate it from its competitors at a cheaper rate with best quality. Value addition is the process of economically adding value to products (raw commodities) that possess intrinsic value in their original state by changing their current place, time, and form characteristics to improve their economic value and preferred by consumers in the market place (Fleming *et al.*, 2005).

Value-addition can involve different activities: (change in the physical state or form of the product such as milling wheat into flour or making strawberries into jam), production of a product in a manner that enhances its value, physical segregation of an agricultural product in a manner that results in the enhancement of the value such as an identity preserved marketing system which creates a special link/ between the grower and consumer by meeting the specific requirements of food processors) (Berhanu *et al.*, 2012).

Value chain actors: Value chain actors are those involved in input supply, producing, processing, marketing, and consuming agricultural products. They are corporate persons, a natural person or other entity, that is able to influence its direct surroundings. They can be those that directly involved in the value chain (rural and urban farmers, cooperatives, processors, traders, retailers, cafes and consumers) or indirect actors who provide financial

or non- financial support services, such as credit agencies, business service and government, researchers and extension agents (Kaplinisky and Morris, 2001).

Value chain map: It is a visual representation of the relationship of actors in a value chain as well as other market players through a simple diagram. Things that need to be mapped can be actor relationship, product flow, information flow, service flow or other like cost and margin of the actors in value chain. Value chain mapping is graphical presentation the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to industrial processing and marketing (UNIDO, 2009).

Value chain analysis: Value chain analysis examines the full range of activities required to bring a product or service from its conception to its end use. It helps for identifying weakest point in value chain and for taking appropriate intervention. It also helps to assess the income distribution among chain participants. Value chain analysis is an original methodological tool that enables to design teams in the product definition phase to comprehensively identify pertinent actors, their relationships with each other and their role in the product's life cycle (Donaldson *et al.*, 2006).

Value chain analysis has been influenced by both internal and external forces which help to study each and every aspect of the industry or sectors. The internal forces are production, marketing etc. and external forces such as technological, ecological, economic, new industry trends and regulatory development.

Value chain governance: Kaplinsky and Morris (2000) explained governance as coordination and identifying opportunities and assigning roles to key players of value chain. Governance ensures that interactions between actors along a value chain reflect organization, rather than randomness. The governance of value chains emanate from the requirement to set product, process, and logistic standards, which then influence downstream or downstream chain actors and results in activities, roles and functions.

Marketing channel: A marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). Marketing channels are alternative routes of product flows from producers to consumer and it can be either short or long depending on kind and quality of the product marketed,

available marketing services, and prevailing social and physical environment (Islam *et al.*, 2001).

Marketing: Marketing includes all activities of exchange conducted by producers and middlemen in exchange for the purpose of satisfying consumer demand (Kilingo and Kariuki, 2001). Kotler and Keller (2003) define marketing is as a social and a managerial process in which individuals and groups obtain what they need through different activities.

Marketing costs: It refers to those costs, which are incurred to perform various marketing activities in the transportation of goods from producer to consumers such as market research and promotion, product preparation, packaging, handling, transport, product losses, storage, processing, and fees and unofficial payments (William and Robinson, 1990).

Marketing margin: Market margin explained as difference between the prices the consumer pays and the price that is obtained by producers (Cramers and Jensen, 1982). Marketing margin in an imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit. But marketing margins can also be high, even in competitive market due to high real marketing costs (Wolday, 1994). It is a commonly used measure of the performance of a marketing system (Abbott and Makeham, 1981).

Marketable and marketed surplus: Marketed supply refers to the quantity actually taken to the markets irrespective of the needs for home consumption and other requirements. Marketable surplus shows the quantity left out for sale in the market after meeting farmer's consumption and utilization requirements for kind payments and other obligations such as gifts, donation, charity (Wolday, 1994). Marketed surplus may be equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during transit (Nuri, 2016).

2.2. Basics of Value Chain Analysis

Value chain analysis is basically important to identify chain actors, discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation; and to finding value adding activities and assigning costs and added value to each of those activities (UNIDO, 2009). Kaplinsky (2000) confirmed value chain analysis can be helpful in the following aspects:-

To overcome problems of market access: It helps to increase producers to gain market access from international market by accessing to lead firms in the chain. Developing country's producers will not automatically gain market access and unable to compete in international market. However, the presence of lead firms in the chain make them to participate indirectly.

Identifying inefficient part of the chain: It helps to identify levels where policy and/or organizing could be used to improve the distribution of gains. Value chain analysis is important to understand the reasons for inefficiencies in the chain and identify potential leverage points for improving the chain performance (Anandajayasekaram and Berhanu, 2009).

Understanding of gains along the chain: Knowing how and by whom a chain is governed helps to understand the distribution of gains among firms along it. Kaplinsky and Morris (2000) explained on three sets of reasons why value chain analysis is important in this era of rapid globalization. The first reason is increased systemic competitiveness. Next he justify on the efficiency in production as only a necessary condition for successfully penetrating global markets. Finally explained on entry into global markets which allows for sustained income growth – that is, making the best of globalization - requires an understanding of dynamic factors within the whole value chain.

2.3. Domains of Value Chain Analysis

Value chains are complex sets of interrelated elements (public and private agents, domestic and foreign markets, inputs, outputs, production factors, institutions, environment and natural resources) (Kaplinsky and Morris, 2000). It allows analysts to identify issues (constraints, opportunities, strengths and weaknesses) to be addressed by policies. Analyses to be carried out cover the following domains:

Socio-economic context of the value chain: this analytical domain identifies and outlines the key elements of the context, such as the macro-economic and social situation of the country in which the value chain develops, explains how these elements influence the value chain and vice-versa.

Demand for value chain outputs: It is important to investigate the consumer side of a value chain. The current and potential demands of the various final output(s), their various destinations and related price trends have to be considered. This allows analysts to identify

threats and opportunities related to the destination of the value chain outputs to be addressed by means of appropriate policies.

Analysis of the institutional set-up: The identification and appraisal of the institutional set-up, i.e., set of interactions taking place among agents and the formal and/or informal rules governing them is a key aspect when designing policies aimed at fixing issues related to the value chain governance.

Analysis of input and output markets: A specific focus on markets allows analysts to understand agents' behavior and to further explore the institutions governing the value chain because there are close relationships among markets' set-up, rules and agents' choices. The degree of competitiveness, the existence of monopolies, monopsony's, oligopolies, market segmentation, etc. strongly contributes to determine the value chain's performances. Policies have to be shaped considering the existing and desired market structure.

Functional analysis of the value chain: the functional analysis provides a detailed profile of the industry structure and production technology by identifying, describing and quantifying in physical terms the sequence of operations concerning commodity production, processing, marketing and final consumption and related agents carrying them out.

Economic analysis of the value chain: The economic analysis allows analysts to determine, for instance, the value added created by the overall value chain, the value added and margins for each economic agent at each stage of the chain, the value added distribution among the factors (capital: profits, labor: wages, other assets: rents).

2.4. Steps of Value Chain Analysis

Various manuals, handbooks, researchers exist for carrying out value chain analysis. The first steps is appraisal of value chains and related information, e.g., choosing products, areas to work, and partners; conducting surveys to describe value chains and product sub-sectors; rapid market appraisals, and data analysis. The second step is design of interventions to improve value chain performances, including technologies, institutional innovations, and policies. The third step is that implementation of interventions and finally monitoring and evaluation.



Figure 1: Stage of value chain analysis

Source: Nang'ole *et al.*, (2011)

2.5. Approach of Value Chain Analysis

Value chain approaches examine the interactions between different actors (firms) in the chain and factors influencing the chain. A value chain approach of mapping is an indispensable part of value chain analysis and reduces the complexity of economic reality with its diverse functions, multiple stakeholders and relationship (GTZ, 2007). The maps identify business operations, chain operators and their linkages, as well as the chain supporters within the value chain. Value chain analysis focuses on changes over time in the structure, conduct and performance of value chains, particularly in response to changes in market conditions, technologies and policies (Anandajayasekaram and Berhanu, 2009). There are two different kinds of approaches used for value chain mapping:

1. Functional and Institutional Analysis

The mapping is denoted as a functional and institutional analysis which starts with constructing a preliminary map 'of a particular chain to provide an overview of all chain actors (institutional analysis) and the type of interaction between them (functional analysis). The principal functions of each stage are: 1) the agents carrying out these functions; 2) the principal products in the chain and their various forms into which they are transformed along the entire chain (Faße. *et al.*, 2009). This study applied this approach to map the value chain of wheat in the study area.

2. Social Network Analysis (SNA)

Another approach for mapping value chains is the social network analysis (SNA) originated in social sciences. Faße *et al.* (2009) concept, it serves as a tool for mapping and analyzing relationships and flows between people, groups, and organizations. The initial flow chart of the chain consists of various nodes and links arranged in form of a matrix. Social Network Analysis (SNA) is used when the value chain is more characterized by a network than a single vertical chain.

2.6. Approaches to Study Agricultural Marketing

The study of marketing involves various approaches. Different circumstances involved in the demand and supply of agricultural products, and the unique product characteristics require a different approach for analyzing agricultural marketing problems (Johan, 1988). The major and most commonly used approaches are functional, institutional and commodity approaches.

2.6.1. Functional approach

Functional approach of marketing take apart of the whole marketing process into specialized activities performed in accomplishing the marketing process (Kohls and Uhl, 1985). The widely accepted functions are: exchange (buying and selling), physical (processing, storage, packing, labeling and transportation), and facilitating (standardizing, financing, risk bearing, promoting and market information).

2.6.2. The system (institutional) approach

This approach of agricultural marketing examines various agencies and institutions which perform a range of functions in the marketing process and it focuses on the study of the various institutions, middlemen and other agencies which add utility to the product. These organizations or market participants are those who perform the activities necessary to transfer goods from the producer to consumer, because of the benefit of specialization and scale that exist in marketing (Cramer and Jensen, 1982).

2.6.3. Commodity (individual) approach

This approach combines both functional and institutional approaches and extremely useful to the person who is interested in only one product for depth analyses. It is important to understand on what is done to the commodity and who does it as it moves through the marketing system. Commodity 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).

2.6.4. Market Structure, Conduct and Performance (S-C-P) Analysis

The SCP analysis evaluates markets in terms of whether the number of firms or traders operating in a market are large enough – in number and size distribution – to ensure that competition exists between the firms, which is assumed to reduce prices (for sellers in a

market) or increase market prices for goods or services (for buyers competing with each other for a good) (Samad, 2008).

It is an analytical approach used to study how the structure of the market and the behavior of sellers affect the performance of markets. It focuses on the behavior of similar rather than individual firms. It provides a broadly descriptive nature of market attributes, and the relationship between them and performance. This approach has been used extensively by government regulatory agencies to achieve competition and avoid the evil of monopoly power.

2.6.4.1. The structure of the market

Abbott and Makeham (1981) define market structure as the market behavior of the firms. structural characteristics may be used as a base for classifying markets may be perfectly competitive, monopolistic or oligopolistic Perfect computation is an economic model of market possessing the following characteristics: each economic agent's acts as if price is given, i.e., each acts as a price taker; the product being sold is considered a homogenous good. Product differentiation does not exist.

There is free mobility of and exit of firms and all economic agents in the markets possess complete and perfect knowledge. Pure monopoly exists when there is only one seller (producer) in the market, barriers to entry to other potential competitors from selling in this market. Oligopoly is said to exist when more than one seller is in the market but when the number is not so large as to render negligible the contribution of each. A typical oligopoly exists when, for example, three firms control over 50% of all sales of a particular good in a particular market and certain barriers prevent potential competitors from entering the market (Tomek and Robinson, 1990).

Market concentration ratio: refers to the number and relative sizes of buyers /sellers in a market many studies indicate that the existence of some degree of positive relation between market concentration and gross marketing margins. It is generally believed that higher market concentration implies non-competitive behavior and thus inefficiency. But studies warn against the interpretation of such relationships in isolation from other determinant factors, like barriers to entry and scale economics (Scott, 1995).

Kohls and Uhl (1985) suggest that as a rule-of-thumb, a four largest enterprises concentration ratio of 50% or more is an indication of a strongly oligopolistic industry, 33-

50% shows weak oligopoly, and less than 33% shows not-concentrated industry. The problem associated with this index is the arbitrary selection of r (the number of firms that are taken to calculate the ratio). The ratio does not indicate the size of distribution of the firm. In least developing country, where firms' records are usually not available publicly, it would be difficult to determine such ratios.

The Gini Coefficient and Herfindahl Index (HHI): Both utilize market shares to determine the extent of market concentration. Koch (1980) lists two kinds of partial concentration indices to measure market concentration. The Herfindahl Index is given as follows

$$HHI = \sum_i^n S_i^2 \quad 1$$

where: - S_i is the percentage market share of i^{th} firm and n , the total number of firms.

The index takes into account all points on the concentration curve. It also considers the number and size distribution of all firms. In addition, squaring the individual market share gives more weight to the shares of the larger firms which is an advantage over concentration ratio. A very small index indicates the presence of many firms of comparable size whilst an index of one or near one suggests the number of firms is small and/or that they have very unequal share in the market. The method is limited in its application for it imposes burden in so far as more data must be collected (Admasu, 1998).

Condition of entry: Barriers to market entry include a number of different factors that restrict the ability of new competitors to enter and begin operating in a given industry.

Degree of product differentiation: refers to the extent to which competing products in a market are differentiated is expected to influence the competitive interrelationship of sellers in the market.

2.6.4.2. Market conduct

Market conduct refers to the patterns of behavior that traders follow and how they adjust to changing market conditions (Meijer, 1994). The market behavior of firms will determine whether or not they compete and whether they are acting innovatively to improve market efficiency. It 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, the use of intermediaries, and trade within personalized networks (Wolday, 1994). It also includes pricing strategies, collusive behavior and mergers.

Market conduct deals with the behavior of firms that are price-searchers are expected to act differently than those in a price-taker type of industry (Cramers and Jensen, 1982). Price searchers can determine their selling prices or quantity of output they sell. In addition, they could use their market power to weaken or eliminate competitors example reducing price.

2.6.4.3. Performance of the market

Market performance may be defined as the composition of end results in the dimensions of price, output, production cost, selling cost, product design and so forth which enterprises arrive at in any market as the consequences of pursuing whatever lines of conduct they adopt (Cramers and Jensen, 1982). If the market structure in an industry resembles monopoly rather than pure competition, then one expects poor market performance.

Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output. It has 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 the 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 and thereby this study used market margin as a measure of market performance.

Marketing margins, production costs, and price markups are among the possible measures of chain performance. Marketing margin analysis deals with comparison of price at different levels of the marketing chain over the same period of time. It measures the share of the final selling price that is captured by a particular agent in the marketing chain and always related to the final price or the price paid by the end consumer, expressed in percentage (Mendoza, 1995).

The performance of a market can be evaluated by analyzing the costs and margins of marketing agents in different channels. A commonly used measure of system performance is the marketing margin or price spread. Margin or price spread can be useful descriptive statistics if it used to show how the consumer price is divided among participants at different levels of the marketing system (Mendoza, 1995).

2.7. Review of Empirical Studies

2.7.1. Value chain approach

The value chain approach is where all points in the chain are directed towards markets and coordination of actors in the key to achieve systematic competitiveness. Thus, it's a framework to understand how the poor people in rural areas of developing countries can engage, or improve their terms of engagement with trade. It allows for examining the consequence of empowering one group (the producer) and identifying how to link them to importers and consumers. It enables analysis of the implication of who does what, at which stage in the chain, and what this means for risk, capital needed and margins. There are a number of studies that have employed the value chain approach to agricultural commodities.

Addis Ababa Chamber of Commerce Sectoral Association (2017) used functional and institutional approach of value chain analysis to undertake value chain analysis of the wheat industry. The result of this study showed that producers, collectors/assemblers, grain wholesalers, processors, wholesalers and retailers for processed wheat are important actors of wheat value chain. However, there is ineffective value chain actors' interaction and many manufacturing sub sectors performed below their capacity due this poor linkage of participants.

Efa *et al.*, (2016) used functional and institutional approach of the value chain to analyze of *teff* value chain in Bacho and Dawo districts of south west Shewa, Ethiopia. He used value chain approach for identifying and categorizing the value chain actors, evaluate their roles, value added by value chain actors and relationships in the value chain. The result of his study revealed those *enjera* sellers, *teff* producers, flour sellers, farmers' cooperatives and input suppliers as the main actors that involved directly in *teff* value chain in the study area.

Dagmawit (2016) used value chain approach to study on the main actors of maize value chain he confirmed producers, collectors, wholesalers and retailers were found to be important actors in the maize value chain. He also used to study governance of maize value chain on the basis of control over supply, contractual agreement, quality and level of competition.

Sultan (2016) also used value chain approach to study value chain of wheat in Sinana district of Oromia National Regional State. He found that provision of adequate services

for the chain participants enhances the community socioeconomic development and it has an important contribution to improving their production and productivity and thereby increasing marketable surplus and ultimately for increasing the income of smallholder farmers.

Hymanot (2014) used value chain approach to the study of durum wheat value chain particularly identifying durum wheat value chain actors, their roles and interaction. The researchers found that input suppliers, producers, cooperatives/union, local collectors, rural wholesalers, processors, urban wholesalers, urban retailers, supermarkets, supporters, enablers and consumers as important actors in durum value chain.

Beza (2014) undertake value chain analysis of maize by using a value chain approach for identifying actors and mapping their interactions, and value adding activities. Barrett (2008) value chain analysis can help to identify with whom to form a partnership in the chain and the potential benefits of such a market-driven perspective.

Dereje (2007) used value chain approach to study the competitiveness of Ethiopian coffee in the international market. The study indicates that Ethiopian farmers have low levels of education, large family size with small farmland and get only 3% of the retail price in the German market and policy intervention was suggested to improve farmers' performance.

2.7.2. Market Structure, Conduct and Performance approach

A number of studies have used Structure, Conduct and Performance approach as a measure of market performance (Sultan, 2016; Twinamasiko, 2014; Ayelech, 2011; Bosena, 2008 and Rhima, 2006).

Enibe *et al.* (2008) in their study on Policy Issues in the Structure, Conduct and Performance of Banana Market in Anambra State, Nigeria estimated marketing margin as the difference between the consumer price and the price received by producers. The results indicated that producers share of the consumer spending was 56 %. They further indicated that the remaining 44 % was the marketing margin that covers the marketing cost (16 %) and the profit of the middlemen (28 %).

Getahun *et al.* (2017) used market structure – conduct –performance analysis approach to assess the performance of the fruits market in Bench Maji zone, southwest Ethiopia. Fruits

market in the area was characterized by non-competitive nature with high concentration ratio, entrance and exit barriers.

Abrham (2009) evaluated performance of grain market in Lume woreda of Oromia National Regional State, Ethiopia using structure, conduct and performance approach. He found that grain market the structural organization of the grain marketing system appeared to be competitive for *teff* and wheat. The market conduct was found to be influenced by factors like timing of loans return by farmer, the presence of informal traders, and uncertainties created by price fluctuations in the terminal markets. Generally, he confirmed grain market was not performing well and the agricultural marketing system does not seem to be benefiting either the grain traders or the rural households due to high marketing cost.

2.7.3. Determinants of wheat market supply

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 (Tomek and Robinson, 1985). There are a number of empirical studies on factors affecting the market supply of agricultural commodities:-

Sultan (2016) also identified factors affecting wheat supply in Sinana district of Bale zone, Ethiopia using multiple regression models (two stage least square estimate). According to his result wheat supply was found to be affected positively by quantity of wheat produced; size of land holding, livestock ownership while negatively affected by family size of a household.

Tadele *et al.* (2016) identified factors affecting *teff* and wheat market supply in Dendi district, west Shoa zone, Ethiopia using multiple linear regression models. The results showed that market supply of wheat was positively associated with education, quantity produced of wheat and extension access.

Zewdie *et al.* (2016) identified factors of supply issues in wheat industry in the cases of Arsi and East Shewa Zone, Oromia National and Regional State, Ethiopia using multiple linear regressions model. The result of his study confirmed that wheat producer's marketed surplus significantly increased with land size, fertilizer, extension service, and decreased with crop rotation and distance from the main road,.

Girma (2015) identified the determinants of marketed supply of *teff* in Bacho woreda of Oromia National Regional State. His result from multiple linear regression model indicated that sex of the household head, land allocated for *teff*, market information and frequency of extension contact significant effect on volume of *teff* marketed in the study area.

Hymanot (2014) identified factors affecting the volume of wheat marketed using OLS method in the Gololecha district of Bale zone. She found that the volume of wheat marketed affected by sex of the household heads, land allocation for durum wheat, amount of credit, quantity of improved seed varieties used, lag (previous) durum wheat price and tropical livestock size influenced positively. Contrary to this, family size had shown a negative and significant relationship with volume of wheat marketed.

Muhammed (2011) identified factors affecting market supply of wheat in Selta zone of southern Ethiopia using a multiple linear regression model. He found that the quantity of wheat produced, and access to credit were found to influence the market supply of wheat positively and significantly. Contrary to this, the price of other crop (pepper) had shown a negative and significant relationship with volume of wheat marketed.

2.7.4. Factors affecting wheat market outlet choices

The availability of alternative marketing outlet is one of the key ingredients to successful marketing of agricultural products. This is so because different outlets are characterized by different benefits (profitability) and costs. The Ethiopian wheat value chain consists of multiple actors and channels. A range of actors that include smallholder farmers, wholesalers, retailers, part-time farmer-traders, brokers, processors, cooperatives, the government and parastatal organizations, and private consumers take part in the wheat value chain (AACCSA, 2017). There are a number of empirical studies on market outlet choice of agricultural commodities:

Takele *et al.* (2017) identified on important determinants of market outlet choice of smallholder mango producers in Boloso Bombe woreda, Wolaita zone, Southern Ethiopia using Multivariate Probit model. The result showed that variables such as family size, distance to the market, quantity of mango produced, the price offered, access to market information and access to non- farm income determined the decision of choice of wholesaler, collector, retailer and consumer market outlets at different significance level.

Shewaye (2016) analyzed the determinant factors that affect the choices of market outlets of smallholder haricot bean farmers by using a Multivariate Probit model (MVP). She found four main outlets: rural assemblers, direct consumers and urban traders marketing outlets were used by haricot bean producer farmers. MVP model results revealed that distance to all weather roads and distance to the nearest district market had a positive association for the probability to choose the rural assemblers market outlet whereas, number of equine owned and use of credit had a negative association.

Sultan (2016) identified factors affecting wheat market outlet choice of producers at Sinana district of Bale zone, Ethiopia using multinomial logistic regression model and he indicated that compared to accessing assembler market outlet, wholesalers market outlet are influenced by frequency of extension contact, distance from market place, own price of the commodity and membership to cooperative while that cooperative wheat market outlet influenced by price given to the commodity at different outlets.

Mekonin (2015) used Multivariate Probit model to determine market outlet choice and livelihood outcomes of coffee producing farmers in Lalo Assabi district, Oromiya, Ethiopia and they confirmed that, extension contact, education, market distance, non/off-farm income, and cooperative membership influence outlet choice decisions in all outlet channels selected.

Sunga (2011) identified on the basic factors influencing bean producers 'choice of marketing channels in Zambia. His results from Multivariate probit model indicated that the choice of marketing channel is directly influenced by the price of beans, scale of operation (as measured by the quantity of beans harvested, and quantity sold), distance to the market, farming mechanization used and livestock ownership were significant determinants of bean producers' choice in Zambia.

Woldehanna *et al.* (2010) stated that wheat supply chain in Ethiopia consists of seven to ten marketing channels or outlets. A farmer's decision to select a given market or not is made by evaluating the return in expected utility, taking into account the related investment and transaction costs (Urquieta, 2009). Farmers may select the market channel that shows the most positive utility.

2.8. Conceptual Framework

A widely accepted conceptual framework in industrial organization studies holds that structural conditions determine the behavior (conduct) and subsequent performance of a firm. The wheat value chain includes direct actors who are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors who provide services or support the functioning of the value chain.

The value chain includes direct actors who are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors who provide services or support the functioning of value chain. These include financial or non-financial service providers such as bankers and credit agencies, business service providers, government, researchers and extension agents.

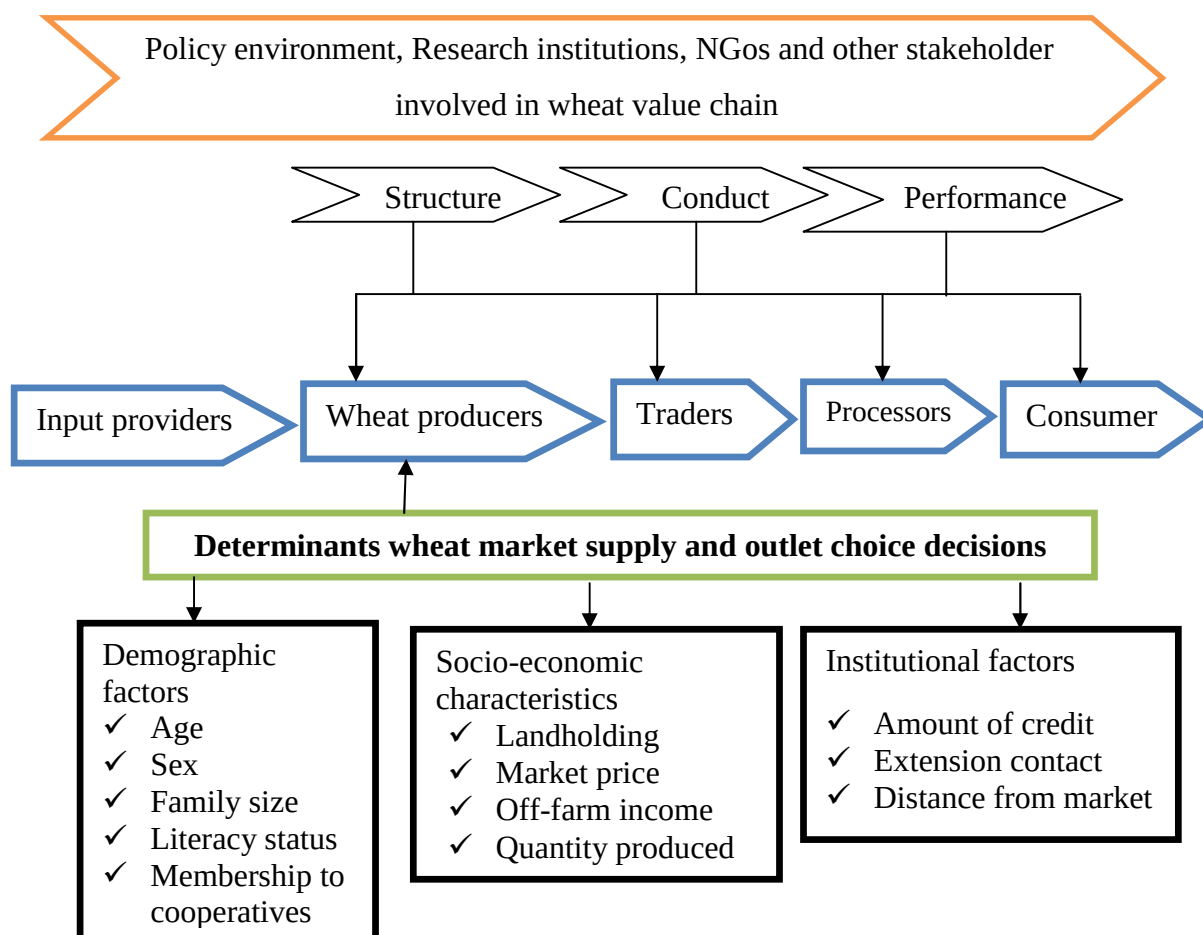


Figure 2: Conceptual framework for wheat value chain analysis

Source: Own design, 2017

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

Dembecha is located 349 km north of Addis Ababa and about 205 km North East of the National Regional State capital of Bahirdar. It is a part of the 15 districts of West Gojjam zone and bordered on the west by Bure, on the northwest by Jabi Tehnan, on the north by Dega Damot, and on the east and south by the Misraq Gojjam Zone. Towns in Dembecha include Addis Alem, Dembecha and Yechereka. The district has 29 *kebeles* of which, 25 are rural while 4 are urban *kebeles* (DDLRL, 2017).

According to the recent District population reports (2016/17), the total number of rural households in 25 rural *kebeles* in the *woreda* is 20029. Out of these, 17199 (86%) are men and 2830 (14%) are women households. The total *woreda* population is 156,630, out of which 78,355 (50.03%) are male and 78,274 (49.97%) are female. Economically active population of the *woreda* (15-55 years of age), are 88225 people out of which, 43302 (49.08%) are male and 45013 (51.02%) are female (DDLRL, 2017).

Attitudinally, the district ranges from 1500 to 2999 m above seas level (MASL). Except for few hills, the *woreda* has an agriculturally suitable land in terms of topography. Despite the recurrent drought, hail has also been a major problem in the area. The agro ecological conditions of Dembecha districts are suitable for the production of cereals and grain legumes. About 87% of land area in districts lies in mid-highland (*Woinadega*) whereas the remaining 12 % is high land (*dega*) and less than 1% low land (*kolla*). The districts have monomodal rainfall distribution with average annual rainfall reaching 1006mm (DDLRL, 2017).

Mixed agriculture is the main activity and plays important role in the district. From the total land area of district which is 979.26 km² of which 900.92 km² (92%) are considered suitable for agriculture. At Dembecha, maize, wheat, *teff*, pepper, sorghum, *noug*, bean, and barley are the major annual crops grown by the majority of farmers. Pepper, wheat and *teff*, maize *noug* are also marketable crops (DDLRL, 2017).

Households in Dembeha District produce wheat, which is one of the most cereal crops grown and marketed by every household in the district. Wheat production in the district is the second in area coverage next to maize and nearly more than 50% of produce in the

district is supplied to the market compared to maize in which less than 30% is supplied to the market. Moreover, demand for wheat in the district has been increased due to the expansion of local alcohol (*areqi* and *tella*) production, which is increasingly becoming an important business for women and helps for the expansion of another business such as fattening, Careata (*Yejjigarea*) and other related business due to expansion of *areqi* production. As a result, all households in the district produce and supply wheat and they use maize and *teff* as a substitute of wheat for household consumption (DDBoA, 2017).

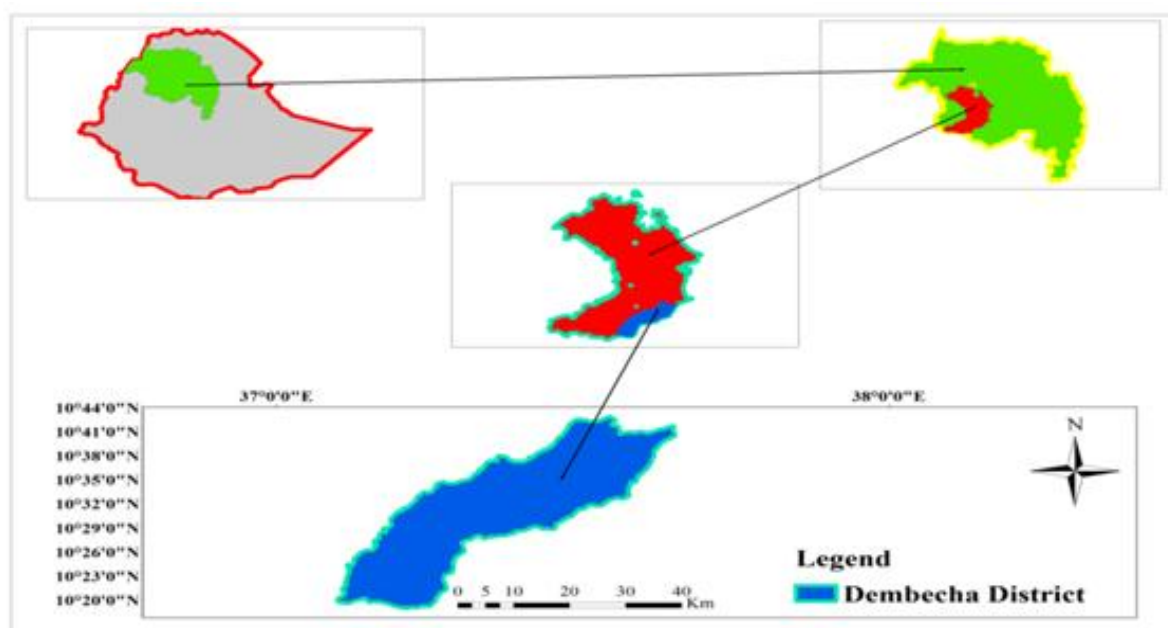


Figure 3: Location of Demebecha district

Source: Ethio- GIS

3.2. Types, Sources and Method of Data Collection

The data for this study were collected from both primary and secondary sources. Primary data were collected by use of pre-tested and semi structured questionnaires that were administered through direct interviews and observation with the selected farmers, traders, processor, bakers and consumers.

The primary data from farmers captured information such as socio-demographic characteristics, cost of production, quantities produced and sold, price related information, distance to the market, frequency of extension contact, transportation ownership and costs to the market, potential buyer of their product, main input source, amount of credit,

membership to cooperatives, experience in wheat farming and quantity of improved seed varieties used in 2016/17 production year.

The data collected from traders included the socio-demographic characteristics, type of trade, experience in wheat trade business, cost of transport used, selling and buying price of wheat, potential buyers and suppliers of wheat, accessibility of storage facilities, quantities purchased and sold, initial and current working capital, the amount of credit, buying and selling strategy, sources and destinations of wheat and number of collection points.

Secondary data required for the study were taken from the Central Statistical Agency, published and unpublished sources, district agricultural and natural resource office, and trade and industry office of the Districts. The data collected were on the number of grain traders (wholesalers, retailers and collectors), the number of cooperatives, total land used and production and number of wheat producer households in sampled *kebeles*.

To triangulate the answers provided by sample respondents, key informant interviews and focus group discussions were held with farmers, development agent and traders by using checklists.

3.3. Sampling Procedure and Sample Size Determination

Two stage-sampling techniques were employed to select sample wheat producer households. In the first stage, out of twenty-five wheat producers 'rural *kebeles* in Dembecha district, four *kebeles* namely Zeleka, Egziabharab, Jajjirab and Wad were selected randomly. Then, in the second stage wheat producers from the sample *kebeles* with the intended sample size were selected randomly using probability proportion to population size sampling technique.

There is no common consensus on formula or rule of thumb that yields optimal sample size to run a regression model and the controversy is still unsettled. So, scholars have failed to reach common consensus, which leads various researchers to use various methods to determine sample size. However, most statisticians and econometricians consider independent variables to determine sample size (i.e., sample size (m) is 10 or more times the number of relevant independent variables) in a given model (Green's, 1991). Thus, based on the above justifications, a sample size of 130 sample households was drawn from

the total of over 4527 wheat producing households in the survey and therefore a sample size of 130 in this case is adequate enough for generalizing findings.

Table 1: Sample distribution of wheat producer households

Name of Kebele	Wheat producer households	Sampled households
Zeleka	1098	31
Egziabharab	1215	35
Wad	1165	34
Jajjirab	1049	30
Total	4527	130

Source: Dembecha district agriculture and natural resource office, (own computation, 2017)

There is no clear data in the district about how many traders are there in the study area involved in wheat trade. Therefore, to obtain a representative sample of traders prior to implementation of the full scale survey, an informal survey was conducted to come up with clear pictures of traders engaged in wheat trading activity in the study area. Then, information was collected from the district Trade and Industry development office about the total number of registered grain traders. However, it's difficult to obtain the exact figures of traders involved only in the wheat trade in the area. Due to this fact a total of 30 traders (10 wholesalers, 12 retailers and 8 collectors) who trade basically wheat were selected purposively for the interviews because the exact number of them was not known.

Sample size determination for other actors such as bakeries, processors and cooperatives and consumers in wheat value chain relies on numbers of available actors. As a result, a census of 2 bakeries, a census of 1 processor and 4 cooperatives that purchase wheat from farmers in 2016/17 were used for the study. Furthermore, 10 urban households which consume wheat were randomly selected from the districts town. If the randomly selected household did not consume wheat in the last six months, it was dropped and replaced by the other randomly selected household.

3.4. Methods of Data Analysis

Descriptive statistics and econometric analysis were used to analyze the collected data from wheat producers, traders and consumers. The first two objectives of the study were examined through descriptive statistics while the remaining two objectives were analyzed using econometric methods of data analysis.

3.4.1. Descriptive statistics

Descriptive statistics such as mean, maximum, minimum, standard deviation and percentages were computed for describing socio-economic characteristics of respondents, mapping of wheat value chains, market channels and market performance.

3.4.1.1. Value chain analysis

For products move successively through the different stages and transactions between multiple chain actors, money and information are exchanged and value is progressively added throughout the chain. Thus, conducting value chain analysis for staple commodities, such as wheat, provides a holistic insight in the chain for identifying actors; their functions; how the actors and functions are interlinked, where inefficiencies in the chain are and the existing opportunities that could be utilized to improve the benefit of actors can get.

The approach also enables us to analyze the benefits accrued by each actor and ways to improve the benefits of target groups, in this case wheat producer and consumers that use the market to access wheat. Therefore, this study used functional and institutional approach of value chain analysis to study value chain actor, their roles and linkages. The following steps of value chain analysis were applied in this study. In first stage, the main value chain actors and their roles were identified and mapped. Then, based on the direction and volume of product flow the existing market channels and its performance were analyzed.

3.4.1.2. Structure-Conduct-Performance (S-C-P) of wheat market

This approach examines the fundamental relationships between market structure, conduct and performance of a particular commodity. Wolday (1994), Muhamed (2011), Sultan (2016) used this approach to evaluate food grain market and performance of the wheat market, respectively. Therefore, this study used S-C-P approach to evaluate how well wheat market is operating in the study area.

(a) Structure of market

The perfect competition market is often used in economics as a standard by which structure and conduct of the markets can be compared and evaluated. Knowledge regarding structure can give indications about competitiveness. The structural organization of the wheat market in the study area was assessed to identify if it is competitive enough to fairly benefit both smallholder producers and the wheat traders. The variables used to explain

market structure are the degree of concentration, vertical and horizontal integration, and condition of entry in the market and magnitude of product differentiation (Nambiro *et al.*, 2001).

For this study, concentration ratio, market transparency (information) and entry barrier were used to measure the structure of the wheat market over Gini Coefficient and Herfindahl Index (HHI) because of both Gini Coefficient and Herfindahl Index require more data and it is difficult to achieve such full data in developing country like Ethiopia (Abrham, 2009).

Concentration Ratio (CR): Four firm concentration ratios' indicates the proportion of the marketed volume controlled by the big four firms in a market. If a smaller number of buyers or sellers control a significant proportion of the marketed commodity, they may participate in a non-competitive behavior to maximize their gain from the market transactions. This leads to inefficient market and reduce the benefit of other market participants. For competitive market, there should be sufficient number of buyers and sellers (Abraham, 2009). As it is calculated in many market researches, and four firms Concentration Ratio (CR4) were calculated as follows:

$$CR4 = \sum_{i=1}^4 S_i \quad i= 1, 2, 3, 4 \quad (2)$$

Where S_i = the percentage market share of i^{th} firm and i = four largest wholesalers for which the ratio is going to be calculated.

As a rule of thumb suggested by Kohls and Uhl (1985), for the largest four firm's concentration ratio of 50 percent or more is an indication of a strong oligopolistic industry, 33 to 50 percent a weak oligopoly, and less than 30 percent that indicates not concentrated industry.

Market information (transparency): The availability and value of market information are significant determinants for the structural feature of the market. Even though attempts were made to establish a public market information system following the market reforms in 1990s, the status of a market information system in Ethiopia is still very limited (Alemu *et al.*, 2008 as cited in Abrham, 2009). Therefore, timely market information availability was considered as one means of evaluating wheat market structure.

Barriers to entry: A barrier to entry is simply any advantage held by existing firms over those firms that might potentially participate in a given market. The modes of entry into trade, means of building capital, means of acquiring marketing skills and customers, trader's perceptions of barriers, the origins and levels of initial capital required for traders of different sizes (functions, or commodities), and the degree of mobility between functions and commodities can be used as center of data to see the barriers to entry (Timmer *et al.*, 1983).

In fact, it is difficult to get barriers to entry directly from traders because they are actually in the businesses. Rather, potential entry barriers were investigated based on: number of licensed and unlicensed traders, required working capitals, educational level of traders, acquiring potential customers and experience that traders stay in trading activities (Rhima, 2006).

(b) Market conduct

Market conduct is a systematic way to detect indication of unfair price setting practices and the conditions under which practices are likely to prevail. The existence of formal and informal marketing groups that influence the price and volume of products sold; formal and informal producer groups that affect bargaining power; distance from major market and its impact on prices; and the feasibility of utilizing alternative market outlets are important points that need to be considered to understand the behavior of the buyer and seller in the particular commodity market (Abrham, 2009).

For this research, the following few points were taken into consideration to systematically detect indicators of unfair marketing practices. The numbers of buyer and sellers (one or many), price setting strategy (trader, market and negotiation), quality determiner (standardize), bargaining power and the impact of physical location of the market on prices and marketing arrangements were taken for evaluating conduct of wheat market.

(c) Market performance

Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output (Bressler and King, 1979). There are different approaches to measure marketing performance: marketing margin, costs and the analysis of market channel efficiency. However, this study used marketing cost, margin

and market return (profit) as a measure of wheat market performance across different channel.

Estimates of the marketing margins are the best tools to analyze performance of market and marketing margins of market actors were calculated by taking the difference between producers and retail prices. The producers 'share is the commonly employed ratio calculated mathematically as, the ratio of producers 'price to consumers 'price. Mathematically, producers 'share can obtain as follows:

$$PS = \frac{PP}{CP} \quad \text{Or} \quad PS = 1 - \frac{MM}{CP} \quad (3)$$

Where: PS = Producer's share, PP = Producer's price, CP = Consumer price and 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 (Nuri, 2016). Computing the total gross marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as a percentage (Mendoza, 1995).

$$TGMM = \frac{CP - PP}{CP} * 100 \quad (4)$$

Where, TGMM = total gross marketing margin, CP =consumer price, PP= producers price
The traders margins in this study were calculate with the average prices practiced at each level of the market chain and the various charges incurred by each actor. It is useful to introduce the idea of farmer's portion or producer's gross marketing margin (GMMP). The producers' margin calculated as:

$$GMMP = \frac{CP - TGMM}{CP} * 100 \quad (5)$$

Furthermore, market margin of each actor at each stage (GMM) was compute as:

$$GMMT = \frac{CP - TGMM}{CP} * 100 \quad (6)$$

Where, GMM = Gross Marketing Margin for traders, Sp = Selling price, Bp = Buying price

3.4.2. Econometric models

Econometric models useful to analyze determinants of wheat market supply and factors affecting market outlet choices decision of wheat producers are specified below.

3.4.2.1. Determinants of wheat market supply

For successful commercialization, farmers need to produce and supply a considerable volume of product in the market. The need to increase market supply could be addressed through not only provision and use of improved production technologies and inputs but also through improving other embedding factors too. Identifying and assessing potential factors affecting market supply of wheat is critically important (Tadele *et al.*, 2016).

In estimating factors that affect household's levels of market supply, a multiple liner regression model is applicable if all the sample households participate in the marketing of the commodity of interest. If participation of all households in the marketing of the commodity is not expected, using OLS model by excluding non-participants from the analysis results in selectivity bias in the model (Gujarati, 2003). If only the probability of selling is to be analyzed, Probit or Logit models would be adequate techniques for addressing it. But if researcher targets to know the factors influencing the volume of sales, at the same time with the probability of selling, a hybrid between the Logit or Probit and OLS preferred. The appropriate tool for such case is the Tobit model that uses maximum likelihood regression estimation that helps to determine both factors influencing the probability of selling and factors determining the magnitude of sale.

For studying factors affecting wheat market supply in the study area, a multiple linear regression model was employed. All sampled households supplied a part of their produce (wheat) to the market, but the amount supplied varies from household to household due to different factors. This implicates wheat in the study area is an important cash source for most households. Yet, the econometric model specification of the supply function in matrix notation is given below.

$$Y = X' + U \quad (7)$$

Where: Y = quantity of wheat supplied to market, X = a vector of explanatory variables, β = a vector of parameters to be estimated and U = disturbance term.

However, when some of the assumptions of the Classical Linear Regression (CLR) model are violated, the parameter estimates of the above model may not be Best Linear Unbiased Estimator (BLUE). Important tests such as, multicollinearity, heteroscedasticity, endogeneity and omitted variable test were checked before fitting important variables in the regression models for analysis.

Dependent variables

Quantity of wheat supplied to market: It is a continuous dependent variable and measured in quintals. It represents the actual quantity of wheat marketed by farm household in the 2016/17 production year.

Independent variables for quantity of wheat supplied

Education level of household head (EDUHH): This variable is treated as continuous variable and measured using formal year schooling of the household head. Education determines the readiness to accept new ideas and innovations, market information and this enhances farmers' willingness to produce more and increase volume of sales. Astewel (2010) found that education affected the amount of paddy supplied to the market. Moreover, Dagmawit (2016) also confirmed that more years in formal education increased the volume of maize supplied to the market. Therefore, it was hypothesized to affect market supply of wheat positively.

Sex of the household head (SEXHH): This is a dummy variable, which takes a value of one if the household head is male and zero, if female. Literature reported that female headed households have less access to improved technologies, land, and extension services and market information as compared to male headed households. Tadele *et al*, (2016), Addisu (2016), Wondmagegn (2014) and Haymanot (2014) confirmed that as the household head is male, the volume of *teff*, potato, coffee, and durum wheat to be marketed increased, respectively. Thus, the variable was expected to have a significant effect on the volume of wheat marketed.

Family size (FAMSZ): It is a continuous variable measured in terms of man equivalent, which is the availability of the active labor force in the household, which may affect farmer's market supply. Since production is the function of labor, availability of labor is assumed to have positive relation with volume of supply. The size of economically active family members within a given farming household affects the crop production activities

positively (Million and Belay, 2004). In the contrary, Haymanot (2014) and Sultan (2016) also reported that family size had a negative impact on volume of bread and durum wheat marketed supply. Therefore, family size was expected to affect sales volume of wheat either positively or negatively.

Quantity of wheat produced (QWPR): It is the total amount of wheat produced in quintal in 2016/17 production season in the study area. An increase in volume of production has a significant effect on market supply and motivates farmers to increase the supply of commodity to the market. Ayelech (2011) and Sultan (2016) found that the amount of vegetable and wheat produced by farming households has augmented marketable supply of the commodities significantly. Therefore, it is hypothesized that quantity of wheat produced positively affects the supply of wheat to market.

Quantity of improved wheat seed varieties used (QISVU): This is a continuous variable that refers to the total quantity of improved seed in kilogram per hectare used for wheat production in 2016/17 production year. If the producers used recommended amounts of improved seed varieties per the land that they allocated for wheat, it improves his/her productivity. Hymanot (2014) indicated that seed utilization affected the volume of durum wheat marketed positively. Abay (2007) found the positive relationship between improved seed varieties used and productivity level which leads to increase the volume of sale. Therefore, use of improved seed varieties was expected to have a positive effect on volume of wheat marketed.

Farming experience (EXPR): This is a continuous independent variable measured in year's household engaged in wheat farming activities. Abay (2007) found increases in farmer's experience, increased tomato supplied to market. Ayelech (2011) also revealed that farmers with longer farming experience are expected to be more knowledgeable and skillful to produce more volume of fruit and supply in the market. Abrham (2013) suggested that as farmers have high potato production experience, the amount of potato supplied to market increased through its effect on potato production. Therefore, experience in wheat production was expected to have a positive relation with volume wheat marketed.

Frequency of extension contact (EXTCO): This variable is treated as a discrete variable measured by the number of visits made by the extension agents per years to sample households. More frequent DA visits help the farmers adopt new technologies and accesses to right market information. Rehima (2006), Muhammed (2011) and Girma (2015)

identified that extension is positively related to pepper and *teff* and wheat market supply, respectively. Therefore, frequency of contact with extension agent was expected to have direct relation to the volume of wheat marketed.

Distance to the nearest market (DISNMK): It is a continuous variable measured in kilometers from the household residence to the nearest market centers. The closer a household to the nearest urban center, the lesser would be transportation costs and better access to market information and facilities and more volume of wheat will be marketed. Beza (2014), Abrham (2013) and Ayelech (2011) found negative relationship between market distance and volume of maize, cabbage and mango marketed, respectively. Therefore, this variable is expected to have an inverse relationship with volume of wheat marketed.

Amount of credit used (Incredit): Amount of credit is a continuous variable representing the amount of money taken as credit by sampled households in 2016/17 production year and measured in Birr. A use of credit improves the financial capacity of wheat producing farmers to buy modern inputs, thereby increasing production and the market supply of wheat. Bosenia (2008) indicates that households who took credit for cotton production had supplied more amount of cotton to market than those who did not. Muhammed (2011) also found that if wheat and *teff* producer gets credit, the amount of wheat and *teff* supplied to market increased. This variable was expected to affect the marketable supply of wheat positively.

Livestock ownership (TLU): It is a continuous variable measured in tropical livestock unit. It affects the quantity of wheat supplied to market positively. Study by Kinde (2007) and Haymanot (2014) found that household with larger TLU have the better economic strength and financial position to purchase a sufficient amount of input. In this study livestock ownership was hypothesized to influence the volume of wheat supply positively.

Lagged market prices of wheat (LMKPW): This is continuous variable measured in birr per quintal of wheat in the reference market in 2015/16 production year. It is taken as proxy variables to measure farmers' perception towards the attractiveness of price prevailed'. When wheat price is high (attractive) in the market in the previous year, farmers would be interested to produce and supply more. Hymanot (2014) and Muhammed (2011) argued that the lag product price has direct relations with the market supply of wheat. Therefore, lagged price was expected to have positive relations to volume marketed.

Participation in non-farm income activities (NFINC): This is a dummy variable, which takes a value of one if the household head has income from non-farm activities and zero, if not. As a family gets involved in non-farm activities, they tend to sell less and increase family food consumption and as result less market supply. Beza (2014) showed that non-farm income has a negative effect on maize marketed surplus. Therefore, in this study participation in non-farm income activities was hypothesized to affect marketed surplus of wheat negatively.

3.4.2.2. Factors affecting market outlet choices of wheat producers

For the analysis of categorical dependent variables more than two choices econometric models such as multivariate probit, multinomial logit, conditional or mixed or nested logit are useful models used by previous researchers. Multinomial models are appropriate when individuals can choose only one outcome from among the set of mutually exclusive, collectively exhaustive alternatives. But, recent empirical studies of market outlet choices assume that farmers consider a set (or bundle) of possible outlets and choose the particular marketing outlet that maximizes expected utility (Takele *et al.*, 2017; Kassa *et al.*, 2017; Nuri, 2016; Addisu, 2016; Rehima *et al.*, 2013; Jason, 2012).

The multivariate probit model takes into account such potential interdependence in market outlet choices and the possible correlation in the choice of alternative outlets. The multivariate probit model is one form of a correlated binary response regression model that simultaneously estimates the influence of independent variables on - more than one - dependent variables, and allows for the error terms to be freely correlated. The dependent variable represents positive (chosen or 1) or negative (not chosen or 0) responses to the question regarding the importance of each factor on outlet choice (Greene, 2003).

On the base product (wheat) four market outlets such as: wholesalers, collectors, cooperatives and consumers outlet were identified in the study area. Wheat producers were possibly used one or more marketing outlets or several combinations of four outlets to maximize the expected utility. Most producers sold on more than one market outlet and this is to mean that farmers do not sell wheat permanently to the particular market outlet. As a result, multivariate probit model was used for analyzing factors that significantly influence producer's market outlet choice decision of wheat producers.

The general specification for a multivariate probit model of dependent variables (or alternatives) can be expressed as (Greene, 2003). The observed outcome of market outlet choice can be modeled following random utility formulation. Consider the i^{th} farm household ($i=1, 2, \dots, N$), facing a decision problem on whether or not to choose available market outlets. Let U_k represent the benefit of farmer to choose the K^{th} market outlet: where K denotes choice of different market outlet.

The farmer decides to choose the K^{th} market outlet if $Y^*_{ik} = U^*_k - U_o > 0$. Where, U_o refers to alternative outlet. The net benefit (Y^*_{ik}) that the farmer derives from choosing a market outlet is a latent variable determined by observed explanatory variable (X_i) and the error term (ε_i):

$$Y^*_{ik} = X'_i \beta_k + \varepsilon_i \quad k=1,2,3,4 \quad (8)$$

Using the indicator function, the unobserved preferences in equation (7) translates into the observed binary outcome equation for each choice as follows:

$$Y_i = 1 \text{ if } Y^*_{ik} > 0 \text{ and } 0 \text{ otherwise} \quad (9)$$

Where Y^*_{ik} is an unobservable latent variable denoting the probability of choosing k type of market outlet, for $k = 1$ (wholesalers), $k = 2$ (collectors), $k = 3$ (cooperatives) $k = 4$ (consumers) is as follows: Thus empirically the model can be specified as follows:

$$Y^*_{i1} = \beta_1 X_{i1} + \varepsilon_{i1} \quad (10)$$

$$Y^*_{i2} = \beta_2 X_{i2} + \varepsilon_{i2} \quad (11)$$

$$Y^*_{i3} = \beta_3 X_{i3} + \varepsilon_{i3} \quad (12)$$

$$Y^*_{i4} = \beta_4 X_{i4} + \varepsilon_{i4} \quad (13)$$

Where, $Y_{i1} = 1$, if farmer choose wholesaler (0 otherwise), $Y_{i2} = 1$, if farmer choose collector (0 otherwise), $Y_{i3} = 1$, if farmer choose cooperatives (0 otherwise), $Y_{i4} = 1$, if farmer choose consumer (0 otherwise), X_i = vector of factors affecting market outlet choice, β_k = vector of unknown parameters ($k = 1, 2, 3, 4$) and ε = is the error term. In multivariate model, where the choice of several market outlets is possible, the error terms of the above equations ($\varepsilon_1, \varepsilon_2, \varepsilon_3$ and ε_4) may be correlated and jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity (for identification of the parameters), $MVN \sim (0, \Omega)$. Following the form used by Cappellari and Jenkins (2003), the log-likelihood function associated with a sample outcome is then given by;

$$\ln L = \sum_{i=1}^n \omega_i \ln \Phi_i(\mu_i, \Omega) \quad (14)$$

Where ω_i is an optional weight for observation i , and Φ_i is the multivariate standard normal distribution with arguments μ_i and Ω , where μ_i can be denoted as:

$$\mu_i = (k_{i1-1}X_{i1}, k_{i2-2}X_{i2}, k_{i3-3}X_{i3}, \dots, k_{in-n}X_{in}), \text{ While } \Omega = 1 \text{ if } j = k \text{ and} \quad (15)$$

$$\Omega_{jk} = \Omega_{kj} = k_{ij}k_{ik} \text{ For } j \neq k, \quad k=1, 2, 3 \text{ and } 4, \text{ with } K_{ik} = 2y_{ik} - 1 \quad (16)$$

Dependent variables

Market outlets choice: A binary categorical dependent variable measured by the probability of producers sells wheat to either of the wholesalers; collectors, cooperatives and consumers market outlet. The outlet choices might be along farmers decision involving in alternative markets.

Independent variables for market outlet choices

Quantity of wheat supplied to market (QMKTS): It is a continuous variable measured in quintals. The more quantity of wheat sold, the higher would be the chances of using different market alternatives. Farmers producing small quantities of wheat are likely to sell their products to retail market within a village rather than selling to wholesale market. The study of Chalwe (2011) and Adisu (2016) also indicated the relationship between quantities sold and channel outlet choice. Thus, in this study, quantity sold was hypothesized to affect channel choice decision of the household.

Education level of household head (EDUHH): It is a continuous variable and measured in years of schooling of the household head. Education improves the knowledge of the alternative market outlet choice, because as people learn more and more they become wise in choice of best outlet. Education level of households significantly affected level of choosing consumer outlet (Addisu, 2016). This is supported by Bezabih *et al.* (2015). Abraham (2013) confirmed that educated household heads is less likely chosen to retail outlet choice. As a result, education level was hypothesized affect outlet choice.

Sex of household head (SEXHH): This is dummy variable and measured as 1 if the household head is male and 0 if female. Several researchers indicated that female household heads have more chance to choose appropriate channels than male household heads. Jafer *et al.*, (2017) found that sex of the household head has statistically significant

effect in the groundnut market outlet choice of producers. Adisu (2016) found that sex of a household head was positively and significantly associated with choice of collector outlet.

Age of household head (AGE): Old farmers may make their decision more easily than young farmers, because the older farmers might have a long-term relationship with their clients in the rural market. Bongiwe and Micah (2012) revealed that age of the farmers was a significant determinant of the choice to use non-wholesale market outlet over other-wholesale market outlet. Therefore, age of household head was hypothesized to influence the decision of household head to choose market outlet choice of producers.

Family size (FAMSZ): It is a continuous variable measured in man equivalent. It represents the availability of active labor force in the household, which affects farmer's market supply. Household size increases the available labor force requirements and may render households more supply to different outlet. Berhanu and Moti (2010) showed negative relationship between household size and market participation of households. In the contrary, Addisu (2016) revealed that households with large family size are more likely to choose wholesaler outlet than other market outlets. Therefore, it was hypothesized to have an effect on wheat market outlet.

Distance to the nearest market (DNMKT): It is a continuous variable measured in kilometer that wheat producers are required to travel to sell their product in the market. Those households who are close to market are assumed to have better access to market information and have more probability of choosing better market outlet. Shewaye (2016) found households located farther away from market face higher transaction costs and sold for rural assemblers in their villages or in nearby villages rather than selling to urban traders in more distant market that increase transaction costs. Djalalou *et al.* (2015) and Riziki *et al.* (2015) found that distance to the market is significant determinant of choice of marketing outlet. Therefore, distance to the nearest market was hypothesized to influence the decision of producers on outlet choice.

Frequency of Extension contact (EXTCO): This variable will be treated as a discrete variable and measured by number of visits made by the extension agents. Extension agent visits had direct relationship with market outlet choices. Number of extension contact has positive and significant influence with wholesaler outlet choice decision at 1% significance level (Addisu, 2016). Moreover, Sultan (2016) reported that frequency of extension contact positively and significantly affected accessing wholesales market outlet choices as

compared with assembler market outlet choices. Therefore, frequent extension service was hypothesized to affect wheat market outlet choice of producers.

Amount of credit used (Incredit): This is a continuous variable representing amount of credit utilized by sampled households in 2016/17 production year and measured in Birr. Shewaye (2016) confirmed that use of more credit would enhance the financial capacity of the farm households to purchase the necessary materials and increases output and thus leading to more marketed supply. Therefore, it was hypothesized to affect market outlet choice of wheat producers.

Non/off -farm income (NFINC): This is treated as a dummy variable and measured as 1 if the household obtained income from off farm activities and 0 otherwise. Farmers who gain income from non/off farm activities want to supply their vegetable to any nearest market outlet with low price than to go far (Addisu, 2016; Ayelech, 2011). Therefore it was hypothesized that off farm income has significant influence on market outlet choice decision of wheat producers.

Membership to cooperative (COOPMB): This is a dummy variable that takes 1 if the household is member of cooperative and 0 otherwise. Farmers who are members of cooperative are supposed to sell to cooperative rather than other market outlets. Fikru *et al.* (2017) indicated that those households who were members of cooperatives the probability of choosing collector outlet increased compared to base category. Abraham (2013) also found that membership to cooperative is negatively related with retail outlet choice. This variable was hypothesized to have significant effect on market outlets choice of producers.

Ownership of market transport facilities (OMKTF): A dummy variables that takes value one if households owned transportation facilities and zero if not. The ownership of vehicles, carts and transport animals would be used to measure the availability of produce transportation facilities by households. Study by Bezabih *et al.* (2015) confirmed the likelihood of choosing retailer only channel was statistically and negatively affected by distance to the market. Therefore, this variable was expected to have significant influence on the market outlet choice of wheat producer's.

Bargaining power of producers (BargPower): This is a dummy variable that takes a value of 1 if the households have bargaining power to influence the setting of prices of wheat and 0 otherwise. For this study, households who can seat price of their produce by

themselves and able to negotiate on the seated price is assumed to have bargaining power on his/her produce (wheat). The negotiation power of producers increases the probability of selling their product to better market outlets. Bezabih *et al.* (2015), bargaining power negative relationship with the likelihood of choosing the cooperative market channel. Similarly, Djalalou *et al.* (2015) also confirmed a farmer's bargaining power identified as major determinants of marketing channel selection. As a result, bargaining power of producers was hypothesized to affect better market outlets.

Trust in Buyers (TRUST): It is a dummy variable which takes a value of 1 if the outlet is trusted and 0 otherwise. Farmers who have high trust in buyers are likely to spend less time screening their transacting partners or following up on payments and deliver their product to this outlet. Addisu (2016) showed that farmers who trust in traders are more likely to choose rural collectors for their onion product and less likely to choose consumers outlet. Therefore, trust in traders is hypothesized to have impact on producers' decision to choose market outlets.

4. RESULTS AND DISCUSSION

This chapter presents the results obtained from quantitative and qualitative data analysis. Section one presents demographic and socioeconomic characteristics sampled households, wheat value chain actors, roles and interaction, existing market channels and market performance of wheat. Section two presents results of ordinary least square method for market supply at farm level and maximum-likelihood estimates for determinants of farmers' choice of market outlet in the study area.

4.1. Demographic and Socio- economic Characteristics Farmers

For this study, primary data were collected from a total of 130 sampled households. Regarding to the age, the overall mean age of the sample household heads was 44.78 years with standard deviation, maximum and minimum age of 10.10, 72 and 26, respectively. The mean year of schooling of respondents was 1.77 years with a standard deviation of 2.68 with maximum year of schooling of 10 years. The survey data also showed that the family size of the sampled households in terms of man equivalent varies from 1.5 to 5.75 with an average household size of 3.35. The mean wheat production experience of respondents was 17.19 years with maximum being 35 and the minimum experience of 2 years.

The mean livestock holding of the sampled households in terms of tropical livestock unit (TLU) was 4.10, the maximum and minimum being 12 and 2.5 TLU, respectively. The total land holding of sampled households ranged from one to 5.75 hectares with an average size of 2.07 hectares. The average size of land allocated for wheat by farm households during the surveyed year was 0.91 ha with standard deviation, minimum, and maximum of 0.34, 0.125 and 1.5 ha, respectively. This implicates that wheat is the major cash crop in the study area and households allocated substantial part of their land to produce it.

The mean distance that sample households far from the nearest market at the time of the survey was about 4.12 kilometers, with the minimum and maximum distance of 0.5 and 11 kilometers, respectively. The survey result also shows that the frequency of extension contact with the farmers ranges from zero to 15 times with an average contact of 6.04 times per year. Moreover, the average productivity of wheat from the survey result is 24.24 quintal per hectare which is smaller than the national average i.e. 26.75 quintal per hectare (CSA, 2017). The mean quantity of improved seed varieties used is 171.89 kg per hectare,

which is extremely higher than the recommended usage (100 kg/hectare) in the study area. The average quantity of wheat produced by sample households in the study area is 27.04 quintals and averagely 15.70 quintal was marketed in 2016/17 production years. This means from the total amount of wheat produced by sample households about 58.04% was marketed and this result is in line with district agricultural and natural office report of 2016 that found more than 50% of the wheat produced in the district was supplied to market.

Table 2: Socioeconomic characteristics of sample farmers/ continuous and discrete variables/

Continuous and discrete variables	Mean	Std. Dev.	Minimum	Maximum
Educational level (Years of schooling)	1.77	2.68	0	10
Age of a household head (Years)	44.73	10.10	26	72
Wheat farming experience (Years)	17.19	9.155	2	35
Family size (Man equivalent)	3.35	1.375	1.5	5.7
Distance from nearest market (Km)	4.12	2.68	0.5	11
Livestock holding (TLU)	4.10	1.28	2.5	12
Total Land holding (Hectare)	2.07	1.337	1	5.75
Land allocated to wheat(Hectare)	0.91	0.34	0.125	1.5
Extension contact (Number)	6.04	8.10	0	15
Lagged market prices wheat (Birr)	570.10	46.97	460	700
Quantity of improved seed used (kg)	209.41	126.41	34	600
Yield (quintal)	224.24	9.38	14.5	40
Quantity of wheat produced (quintal)	27.04	13.75	8	45
Quantity of wheat market supply(quintal)	15.70	10.67	3	33
Quantity of improved seed (kg/hectare)	171.89	49.20	200	320
Amount of credit (ETB)	2028.46	2831.49	0	12000

Source: Own survey result, 2017

From the total sample households about 94.6% were male headed and 5.4% were female headed. It also shows that about 91.5% of the respondents were married, whereas 8.5% were a combination of single, divorced and widowed. This indicates that most of the respondents were married and being married is important to undertake farming activities, to live a sustainable life as well as to collaborate more to the society in social life.

The survey result also revealed that the major source of cash income in the study area is on-farm activities mainly come from the sale of crops, sales of livestock and livestock products (milk and butter). Trading, daily labor and handcraft are also other sources of cash income for some of the sample households. About 18.5% of surveyed farmers' obtain cash income from off and non-farm activities. The surveyed report also confirms that transportation facilities are one of the basic inputs to undertake production and marketing activities in the study area. Due to this reason about 0.546% of the sampled households had own transportation facilities to transport input from factor market and outputs to product market during the surveyed year (Table 3).

Table 3: Socioeconomic characteristics of sample households

Dummy / categorical variables	Proportion
Sex (male)	0.946
Marital status (married)	0.915
Off/non-farm income (yes)	0.185
Ownership of transport facilities (yes)	0.546
Bargaining power (yes)	0.13
Cooperative membership (yes)	0.615

Source: Own survey result, 2017

4.2. Demographic and Socio- economic Characteristics of Traders

A trader's survey was conducted by a total of 30 traders. Of which, about 76.7 % of sample wheat traders were males and 23.3 % were females. About 86.7 % of traders were married and the remaining widowed, single and divorced. Out of the sampled wheat traders, 43.3% were use brokers (Table 4).

Table 4: Socioeconomic characteristics of sampled traders/ dummy variables/

Dummy and categorical variables	Proportion
Sex (male)	0.767
Marital status (married)	0.867
Broker used (yes)	0.433
Entry barriers (yes)	0.889

Source: Own survey result, 2017

Moreover, the mean age of sample traders' was about 38 years with the minimum and maximum age of 26 and 57, respectively. The average family size was about 3 persons. The average initial and current working capital of wheat traders was estimated to be Birr 13267 and Birr 73400, respectively. With respect to educational level of the sample traders the average number of years of schooling completed was 7.93 years with a standard deviation of 3.6 years.

Table 5: Socioeconomic characteristics of sampled traders/ continuous variables/

Continuous and discrete variables	Mean	Std. Dev.	Minimum	Maximum
Educational level (Years of schooling)	7.93	3.609	1	12
Age of a household head (Years)	37.80	8.988	26	57
Trading experience (Years)	6.93	3.117	1	14
Family size (Number)	2.80	1.845	1	7
Initial capital (Birr)	13267	8369	1500	35000
Working capital (Birr)	73400	45729.79	100000	160000

Source: Own survey result, 2017

4.3. Demographic and Socio- economic Characteristics of Consumers

As shown in Table 6, about 80% of sampled consumers were female-headed households. The consumers' survey result also confirmed that sampled consumers spend averagely 6.2 years in education. Similarly, a sampled consumer averagely has consumption experience of 32 years. The average age of sampled consumers was 38.1 with minimum, maximum, and standard deviation of 27, 56 and 9.84, respectively.

Table 6: Socio-economic characteristics of sampled consumers

Continuous and discrete variables	Mean	Std. Dev.	Minimum	Maximum
Educational level (Years of schooling)	6.2	3.97	0	10
Age of a household head (Years)	38.1	9.84	27	56
Family size (Number)	3.4	2.17	1	7
Experience in consumption (years)	32	10.37	20	57
Dummy / categorical variables		Percentage		
Sex (female)			80	
Marital status (married)			70	

Source: Own survey result, 2017

4.4. Results of Value Chain Analysis

4.4.1. Map of Wheat Value Chain

As depicted below in Figure 4, the map lists functions vertically along the left-hand side with the final markets across the top. The participants or actors of the value chain are designated by boxes at the middle. The enablers /supporters of wheat value chain are at the right-hand side of the chain. Moreover, product, information and financial flows are represented by single solid, double solid and single broken line arrows, respectively.

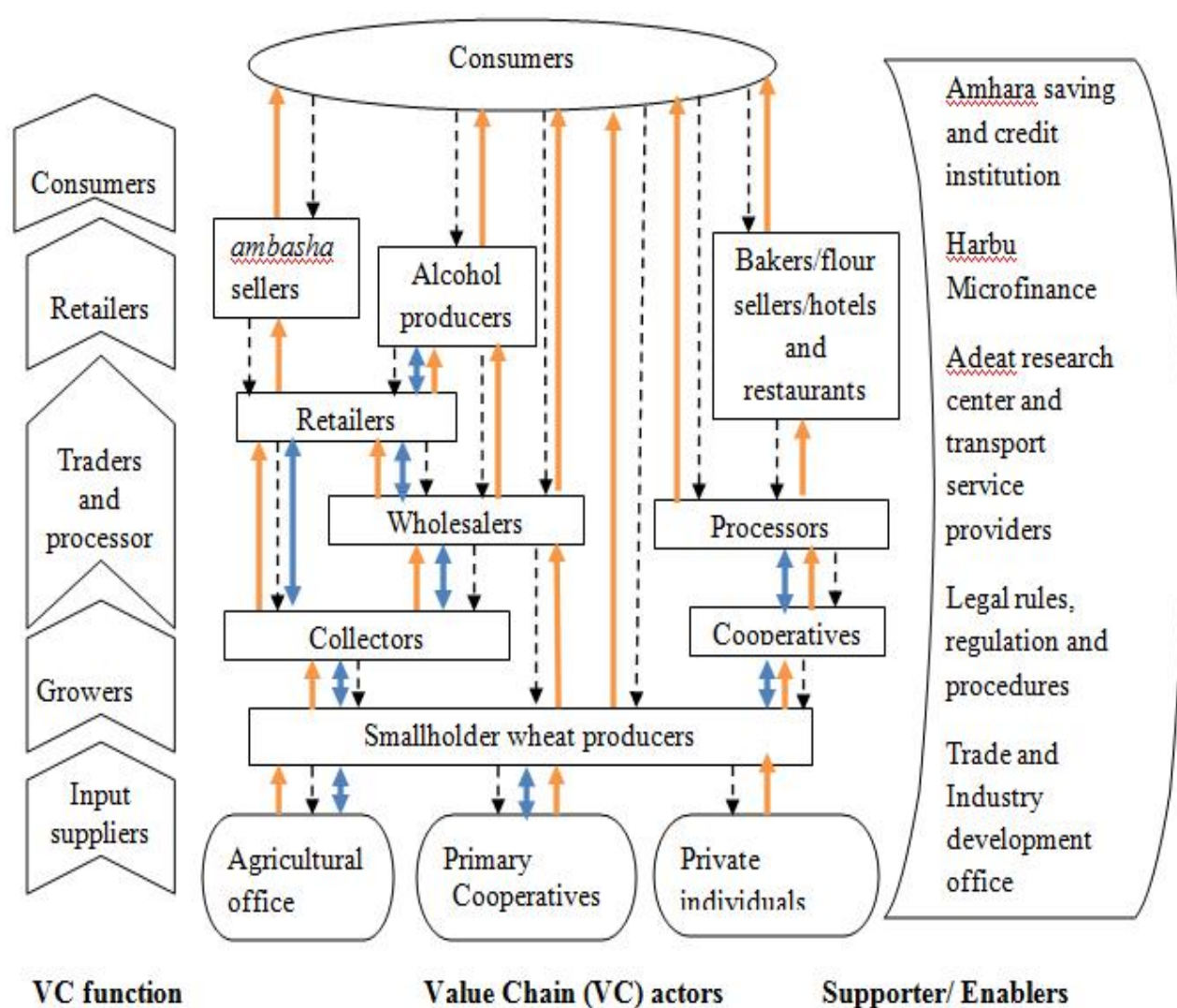


Figure 4: Value chain map for wheat

Source: Own design from survey 2017

Legend

- Product flow
- - - - -> Financial flow
- ↔ Information flow

4.4.2. Wheat value chain actors and their roles

Input suppliers

Agricultural input application is one of the most important farming activities that are used by wheat growers in the study area. Cooperatives are the potential suppliers of such input to wheat producers/farmers. The most agricultural input provided by cooperatives majorly is seeds and fertilizers (Urea and DAP), and chemicals (2, 4-D and Pallas) to wheat producers in the study area. In addition, inputs are also provided by agricultural developments office, individuals and private shops. Pesticides, fungicides and supplying farm implements are also supplied by private shops of the district to farmers. The existence of such inputs with the required quantity, time and quality is crucial to improve the performance of the agricultural sector in general and wheat production in particular. As a result input suppliers are considered as one of the main actors that facilitates wheat production and marketing in the study area.

Unions of the zone purchase inputs from National Input Supply Enterprise and then the unions sell to primary cooperatives existed in west Gojjam zone. Cooperatives also distribute such input to majorly to its members. The focus group discussion result shows there is a condition that cooperative members purchase input from cooperatives beyond they actually need and supply to other producers when input is scarce.

Table 7: Sources of Agricultural inputs wheat production in 2016/17 production year

Source of input	Frequency	Percent
Local market	2	1.54
Primary cooperatives	64	49.23
Agricultural developments office	6	4.61
Local market and primary cooperatives	39	30
Local market and Agricultural developments office	8	6.15
Local market , primary cooperatives and Agricultural developments office	11	8.46

Source: Own survey result, 2017.

As shown above, about 49.2% of sample wheat producers purchased inputs from only cooperatives in 2016/17 production years, while about 30% of producer purchased from

cooperatives and local market. The remaining 20.8% of farmers used different sources such as local market, Agricultural developments office and other possible combination of listed sources. As a result showed totally about 87.69% of sample households take input from cooperatives and therefore cooperatives are the dominant input providers in the district. This is due to availability of primary cooperative in the near distance to farmers, the awareness created on the importance of cooperatives to farmers and farmers experience from observation or information.

Farmers (wheat producers)

Wheat producers are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. Producers of wheat in the district are smallholder farmers who produce wheat for market and/or both market and consumption. They are the main actors of the chain by participating both in the product market to supply their produce and factor market in purchase basic inputs from input suppliers of the district.

The major value chain functions that wheat producers perform include ploughing, sowing, fertilization; weeding, pest/disease controlling, harvesting, post-harvest handling and marketing are mainly undertaken by farmers. All wheat producers practiced sole cropping production system. The focus group discussion and key informants' interview showed that volume of wheat production increases at farmer level in particular and district level in general.

Table 8: Value addition, production purpose and interest of wheat production Variables

Variables	Item	N	Percent
Value adding	Yes	27	20.76
	No	103	79.23
Purpose of production	Market	58	44.61
	Market and consumption	72	55.38
Interest in wheat production	Yes	124	95.38
	No	6	4.62

Source: Own survey result, 2017

As depicted in Table 8 above, about 20.76% of sample wheat producers were participated in value adding activities such as grading, packing, storing and transportation purposively

to increase value. The result also indicated that from the total sampled wheat producers about 95.38% were interested to expand wheat production and their being satisfied with the existing market of wheat. This may be due to the increasing market demand and market price of wheat in recent years as a result of the increasing number of local alcohol (*areqi*) producers in the district and increased demand for consumption at country level in general

Collectors

These are actors in the wheat value chain who collect wheat from smallholder farmers in village markets or at the farm gate and reselling it to wholesalers and retailers in district market (Dembecha). They are important actor who facilitates transaction by serving as an intermediary among wheat producers, wholesalers and retailers. Buying, assembling, transporting, packing and selling to wholesalers and retailers at district levels is the main activity undertaken by them. The major places where wheat collector available and undertake transaction in the district are: Zeleka, Wad/Merkato, Gelila and Dembecha.

Collectors have strong linkages with most wholesalers and few retailers in the market district. They were also loyal to their order and phone communication is an important means used to share information about their customers. Out of the total amount from purchased from wheat producers (881.30 quintals), about 632.77 quintals or 71.80% were sold to wholesalers and therefore they are potential suppliers of wheat for wholesalers. In addition to wholesalers sometimes they provide wheat retailers but this relationship is not temporary as compared to wholesale relationship. They have their own mini-store houses in village market to collect and store until they transport to resell for wholesaler and retailers of the district. Sometimes they try to maximize their profit by purchasing at farm gate from remote areas at relatively lower price and then supply to their customers (wholesalers and retailers).

Cooperatives/unions

Primary cooperatives are important actors in the value chain due to their vital role in both production and marketing. They are mostly located in local *kebeles* near to farmers to undertake their task easily. They are involved buying of agricultural output (wheat) and distributing sugar and oil mainly to members. They purchased 376.15 quintals or 10.7% of sample households 'production and sold to processors. The sample cooperative purchased 1104.31 quintals from households in their respective *kebele/* market including sample

households. The quality requirement for the processor was considered before the purchased from producers.

There are eleven primary cooperatives and one cooperative union in the study area, of which four primary cooperatives were active in input provision and marketing wheat. They were the main source of inputs and struggle to increase farmers' benefit from production of wheat in the study area. In addition to providing input and buying produce wheat, cooperatives of the study area are well organized by increasing their member's yearly income by providing additional benefits to the member's in allowance or by giving a share from dividends. Due to this reason, cooperative membership is increased in the study area.

Processors

Processors are the main wheat value chain actors who collect the raw wheat from different cooperatives of the zone, processor (converting to flour) and distributing the processed flour hotels/restaurants, bakers, flour wholesalers, and to consumers directly. However, there is no processor/miller in the study area, but wheat produced in the district is processed outside the district by passing through the cooperatives market outlet. Based on direction of product flow substantial amount wheat produced in the study area is processed by Damot union flour factory which is located in Burie district. In 2016/17 this processor used a total of 376 quintal or 18.43% of wheat produced by sample households. However, there is no direct relationship between a processor and wheat producers and cooperatives are the intermediate actor that purchased from smallholder wheat producers and sold to processors. This processor plays an important role in creating market opportunities for farmers indirectly.

Wholesalers

Wholesalers are also the key actors in the wheat value chain and are involved in buying wheat from collector and producers in large volume selling it to retailers and consumers. They have strong working capital, better storage house, and communication access than other traders of the district. These were major participants of the marketing system who used to buy wheat a larger volume than other actors and most of them located in the district market.

About 1112 quintals or 54.48% wheat marketed wheat from sample households passed through wholesalers and this implies they are the dominant actors by coordinating the downstream and downstream value chain actors. They all have a store house near to a market which is either

self-owned or rented. They undertake different value addition activities like sorting, grading, storing, packaging and mixing wheat purchased from different individuals.

Retailers

Retailers are delivers wheat to consumers. They are located in the district town. They own and handle wheat for a short period, compared to other market actors. Retailers purchase wheat from collectors and wholesalers at district market and resale it to consumers. They have limited working capital and operate in small scale compared to other wheat traders of the district. Retailers of the district do not incur more cost to the product when as compared to other value chain actors. They do not hold the product for more than three days except when they face a lack of potential buyers. Most of them give the product in the form of credit to their customers for future repayment and hence face financial problems to operate in large scale.

Local alcohol processors

Local alcohols producers purchase wheat from retailers and wholesalers and process wheat in to local alcohol which is locally named as *areqi* and *tella*. Buying, grading, sorting, milling, processing and selling alcohol is the most important task by undertaken by women in the study area. They are large in number and most of them have permanent customers (either from retailers or from wholesalers) and take wheat on credit term. Local alcohol processing recently becomes as an important business that creates multi-dimensional job opportunities like fattening of oxen.

Hotels/Restaurants/Bread sellers /Bakers

They are also actors of wheat value chain that take wheat flour from processors or flour sellers and provides to consumer houses in the form of bread, *kollo*, *enjera* and alcohol (*tella and areqi*). There is also grocery that only sells different types of *areqi* made from wheat. Hence, district Hotels/Restaurants/Bread sellers /Bakers did not purchased from Damot union wheat processors the above listed actors are all outside the district.

Flour sellers

Flour sellers purchase flour from processors. They are grouped in wholesalers and retailers. Wholesalers are those actors that purchase flour in large volume and sale to retailers, baker, and hotels, restaurants and consumers. Retailers are those operating in small scale but they can distribute to baker, and hotels, restaurants and consumers like wholesalers. They

undertake less value adding activities than other value chain actors because only transporting and storing are the main tasks undertaken by them. They generally distribute flour to the urban and rural area of the district and mostly located in Burie, Finoteselam, Mecha, Sekela, north and south Achefer. However, all flour sellers located outside the district. Even if there are bakers and flour sellers in the district, they do not use processed wheat from the district. Those bakers and flour sellers purchase such flours from Debremarkos and Debre-elias that relatively exist at close distance from the district.

Consumers

Consumers are the end actors in wheat value chain that consume wheat in the form of bread, *kollo*, *enjera* and alcohol (*tella*, *areqi*). Therefore, the marketed wheat reaches consumers through direct purchasing from farmers, wholesalers, retailers and hotels and restaurants as food and alcohol. Residents of the rural and urban, peoples visiting markets, travelers, etc. are the most common consumers of wheat and wheat product in the study area.

Chain supporters/enablers

The main actors of wheat value chain in the district are sustained by different institutions that are not participating directly in the wheat value chain, but indirectly facilitate major actors in wheat in the chain to undertake their task. It provides supportive services like training and advisory, providing production and market related information, financial and research services as well as legal legislation to main actors. District agricultural and natural development office, cooperative promotion office, micro finance (Harebu micro finance), Amhara Saving and Credit Institution, district trade and market development office, transport service providers are the main support institutions who play a central role in the provision of such services. Moreover, district agricultural office supports farmers by providing improved seed varieties in collaboration with Adeat research center.

4.4.3. Wheat value chain governance

Value chain governance of wheat shown by the relationships among the buyers, sellers, service providers and regulatory institutions that operate within wheat value chain or influence the range of activities from input provision. From the map of wheat value chain, wholesalers are the dominant value chain actors and most of the product passes through it. They determine the flow of commodities, level of competition, quality control and level of

prices. In effect they govern the value chain and most other chain actors subscribe to the rules set in the marketing process. They are also the center for all other traders by seating price and they have the power to set the final market price. In addition, processors also fix price of cooperatives and usually have strict wheat quality standards.

Producers are price takers and do not governing the value chain. There is no significant vertical linkage between producers and other actors like processors, retailers along the value chain. However, there is horizontal linkage between producers with producers, cooperatives with cooperatives, traders with others traders. Overall, the governance of the wheat crop value chain is buyer driven with minimum trust between various actors. Generally, wheat value chains in the study area look like inefficient due to the absence active governances that should be responsible to carryout leadership roles and facilitating smooth business atmosphere among stakeholders of the value chain. This is due the inexistence of a system that miller (flour factory) to directly deal with suppliers of wheat or farmers.

4.5. Marketing Channels of Wheat

Market channel analysis is important to provide a systematic knowledge of the flow of products from producers to consumers (Mendoza, 1995). Therefore, wheat market channel for this study were designed based on the direction and volume of flow of product (wheat) passing through different routes during the 2016 /17 production year.

As depicted below, the major identified channels from the survey were listed as follows:

Channel I: Producer → consumer (14.43%)

Channel II: Producers → collectors → retailers → consumers (12.31%)

Channel III: Producers → collectors → wholesalers → consumers (10.10%)

Channel IV: Producers → collectors → wholesalers → retailers → consumers (21.25%)

Channel V: Producers → wholesalers → consumers (7.57%)

Channel VI: Producers → wholesalers → retailers → consumers (15.91%)

Channel VII: Producers → cooperatives/union → processors → consumers (18.43%)

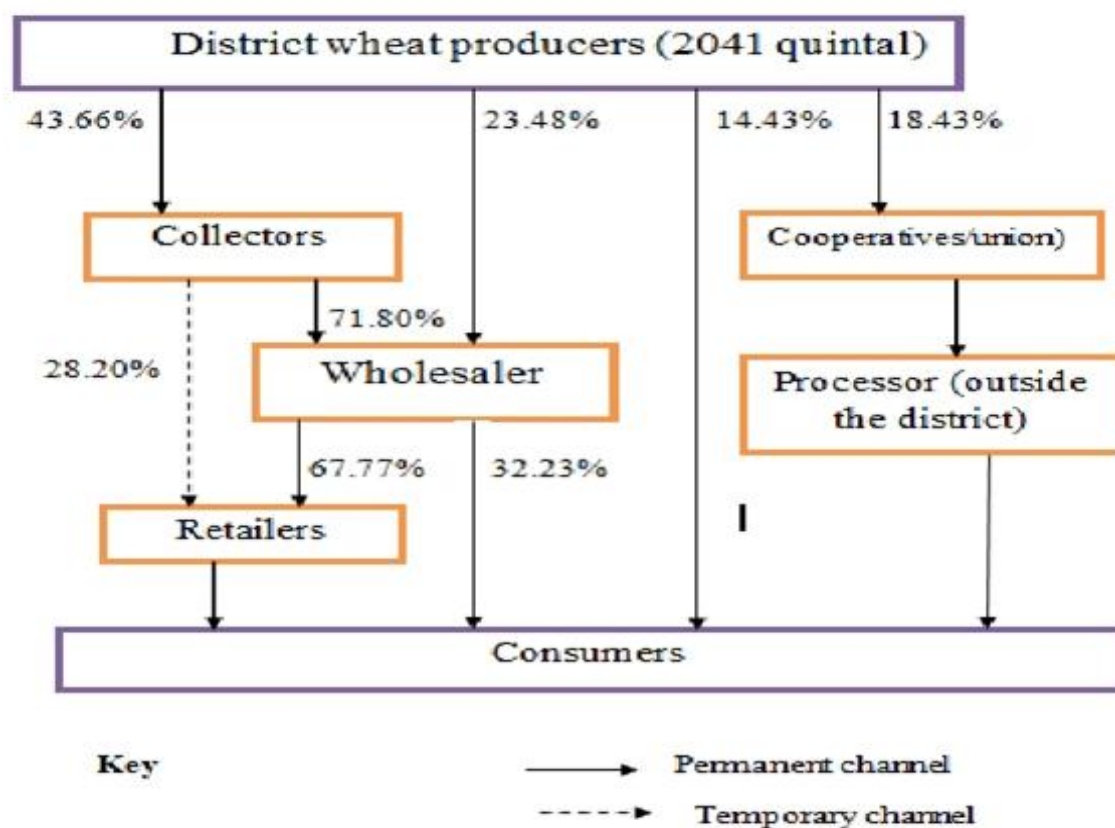


Figure 5: Market channel of wheat in Dembecha district of West Gojjam zone

Source: own sketch from survey data (2017)

Seven wheat-marketing channels were identified that passed the product from producer to consumers. The major actors in the channel were producers, cooperatives, collectors, wholesalers, retailers and consumers. There were four alternative buyers that purchased wheat directly from sample wheat producer households. According to survey result, a total of 3516 quintals of wheat was produced by the sample wheat producers' households in the year 2016/17. Of this, the amount that was transacted during the year was found to be 2041 quintals. From the marketed surplus, 433.71 quintals (21.25%) passed through channel IV followed by channel VII which shares about 376.15 quintals (18.43 %) quintals which were found to be uppermost in terms of wheat volume of marketed. On the other hand, the least volume of wheat passed through channel V, which accounts 154.50 quintal (7.57%) from the total volume marketed by sample households.

4.6. The Structure- conduct and performance of wheat market

As stated in Kizito (2008), the structure-conduct-performance (S-C-P) model is an analytical approach used to study how the structure of the market and the behavior of

sellers of different commodities and services affect the performance of market and consequently the welfare of the country as a whole. Moreover, the approach examines the causal relationships between market structure, conduct and performance of a particular commodity.

4.6.1. Structure of wheat market

Market structure consists of the relatively stable features of the market that influences rivalry among buyers and sellers operating in a market. Market structure may be determined by the number and size distribution of buyers and sellers of food commodities in the market; barriers to entry into the market and the nature of trading relations (vertical coordination mechanisms) among market participants. For this study the structure of wheat market was characterized and analyzed by using market concentration, the degree of transparency (market information) and entry conditions (licensing procedure, lack of capital and managerial know how).

(a) Four firms concentration ratio

Four firms (CR4) concentration ratio is the most typical for evaluating the structure of the market. For this study, four-firm market concentration ratio was calculated using the data from the traders' survey. The annual purchase of wheat by the sample traders in 2016/17 were used to calculate the four firm market concentration ratios in the study area. Since, the number of traders at each local market level was few; the market concentration ratio was calculated at the district level to analyze the concentration of wheat market prevailing in the district.

The four firms' market concentration ratio (CR4) for four largest firms at district level was found to be 39.78 (Table 9). On the basis of rule of thumb given by Kohls and Uhl (1985), wheat market in the study area is characterized by weak oligopoly market structure, indicating the existence of market imperfection. This indicates four wheat traders handled annually 39.78 percent of the total volume of wheat purchased by the sample traders and wheat market at district level is inefficient and noncompetitive. Therefore, the structure of wheat market exhibits the nature of four big-traders controlling significantly higher volume of wheat and participates in a non-competitive activity to influence the market in their favor. The concentration ratio for the largest four firms calculated as follows:

Table 9: Four firm's concentration ratio for the largest four firms

No of traders (A)	Cumulative frequency of traders (B)	% of traders $\left(\frac{D=A}{10} \right)$	Cumulative % of traders (E)	Quantity purchased in Qt (F)	Total quantity purchased in Qt = A*F	% share of purchase $S_i = \frac{Q_i}{Q_t}$	% cumulative purchase $C = \sum_{i=1}^r S_i$
1	1	3.33	3.33	1400	1400	13.46	13.46
1	2	3.33	6.66	1050	1050	10.05	23.51
1	3	3.33	9.99	950	950	9.09	32.6
1	4	3.33	13.32	750	750	7.18	39.78
3	7	10	23.32	650	1950	18.67	58.45
1	8	3.33	26.65	500	500	4.79	63.24
3	11	10	36.65	450	1350	12.93	76.17
2	13	6.66	43.31	350	700	6.7	82.87
1	14	3.33	46.64	200	200	1.91	84.78
3	17	10	56.64	150	450	4.31	89.09
2	19	6.66	63.3	125	250	2.39	91.48
4	23	13.33	76.63	100	400	3.83	95.31
2	25	6.66	83.29	90	180	1.73	97.04
2	27	6.66	89.95	80	160	1.54	98.58
3	30	10	100	50	150	1.42	100
30		100			10440	100	

Source: own competition from survey 2017

(b) Market Transparency (information)

Availability of accessible and timely information on both market supply and price is a crucial factor in marketing decisions. There is system of dissemination of market information between traders. However, it is not transparent among wheat traders and farmers. About 36.2% of wheat producers get market information when they sold wheat while the remaining 63.8% did not get information at all. The main information source for the wheat producers was other wheat producers, Development agents and *kebele* administrative staff but the information is most not valuable. There is weak relationship between traders and wheat producers and even sometimes traders constrain farmers by giving wrong future price information.

Based on focus group and key informants', market information that farmers obtained is valueless (not have value) due to the fluctuation of price wheat per market days. They also confirmed producers mostly stay until market days (Wednesday and Saturday) for market their produce rather than decide to market as soon as they get information. This is also due to the fact that as price is high in one market day, large number of suppliers available in the next market which forces producers to sell at lower price and vice versa.

On the other hand, all traders such as wholesalers, retailers and collectors got market information from different sources. Due to these reason traders sometimes exploit farmers benefit as a result of information barriers. Therefore, inexistence of reliable market information made farmers failing to negotiate better on the prices of their produce and forced to sell at lower prices. Survey result indicated that 63.33%% of the sample traders got price information through the combination of telephone, personal observation and other traders and brokers. About 36.77% of the traders knew price by personal observation and from other traders.

(c) Barriers to entry and exit

Managerial knowledge: Managerial know how is assessed to measure the ability and knowledge of wheat traders. A formal education and trade experience in wheat of sampled traders is considered as a means of examining it.

(a) Level of education

The survey result indicated that about 27.22 %, 26.11%, 46.67% of wheat traders can read and write, attended primary and secondary school, respectively. Because of the entire trading household heads can read and write and majority of the wheat traders is entitled to secondary education, as a result educational background seem to be a barrier to entry into the grain trade in our case wheat (Table 10). This is because trade needs a certain level of education to calculate cost, profit and to record different information for performing well. Moreover, trading business requires a certain level of understanding their customers need psychologically and require especial skill to attract new customers and/or handle the existing customers and this needs a certain level of education and experience.

(b) Trade experience

Trade experience refers to the number of years that wheat traders spend in the trading activity of wheat. Out of the surveyed traders about 36.66 %, 49.17%, and 10 % of the

traders had an experience of 1-5, 6-10 and 11- 15 years of business experience respectively. Only 3.33% of sampled traders have more than 16 years of experience. This indicates wheat-trading business does not require too much experience and most of wheat traders have less than 10 years of experience. Therefore, there is no barrier to entry in the wheat trade with respect to years of experience.

Table 10: Barriers to entry and exit of wheat traders (%)

	Collector	Retailers	Wholesalers	Average (%)
(a) Educational level				
No read and write	-	-	-	-
Read and write	25.00	16.66	40.00	27.22
Primary education	50	25	20	26.11
Above Primary education	25.00	58.33	40.00	46.67
(b) Trade experience				
1-5 years	37.50	75.00	-	36.66
6-10 years	62.50	25.00	60.00	49.17
11-16 years	-	-	30.00	10.00
Above 16	-	-	10.00	3.33
(c) Requirement working capital				
<i>Main source of fund</i>				
Own capital	50.00	50.00	60.00	53.34
Informal credit source	37.50	-	-	12.00
Formal credit source	12.50	33.33	20.00	21.94
Others	-	16.66	20.00	12.22
<i>Credit availability</i>				
No accesses	-	-	-	-
Difficult to get it	75.00	33.33	60.00	67.25
Do not need at all	25.00	-	40.00	32.75
(d) License condition				
Licensed	75.00	91.67	100	88.89
Unlicensed	12.5	-	-	4.17
On procedures	12.5	8.33	-	6.94

Source: own computation from survey, 2017

Requirement of working Capital: Every business activity needs a certain amount of capital (money) at the beginning. Good working capital is one of the requirements to enter into any commodity trade activity including wheat. The result of this study shows that working capital is from own source (73.33%), formal credit services (16.67 %) and informal credit sources (24.72%). However, most of the traders complain strong collateral required by financial institutions like banks. This restricts traders from using formal credit service in the study area. Generally, in order to handle reasonable quantity of the commodity, traders need sufficient amount of money that assists their business to operate in the right way. This indicates, capital requirement is considered as an entry barrier in the wheat trade in the district because only those who can afford can enter the market.

License for wheat trade: Licensed is recently becoming a major barrier of entry both in developed and developing world. Any trader is not allowed to carry out and perform any other business activity unless for which he/she is licensed. Similar trends observed in the wheat trading activity in the study area. Based on the survey result, about 88.89 % of the traders were licensed in grain trading in the study area (Table 10). This indicates a trading license for wheat trading activities is considered as one of barrier to enter in to wheat trading businesses.

Furthermore, result of focus group discussion and key informants showed that a means acquiring customer is one barrier to enter in wheat trade business. Because of most wheat buyers mainly retailers and wholesalers has long-term relationship and even they conduct transaction without personal contact through phone communication. Due to this reason, new entrant may face strong problems with in short time and therefore it taken as one barrier for new entrants of wheat trade business.

4.6.2. Market conduct of wheat

Market conduct includes different competitive strategies that a trader or a group of traders use and follow to run and compete in the market. Conduct of commodity market focuses on traders' behavior with respect to various aspects of trading strategies such as buying, selling, transport, storage, information and financial strategy. The analysis of the market conduct below relies on the qualitative information gathered through interviews with sample traders, producers and development agents.

The agricultural loan collection schedule, governmental taxes, the existence of many religious and cultural festivals and the easement time for farmers following the harvest season makes traders to cut the market prices and forces producers to supply their produce to market. This shaped traders to behave in unusual ways in the wheat market to increase their benefits. Most of the respondents from the producers 'side and a market extension expert from the agriculture office agree that traders offer low prices for agricultural commodities as soon as harvesting time. January up to March is the months when the supply of wheat reach at peak with prices drains at rock bottom prices in the study area.

Distance of the market from their residence and absence of storage house near to market center constrained and forced farmers to sell their produce (wheat) at low prices. Due to this reason, wholesalers and consumers usually put pressure on producers to sell their product at a low price. This means that farmers have fewer options to negotiate to price. This indicated that most of wheat producers are price takers and the market conduct deviating from norms of competitive market structure.

Another factor influencing the way the traders behave in the wheat market comes from the existence of competition among traders in the wheat market. This has caused the traders to behave unusually in the wheat market in order to attract more farmers (sellers) to their store (market place) by providing relative extra money to the farmers than the prevailing market price. However, they cheat wheat producers through weighing scales to compensate for the extra money they paid. This makes farmers to not trust and to lose confidence on traders and makes them to supply to consumers in which they have better bargaining power.

Moreover, traders use different purchasing strategies like grading product too low quality standard even if it is good, giving wrong future price information to make them to sell below the market price, which is one of the problems in the market conduct that wheat traders implement in the district. Wheat traders are the dominant price determiner and convince producers to sell at the seated price by telling about the quality of their produce. About 55%, 32%, 8% and 5% of the respondents argued that wheat market price were determined by traders, market, producers and negotiations, respectively.

4.6.3. Performance of the wheat market

The performance of wheat market was evaluated by considering associated costs, returns and marketing margins. The Ethiopian Birr (ETB) per quintal was used as a standardized unit of measurement for performance analysis.

Marketing cost

A value chain actors add value to the product when it passes from producer to consumers by incurring marketing costs like transportation, loading, seller/buyer searching, cleaning, packaging, sorting, storage costs like rent, pest/rodent control and weight loss. In addition, smallholder farmers incurred costs for production costs of seeds, fertilizers, plant protection chemicals, land, labor and oxen.

Due to the fact that most households used their family labor, oxen and land for wheat production, opportunity costs were used to compute costs of production. As the Table below indicated, the average cost of wheat production for sample households in the study area was 375.63 Birr/qt. From total production cost 35.97% were spent for purchasing inputs and about 31.68% cost were used for land rent. This cost is the minimum selling price that wheat producer is willing to accept or break even in the study area.

Table 11: Production cost/hectare of wheat producers in 2016/17

Cost items	Cost (Birr/hectare	Percent of total cost
Land clearing and preparation	357.69	4.11
Oxen rent	307.30	3.53
Labor cost for plowing and seeding	630.77	7.25
Inputs/seed, chemicals, fertilizer	3275	37.60
Labor cost for weeding and harvesting	765.5	8.79
Land rent	2884.61	33.11
Tax	140	1.60
Food and other cost	350	4.01
Total cost/ha	8710.87	100
Total cost/Qt	375.63	

Source: Own computation of survey result 2017

Each market actors incurred marketing cost as the wheat passes from one stage to the next stage of the value chain. The arrangement of marketing cost revealed that processors cost is

the highest (ETB 156.60 per quintal) from the other actors. This is because they need additional cost for processing than other trader. Thus, the cost of marketing is the highest amount followed by cooperatives (59.50 Birr/qt) and collectors (41.71 Birr/qt) as they undertake more value adding activities than any other value chain actors as they directly received from farmers and needs more transportation cost to transport to their potential customers (Table, 12).

The average marketing cost of producers was 63.21 birr/qt when they sold to district consumers and wholesalers while 33.31 birr/qt when they sold to collectors and cooperatives because no more additional transportation cost. Similarly, average marketing cost of wholesalers was (15.42 birr/qt) when they purchase from collectors and producers in the district market while 38.75 birr/qt when they purchased from producers in village market.

Table 12: Marketing cost for different marketing agents (Birr/qt)

Cost of marketing (ETB/qt)	Producers	Collector	Wholesaler	Retailer	Cooperatives	Processors	Total cost
Transportation	9.42	22.5	23.33	3	27.5	35	120.75
Storage	-	0.74	2.22	0.66	-	-	3.62
Cleaning/ packing	-	0.35	0.20	-	1	13	14.55
Packing material	6.70	5.00	-	-	7	15.60	34.3
Weight Loss	7.70	3.5	1.40	8	6.5	11.50	38.6
Processing cost	-	-	-	-	-	52.50	52.50
Telephone cost	-	2	2	1	-	3	8
Broker	-	-	1	1	-	3	5
Loading/unloading	4.39	4.62	3.60	4	7.5	8	32.11
Personal expense	5	3	5	3	10	15	41
Total marketing cost	33.21	41.71	38.75	20.66	59.5	156.60	350.43

Source: own competition from 2017 survey result.

The structure of marketing cost revealed that transportation cost is the highest cost for all other market actors except processors, which incur more cost for processing. Averagely wheat market actors incurred 34.46% of marketing costs for transportation, 14.98% for processing, 11.01% of weight loss, 9.79% for packing material, 9.16% for loading/unloading, 4.15% for cleaning and packing, 1.43% broker, 1.03% for storage and

the rest for personal expenses such as transport, food, telephone expenses and other utilities (Table 12).

Marketing margin

Marketing margin can be used to measure the share of the final selling price that is taken by a particular agent in the channel. The relative size of various market participants' gross margins can indicate where in the marketing channel is and/or profits are made. In order to calculate the marketing margin of an agent, the average price of wheat for that particular agent was taken. However, there are situations that one market agent sold at different price to the next actors and the analysis below takes it into consideration. The result from focus group discussion and key informants interview also showed that quantity, transportation cost and quality are among the importance factors that were considered by market actors for setting price in the study area.

Table 13: Wheat marketing margin for different channels (Birr/qt)

	GMMp	GMM col	GMM cop	GMMpr	GMMwh	GMMr	TGGM
I	100						0.00
II	82.28	7.34				10.38	17.72
III	85.63	6.58			7.79		14.37
IV	82.28	6.32			6.90	4.49	17.72
V	91.94				8.05		8.06
VI	88.35				7.45	4.49	11.65
VII	53.38		6.88	39.72			46.62

Source: own computation

Where: GMMp, GMMcol, GMMcop, GMMpr GMMwh and GMMr means gross marketing margins for producers, collector, cooperatives, processors, wholesalers and retailers, respectively.

As depicted in Table 13 above, the total gross marketing margin (TGMM) is highest in channel VII (46.62%) and followed by channel VI and II which accounts for 17.72% of the consumer price. Total gross marketing margin is the lowest which accounts 8.06 % of consumer prices and producer share (GMMp) is uppermost (91.94%) of consumer price in channel V. This result shows as the number of marketing agents decreases the producers share increases and vice versa. This is due to the reason that the higher number of

middlemen in the commodity market, the more profit they retain for their services. In general, producers share in consumer price is above 80% and relatively good except channel VII. Hence, the existence of a high market share does not necessarily mean that the market is performing well and that either the wheat traders or the smallholder producers are getting fair benefits from the wheat marketing.

The result also showed that among different wheat traders, processors obtain relatively highest gross marketing margin (39.72%) of consumer price in channel VII followed by retailers which was 10.38 % in channel II. Retailers also obtain lowest market margin (4.49%) from other traders as they purchase from wholesalers. This implies share of market intermediaries from consumers' price was substantial and thereby it shares the producers' from consumers price (Table, 13).

Profitability Analysis:

The profitability analysis results showed that wheat producers' market profit was highest when they directly sell to consumers in channel I which is 265.62 birr/qt and cooperatives in channel VII which is about 258.49 birr/qt while taking lowest market profit when they sell to collectors which accounts 234.27 birr/qt. This implies producers are more profitable if they sold to consumers and cooperatives and their profit reduce as length of channel increase. The result also showed that among traders processors shared the highest profit 339.97 birr/qt as they purchase from cooperatives in channel VII and they sold to consumers. Retailers gained the second highest profit of 60.44 birr/qt from channel II, when they bought from collectors and sold to consumers. In general, all market channels are profitable (efficient) and the highest profit is somewhat high in channel VII which accounts for Birr 339.97 per quintals (Table 14).

The profitability analysis depicted above showed that all wheat market actors are profitable and producers' profit is better than all other traders except processor, which gets upper most profit from all market actors. However, producers' profit relative to costs that they incurred is not good compared to traders. Traders receive relatively high profit by adding relatively small cost. This implicates producers are relatively disadvantaged due to disproportionate share of profit relative to cost. Table 14 clearly depicted market profit of each actor at different channel, namely producer, collectors, cooperatives, processors, wholesalers and retailers in each market channel.

Table 14: Profitability of wheat for main wheat market actors (Birr/qt)

Actors		I	II	III	IV	V	VI	VII
Producers	Total cost	438.84	408.84	408.84	408.84	438.84	438.84	408.84
	% share of cost	100	86.76	87.74	84.01	96.6	92.4	65.42
	Selling price	704.46	643.11	643.11	643.11	690.54	690.54	667.33
	Gross profit	265.62	234.27	234.27	234.27	251.7	251.7	258.49
	% share of profit	100	75.47	82.19	79.42	84.82	82.07	41.35
Collectors	Total cost		684.82	684.82	684.82			
	% share of cost		8.85	8.5	8.60			
	Selling price		700.50	692.5	692.5			
	Gross profit		15.68	7.68	7.68			
	% share of profit		5.05	2.70	2.60			
Cooperatives	Total cost							726.83
	% share of cost							9.52
	Selling price							753.43
	Gross profit							26.6
	% share of profit							4.23
Processor	Total cost							910.03
	% share of cost							25.05
	Selling price							1250
	Gross profit							339.97
	% share of profit							54.34
Wholesalers	Total cost			707.92	707.92	705.96	705.96	
	% share of cost			3.31	3.17	3.40	3.25	
	Selling price			751	746.5	751	746.5	
	Gross profit			43.08	38.58	45.04	40.54	
	% share of profit			15.11	13.07	15.17	13.22	
Retailers	Total cost		721.16		767.16		767.16	
	% share of cost		4.38		4.25		4.35	
	Selling price		781.60		781.60		781.60	
	Gross profit		60.44		14.44		14.44	
	% share of profit		19.47		4.9		4.70	

Source: Own computation from survey, 2017

Generally, the structure-conduct-performance approach wheat markets assessed by this study appeared to be poor structured (weak oligopoly) and deviating from competitive norms. The S-C-P paradigm discussed above totally indicated that the existence high concentration ratio (39.78%) makes traders to influence price and wheat marketed quantity. To handle the reasonable quantity wheat traders to behave in unusual manner to get disproportional profit and when traders handle large volume wheat, the marketing cost incurred for each quintal of wheat is declining. The less marketing cost per quintals of wheat traders 'results to obtain high market share from consumers' price and reduce the potential share of producers. Therefore, producers are the most disadvantaged from wheat market and wheat market in the study area is not performing well. This result in line with a study by Abrham (2009) who found grain market especially *teff*, wheat and chickpea inefficient Lume district of Oromiya National Regional State.

4.7. Econometric Results

4.7.1. Determinants of wheat market supply

Wheat is produced mainly for market and not used for consumption in large quantity for Dembcha producers. According to the result, all sample households were good suppliers of the commodity to the market and averagely 58.05% of wheat produces by sample produce supplied to market in 2016/17 production years. But, amount of wheat supplied to market varies among farmers as a result of demographic, socioeconomic and institutional factors.

Multiple linear regression models was employed to identify the significant factors that affect volume of wheat marketed supply by using the OLS in STATA software version 13. For the parameter estimates to be efficient, assumptions of Classical Linear Regression (CLR) model should hold true. Therefore, the hypothesized explanatory variables were checked for existence of heteroscedasticity, multicolliniarity, specification errors (omitted variable bias) and endogeneity problem.

Test of heteroscedasticity: heteroscedasticity tests were performed using Breusch-Pagan test for heteroskedasticity and there was no heteroskedasticity problem in data set (Appendix Table 3). Correspondingly, detection of specification error for omitted variables test result also showed that there were no omitted variables and specification error (Appendix Table 4). Furthermore, independent variable, amount of credit used in 2016/17 production years transform into logarizism.

Test for multicollinearity: It is impossible to separate the effect of each parameter estimate in the dependent variables in the case of multicollinearity. The mean VIF among independent variables is 1.56 and each continuous independent variable has VIF of less than 5. This indicates absence of serious multicollinearity problems among regressed variables (Appendix Table 5).

Test of endogeneity: When a variable is endogenous, coefficient of explanatory variables cannot trust and it is not a good reflection of over the true population value. This is because as endogenous variable correlated with the disturbance term results in violating the OLS assumptions and making OLS estimates biased.

Testing for endogeneity of quantity of wheat produced carried out in the model using both Hausman test and Durbin-Wu Hausman (DWH) test and endogeneity problem were no found in the dataset. Hausman test result indicated that, the predicted wheat produced was insignificant with ($p= 0.187$) when included as additional explanatory variable in structural model, which implies hypothesized variables are exogenous due to uncorrelated with error term. Durbin Wu-Hausman test results also shows that the null hypothesis that says exogeneity quantity of wheat produced were accepted ($\chi^2=1.942$ and P-value = 0.1634) using estat endogenous STATA command after ivregress using size of land allocated to wheat as instrumental variable. The test result indicates that the suspected endogenous variable (quantity of wheat produced) is uncorrelated with the structural equations dependent variables (volume of wheat supplied to market) error term and therefore endogeneity is not concern and not happening in the data set of this study.

The model output (OLS estimation) reveled, among the hypothesized 12 variables, only five were found to significantly affect the household level marketed supply. Of the hypothesized variables; education level of a household heads, quantity of wheat produced, frequency of extension contact, quantity of improved seed varieties' used, and lagged market price of wheat influenced positively the marketable supply as expected.

As depicted in Table 15, the F-value for the model from the analysis is 90.77. This implies the fitness of the model to explain the effect of the hypothesized variables is good and statistically significant at 1% probability level. Coefficient of multiple determinations (R^2) was used to check goodness of fit for the regression model and shows that 90.3% of the variation in the farm level marketed supply of wheat was explained by the hypothesized explanatory variables.

Table 15: Determinants of farm level wheat market supply (OLS estimation)

Variable	Coefficient	Std. error	t-value
Quantity of improved seed varieties' used	0.013*	0.007	1.85
Quantity of wheat produced	0.65***	0.046	13.89
Education level of a household	0.44**	0.175	2.50
Sex of households Head	0.26	1.50	0.17
Frequency of extension contact	0.30***	0.091	3.36
Distance from nearest market	-0.11	0.088	-1.23
Experience on wheat production	0.08	0.069	1.10
Amount of credit (log)	0.04	0.146	0.24
Non-farm income	1.57	1.150	1.37
Family size	-0.22	0.253	-0.90
Lagged market price of wheat	0.02*	0.012	1.67
Tropical livestock unit	0.17	0.193	0.92
Constant	-17.88**	7.51	-2.38
Number of observation			130
F (12, 117)			90.77
(p> F)			0.000
R-squared			0.903
Multicollinearity test, VIF			1.56
Heteroscedasticity test, $\Pr > \chi^2$			0.1102
Test for omitted variable bias, $\Pr > F$			0.1214
Durbin (score) χ^2 (1)			0.194 (p = 0.1634)
Wu-Hausman F (1,117)			0.175 (p = 0.1873)

***, ** and * significant at 1%, 5% and 10% significance level, respectively.

Source: Own computation of survey result, 2017.

Education level of household: As hypothesized, this variable has showed positive and significant effect on volume of wheat marketed at 5% significance level. The survey results revealed that, as years of schooling of household heads in formal education increase by one year, the amount of wheat supplied to the market increases by 0.44 quintal, keeping other factors constant. This implies that spending more years in formal education improves household ability to acquire new idea and information in relation to wheat production and

marketing. This may enhance producers to be market oriented and increase the market supply of what he/she produce, in our case wheat. This result is in line with the findings of Dagmawit (2015) who illustrated formal education level of a household heads exhibited an increase of maize production by farming households has augmented marketable supply of the each commodity significantly.

Quantity of wheat produced: As hypothesized the regression coefficient of wheat quantity produced variable was positively related with quantity supplied and significant at 1% significance level. Thus, a quintal increase in the wheat produced resulted in an increase in quantity of wheat supplied to market by 0.65 quintals, keeping other factors constant. The principle is that as households who produce more quantity of wheat had also supplied more to the market. Because of wheat is the major cash source for almost all wheat producers of the district, markets is the most important factors motivating producers to produce and supply in the study area. This result is in agreement with previous studies conducted by Tadele *et.al* (2016), Sultan (2016) and Muhammed (2011) who found that quantity of wheat produced affected the volume of wheat supply to market positively.

Quantity of improved seed varieties" used: As hypothesized the regression coefficient of quantity of improved seed varieties 'used is positively and significantly related to quantity of wheat supply to market at 10% significance level. The model output predicts that as the quantity of improved seed varieties used per hectare increase by one kilogram, the volume of wheat marketed by sample households increased by 0.013 quintals, keeping other factors constant. The positive and significant relationships between the two variables indicate that using recommended quantity of improved seed varieties per hectare of land play pivotal role to enhance farm productivity and production, which in turn leads to increase market supply. This result is in line with the study by Hymanot (2014) and Beza (2014) who found that quantity of improved seed varieties used by households increases the amount of durum wheat and maize market supply, respectively.

Frequency of extension contact: As hypothesized, frequency of extension contact positively influenced the quantity of wheat supplied and was significant at 1% significance level. Result of the finding indicated that one more additional contact of extension agent with wheat producers increase market supply of wheat by 0.30 quintals. This is due to the fact that as wheat producers get extension service frequently through different means of awareness creation and demonstration techniques; this helps producers in availing up-to-

date information regarding the technology which improves production. This helps wheat producers to produce more and supply it to the market. This is in line with Tadele *et al*, (2016), Girma (2015) and Muhammed (2011) who confirmed that as *teff* producers more number of extension contact the amount of *teff* supplied to the market increases.

Lagged market prices: As it was hypothesized, this variable had a positive and significant effect at 10% level. The result showed that as price of wheat in the previous year increase by one birr, the marketed supply of wheat in the current year increases by 0.02 quintal. The principal is that price is an important factor that motivates producers to produce and supply. This result is in confirmation with the findings by Haymanot (2014) who found that when durum wheat price is high in the previous year, farmers would be interested to produce and supply more to market.

4.7.2. Factors affecting wheat producers' market outlets choice

Results from the multivariate probit model on determinants of choice of market outlet from the total of 130 sample wheat producers are presented in the following (Table 16). The estimate of the simulated multivariate probit model fits the data reasonably well. The statistical significance of the model is examined by using a likelihood ratio test of the null hypothesis that all slope estimates are zero. The Chi square statistic with 52 degree of freedom is 106.68 indicating rejection of the null hypothesis at 1% significant level. This means the explanatory power of the factors included in the model is excellent.

Likewise, the results of likelihood ratio test in the model ($LR \chi^2 (6) = 14.21$, $\chi^2 > p = 0.0274$) is statistically significant at 5% level, indicating that the independence of the disturbance terms (independence of four market outlets choice) is rejected. The results on correlation coefficients of the error terms also indicated that there are significant joint correlations for one estimated coefficients across the equations in the models. The SML estimation results suggested that there was negative and significant interdependence between collectors' and wholesale outlet. This shows that wheat producers used collectors' outlets as substitute for wholesaler outlets, and vice versa in Dembecha district. This supports the assumption of interdependence between the different market outlet which may be due to substitution (negative relationship) and complementary (positive relationship) effect in the different market outlet. This result ensures the appropriateness of the multivariate probit specification and choice of market outlets are not mutually independent.

The result of multivariate probit model showed that the likelihood of households to choose wholesale, collector, cooperative and consumer outlet were 39.33%, 40.60%, 58.27% and 44.29%, respectively. This implies that the likelihood that wheat producers choosing cooperative outlet is relatively high (58.27%) as compared to that of choosing collectors outlet (40.60%) and wholesale outlet (39.33%). This is a good evidence to suggest that producers must sell their produce to the cooperatives outlet in order to get input from cooperatives for next production season. The focus group discussion result also shows producers should be a member of cooperative and/or at least they should supply part of their produce to get inputs and other benefits easily from cooperative.

The model result also revealed that the joint probabilities of success or failure of choosing of the four market outlets suggested that households are more likely to fail to jointly choose the four outlets. The likelihood of households to jointly choose the four outlets is only 0.7% compared to their failure to jointly choose all four outlets (4.1%). Regarding the determinants of wheat market outlets, the results suggested that different household, socioeconomic and farm characteristics are significant in determining the households' decisions to choose market outlets. As depicted in Table 16 below out of thirteen explanatory variables included in multivariate probit model, five variables significantly affected wholesaler market outlet; three variable significantly affected collectors' outlet; two variables significantly affected cooperatives and consumer outlet at different significant level.

Quantity of wheat sold: The finding revealed that, wheat quantity sold is positively affecting the likelihood of choosing a wholesaler and cooperatives market outlet at 5% and 10% significance level, respectively. This variable is also negatively related the likelihood of choosing consumers outlet at 10% significance level. This implies that as the large quantity wheat available for sell, the more a farmer is likely to sell to wholesaler and cooperative while less likely to sell to consumer outlets. This may due to the fact that when the volume of supply is large, they find potential buyers that are able to absorb their produce at once with immediate cash payment and thereby wholesalers and cooperatives are expected to satisfy such need with better financial strength and purchasing capacity than consumers. This reduces the probability of supplying to a consumer outlet which is requires a number of market days with small volume of supply in particular market day. This result is in line with Mekonin (2015) who found that the likelihood of choosing consumer was negatively affected by coffee quantity sold. Study by Adisu (2016) who

found that the likelihood of choosing wholesale was positively affected by potato quantity sold is also in confirmation with this result.

Sex of household head: Sex of the household head has a positive and significant influence on wholesale outlet choice decision at 5% significance level. The positive coefficients for sex variable shows, male headed households are more likely to sell to wholesaler's outlet by traveling long distance. Male contribute more labor in the area of cultivation, planting, weeding, harvesting, and marketing of cereals including wheat and more likely to choose for wheat sale than females. Most of the time males are strong and can resist any challenge faced in marketing and able to sell his produce by traveling long distance while female headed households are more likely to sell for outlets at near distance like cooperatives rather than traveling long distance for sale. This result is in confirmation with study by Jafer *et al.* (2017) and Mamo and Deginet (2012) who found that female household head are more likely sell their produce to market at nearest distance like cooperatives as market outlet.

Distance from nearest market: Distance from the market is positively associated with the likelihood of producers selling to collectors' outlet at 1% level of significance and negatively associated with likelihood selling to wholesale and consumer outlets at 5% significance level. This shows that as market distance increase producers choose collectors that found in the village and the less likely producers preferred to sell their wheat to wholesalers and consumers outlets. Therefore, remoteness to market is an important determinant of collector outlet choice, probably because the far market distance leads to highest market cost for producers and makes them to choose collectors over wholesaler outlet. This result is in agreement with study by Takele *et al.* (2017), Jafer *et al.* (2017), Shewaye (2016) and Sultan (2016) who found that as distance to the nearest market increases, the likelihood of selling mango, groundnut, Haircoat bean and wheat to the wholesale market outlet is decreasing, respectively because of the transaction costs related with the delivering of it while the probability of selling to that of collectors outlet is increasing.

Ownership of transport facilities: Ownership of market transport had a positive influence on the choice of wholesale and negative influence choice of collector's at 1% significance level. The positive sign shows that farmers who own transport facilitators are more likely to sell wheat to wholesale outlet compared to those farmers who had not. This might be

due to the reason that, farmers who have transport facility may not supply their product (wheat) at the farm gate or local market to collectors, rather they prefer to sell to wholesalers directly in order to capture additional benefit taken by collectors when they sold to them. This result is in confirmation with study by Nuri (2016) and Abraham (2013) who found that *enset* and vegetable producers owning market transport facilities is negatively related with collector outlets and more likely sells to wholesale outlet.

Off/non-farm income: The result of the model indicates that off/non-farm income decrease the probability of selling to wholesales and consumer outlet negatively at 5% and 1% significant level, respectively. This implies that farmers who participate in off-farm activities are less likely to spend their time in finding buyer rather they supply their produce at farm gate or local market and may prefer to run their off-farm business. The result is in line with study by Fikru (2017) and Addisu (2016) who showed that households having off/non-farm income sell their product to buyer at near distance like collectors and cooperatives.

Cooperative membership: Membership to cooperative positively and significantly affected choice of cooperative market outlet at 5% significance level. The positive relation indicated a member of cooperatives has the responsibility to supply to its cooperative from their production as a norm of cooperative even if they sell to other outlets. This may be also due to the case that cooperative provides inputs, training to its members and gives other incentives. This result is in contrary with study by Fikru (2017) who found those cooperative members are more likely to sell to collector's outlet than other market outlets. However, study by Kassa *et al.* (2017) and Bongiwe and Micah (2012) in line with this finding.

Table 16: Multivariate probit simulation results for households' market outlet choice decisions of wheat producers

Explanatory variables	Wholesale outlets	Collector outlets	Cooperative outlets	Consumer outlets
	Coeff (Std. err)	Coeff (Std. err)	Coeff (Std. err)	Coeff (Std. err)
Quantity of wheat sold	0.03** (0.011)	0.02 (0.011)	0.02* (0.010)	-0.02* (0.010)
Trust in Buyers	0.29 (0.280)	-0.05 (0.263)	0.001 (0.245)	0.12 (0.248)
Distance from nearest market center	-0.04** (0.021)	0.07*** (0.021)	0.008 (0.020)	-0.007** (0.020)
Education level of household head	-0.05 (0.047)	-0.007 (0.043)	0.005 (0.038)	0.02 (0.040)
Age of household heads	0.007 (0.017)	-0.006 (0.016)	-0.02 (0.015)	-0.01 (0.015)
Sex of household head	0.23** (0.389)	0.23 (0.3448)	-0.44 (0.334)	0.21 (0.338)
Ownership of market transport facilities	0.94*** (0.322)	-1.06*** (0.269)	0.23 (0.257)	-0.11 (0.264)
Amount of credit used (log)	-0.03 (0.036)	-0.008 (0.034)	0.01 (0.031)	-0.02(0.032)
Off/non-farm income	-0.64** (0.290)	0.16 (0.266)	0.21 (0.250)	-0.74*** (0.257)
Family size	0.01 (0.065)	0.005 (0.061)	-0.002 (0.056)	-0.04 (0.059)
Cooperative membership	-0.004 (0.284)	0.18 (0.266)	0.47* (0.244)	0.15 (0.253)
Frequency of extension contact	0.01 (0.023)	-0.24 (0.024)	0.001 (0.020)	0.005 (0.021)
Bargaining power	0.14 (0.309)	-0.62** (0.318)	-0.27 (0.288)	0.19 (0.294)
Constant	-2.08** (0.876)	-0.62 (0.791)	0.45 ** (0.742)	1.42* (0.755)

Table 16 (*Continued*)

	Wholesale outlet	Collector outlet	Cooperative	Consumer
Rho2	-0.58***			
Rho3	-0.11	-0.12		
Rho4	0.01	-0.15	0.003	
Predicted probability	0.3933	0.4060	0.5827	0.4429
Joint probability(success)				0.007
Joint probability(failure)				0.041
Number of observations				130
Log likelihood				-269.55
Wald $\chi^2(52)$				106.42
Prob > χ^2				0.0000
Likelihood ratio test of $\text{Rho}_{ij} = 0$,				14.21
$P > \chi^2(6)$				0.0274

***, ** and * significant at 1%, 5% and 10% significance level, respectively.

Bargaining power: This variable was negatively and significantly associated with use of collector at less than 10% significance level. This means households with bargaining power are less likely to sell to collectors 'outlet rather they prefer to sell to other outlet with better price. This may due to the case collectors' lower price at the farm gate or village market to get extra benefit from trading activities. Therefore, households decide to find a potential buyer for their produce to other market outlet that he/she expected to get a better price for their produce. The result is in line with Bezabih *et al.* (2015) who confirmed that bargaining power has a negative and significant effect on collectors' outlet.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

Wheat (*Triticum aestivum*) is the second important and strategic cereal crop next to maize for the majority of small holder farmers in Dembecha district. It is the main commodity that they supply more to market compared to others (maize and *teff*). As survey results revealed, the production of wheat in Dembecha district increased by 10.02% and total land allocated in wheat increased by 3.56% in 2016/17 production season compared to previous production season. This implies that wheat production and land allocated to wheat is increasing in the district. But, the downstream market actors of the value chain constrained by inadequate market supply that comes as result of urbanization, population growth, increasing local alcohol producers and wheat consumers. In line with this fact, this study was investigated on the value chain of wheat specifically; on identifying the major wheat value chain actors, role and interaction, structure- conduct and performance of wheat markets, on determinants of volume of wheat market supply and market outlet choice decision of smallholder wheat producers in Dembecha district of the West Gojjam zone.

Both quantitative and qualitative types of data were used to address the specified objectives. The data were collected from both primary and secondary sources. About 130 producers, 30 traders, 1 processor, 4 cooperatives, 2 bakers and 10 consumers were used to collect primary data using pre- tested semi-structured questionnaires that was administered through direct interviews and observation. Moreover, qualitative data important for the study was collected through focus group discussions, key informants interviews and observations.

Descriptive statistics and econometric model (multiple linear regression model and multivariate probit model) were used to analyze the data collected from different wheat value chain actors. Descriptive statistics was used to identify wheat value chain actors and their role, to analyze the structure-conduct and performance of the wheat market. Multiple liner regression model particularly ordinary least square method was used to identify the determinants of households level wheat market supply while multivariate probit model was used to identify determinants of wheat market outlet choice decision of wheat producers.

The result of value chain analysis revealed that actors in the wheat value chain being wheat producers, collectors, wholesalers, cooperatives, processors (flour factory), retailers and

consumers. There are also governmental and nongovernmental organization supportive actors who support wheat value chain indirectly. Adeat agricultural research center, Amhara credit and saving institution, Harebu microfinance, district office agriculture and natural resource, Extension development agents, cooperatives union, District office of trade and industry, informal credit providers (parents, friends and relatives) and rule and regulation legislators' are the major wheat value chain enablers/supporters/ in the district.

The structure of wheat market was analyzed by four firm concentration ratios, market transparency and barriers to entry in to wheat trade business. The four firms' concentration ratio (CR4) indicated the four largest traders handled 39.78 percent of the total volume of wheat purchased by wheat traders in the district. This indicates that wheat market in the study area being somewhat weak oligopoly structural feature. There is no clear market information for all wheat market actors and traders usually exploit farmers due to such information barrier. Being licensed in grain (wheat) trade business, requirement of working capital and a certain level of education were required to participate in wheat trade business in the study area. These barriers reduce the number of participants entering in to wheat trade business and thereby reduce the level of competition in the market.

Traders' behavior manifest in issues like price setting and purchasing strategy, was found to be influenced by factors like timing of loans return by farmer, governmental taxes, the existence of many religious and cultural festivals and the easement time for farmers following the harvest season. Knowing that the producers are forced to pay their loans and taxes following the harvest season, traders reduce prices to get disproportional benefit. Furthermore, households' residence from market place is another important factor that makes traders to act in abnormal behavior by forcing them to sell at low price.

About seven different market channels of wheat were identified in the study area. The total gross marketing margin (TGMM) was highest in channel VII (46.62%) followed by channel II and which accounts (17.72%) of consumer prices. Producer's share (GMMp) is highest (91.94%) from the total consumers' price in channel V and lowest in channel VII (53.38%). Among wheat traders processors have got the highest gross marketing margin (39.72%) from all traders whereas retailers have got the lowest marketing margin (4.89%).

The ordinary least square method results revealed that education level of household heads, quantity of wheat produced, quantity of improved seed varieties' used, frequency of extension contact and lagged market prices of wheat found to influence volume of wheat

marketed in the study area. This implied farm level market supply may increase if there is improvement in the above listed variables.

The literature in market outlets' choice stresses that producers prefer a particular market outlet either because of its closeness or outlet that offers the best price. However, the result of this study shows that producers use different alternative market outlets such as wholesalers, collectors, cooperatives and consumers. The result of multivariate probit model showed that sample households are more likely (58.27%) sell wheat to cooperative outlet as compared to wholesale (39.33%), collector (40.60%) and consumer (44.29%) outlets. The result also confirmed that the joint probability of using all market outlets was too low (0.7% and the joint probability of failure to choose all of the outlets were 4.1 %. This implies that producers are less likely to choose all four outlets at a time.

The Multivariate probit model confirmed that among the existing four market outlets: the probability to choose the wholesale outlet was affected by quantity of market supply (+ve), distance from market center (-ve), sex of household heads (+ve), non-farm income (-ve) and ownership market transport facilities (+ve) at 5%, 5%, 5%, 5%, and 1% significant level, respectively. Similarly, the probability of choosing collector marketing outlet was affected by distance from market center (+ve), ownership of market transport facilities (-ve), and bargaining power of producers (-ve) at 1%, 1%, and 10% significant level, respectively. Moreover, cooperatives outlet was affected by volume market supply and cooperative membership positively at 10% significant level while that of consumers' outlet was affected by volume market supply, off/non-farm income and distance from market center negatively at 10%, 5%, and 1% significant level.

Expanding wheat production and market supply within the existing condition is restrictive and difficult. Coordination among value chain actors, producers knowledge on production and marketing of wheat in general and recommended input usage in particular, infrastructural facilities (road and store house) for market, producers' benefit from marketed supply, producers cooperative to increase negotiation power in a market, extension service in line with both production and marketing were have still weak in the study area. Therefore, providing reasonable attention to above listed factors is critically important for strong and successful improvement of wheat value chain in the study area.

5.2. Recommendations

Decision making on market supply and further into the choice of marketing outlet is an important task which is influenced by many factors. Based on the empirical results, policy recommendations forwarded are stated below.

The structural- conduct- performance paradigm of the wheat marketing system in the study area is found to be non-competitive and not performing well. Hence, the three paradigms have strong relationship to determine market performance of a commodity market, making adjustment in market structure is expected to make change in conduct and performance. In this respect, wheat market is oligopoly at trader level and also lack of access to market information and entry barriers. This structural feature makes traders to have market power and reduce producers share from consumer's price. Reducing level of four firm concentration ratios by increasing number of new entrants and decreasing entry barriers to improve competitiveness is required. Therefore, expanding easy credit provision system need to be made by financial institutions and banks to increase the size (working capital) of wheat traders.

Quantity produced of wheat influenced market supply of wheat positively in the study area. Concerned bodies need to focus more on smallholder farmers if production of wheat in Dembecha district is required to increase. Providing training, creating awareness to farmers through different methods like model farmers field visit, encouraging farmers to use the recommended input combination, making farmers to use latest production technologies can help producers to increase production.

Quantity of improved seed varieties used per hectare affected market supply of wheat significantly and positively. This implies use of improved seed up to the recommended level can improve both production and productivity of wheat as a result it increases market supply. Hence, facilitating access to improved seed to wheat producers at right time and quantity is required.

Education level of household head affected market supply of wheat positively at 5% significant levels. Hence, strengthening access to education of farm households is required. This will promote both production and marketing of wheat. Producers with a certain level of formal education can acquire new idea in relation to market information and improved

production, which in turn enhance productivity and there by increased market supply of wheat.

Lagged price of wheat significantly affected wheat market this implies that lagged price can motivate production and as a result market supply. Hence, facilitating situations from which farmers can sale their produce at reasonable price like contract farming arrangements and result in an increased and sustainable in market supply of wheat.

Frequency of extension contact significantly affected market supply of wheat positively. Hence strengthening extension services is required. Therefore, the regional and/or district agricultural and natural resource office should provide continuous and well-organized extension service on production and marketing of wheat to all wheat producers.

Multivariate probit models showed that the choice of wholesalers market outlet affected significantly by quantity supplied to market, ownership of market transport facilities, distance from nearest market sex of households. Therefore, expanding equal accessibility of infrastructures such as road and transportation facilities needs government intervention to promote the effective marketing of wheat through all outlets.

The choice of collectors' market outlet is determined by distance from nearest market, ownership of transport facilities and bargaining power of producers. Therefore, the concerned bodies and information centers should be able to disseminate market price information at the appropriate time for the farmers so they can equally get accessibility.

The choice of cooperatives market outlet is also influenced by volume of wheat supply and membership to cooperative. It is good if the government strengthen on organizing producers into cooperatives and provides long term loans for the farmers to enable them to access agricultural inputs which promote the quantity of output and manage their wheat marketing and/or production more effectively and thereby able to accesses better markets outlet.

Furthermore, the choice of consumers' outlet affected by volume of supply, non/off-farm income and market distance from producers dwelling. Therefore, follow up and continues encouragement towards the use latest production technologies and maintain infrastructures (roads) for sustainable input and output transportation service with minimum possible cost need to be taken in to intervention to promote the effective marketing of wheat through all outlets.

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7. APPENDICES

Appendix A

Appendix 1: Conversion factors used to estimate man day labor

Age group	Male	Female
<10	0	0
10-13	0.2	0.2
14-16	0.5	0.4
17-60	1	0.8
>60	0.7	0.5

Source: Storck *et al.*, 1991

Appendix 2: Conversion Factors Used to Calculate Tropical Livestock Units (TLU)

Animals	TLU-equivalent
Calf	0.25
Heifer and Bull	0.75
Cows and Oxen	1.00
Donkey young	0.35
Donkey adult	0.70
Sheep and Goat	0.13

Source: Storck *et al.* (1991)

Appendix 3: Test of Heteroscedasticity

Breus-pagan/cook-weisberg test for heteroskedasticity

HO: Constant variance

Variables: fitted values of QMKTS

Chi2 (1) = 2.55

Prob>chi2 = 0.1102

Appendix 4: Test of specification errors (Omitted Variables Bias)

Ramsey RESET test using power of the fitted values of QMKTS

Ho: model has no omitted variables

F (3,114) = 1.98

Prob >F= 0.1214

Appendix 5: Test of Multicollinearity for Explanatory Variables

Variables used for wheat market supply

Variable	VIF	1/VIF
QWPR	3.31	0.302179
QISVU	2.21	0.452328
EXTCO	1.89	0.529932
DISNMK	1.47	0.680816
EDUHH	1.31	0.765790
EXWPR	1.42	0.705714
FAMSZ	1.38	0.714542
Lncrd	1.23	0.811196
TLU	1.17	0.811196
LMKPW	1.10	0.9113340
FEMAL	1.07	0.934928
Mean VIF	1.56	

Source: Own computation from survey result, 2017

Appendix B: Interview Schedule

“Value Chain Analysis of Wheat (*Triticum aestivum*): The Case of Dembecha District, West Gojjam Zone, Ethiopia”

Prepared by: Yonnas Addis

School of Agricultural Economics and Agri-Business

Haramaya University

1. Make brief introduction before starting any question, introduce yourself to the farmers, traders and consumers greet them in local ways, and make clear the objective of the study.
2. Please fill the interview schedule according to the respondent reply (do not put your own feeling).
3. Please ask each question clearly and patiently until the respondent gets your points.
4. Please do not use technical terms and do not forget local units.
5. Put the answer on the space provided.

A. Producers/ Farmers Interview Schedules

1. General Information/Questions

District: Dembecha

Name of Enumerator: _____

Kebele _____

- 1) Sex of household head: 1. Male 0. Female
- 2) Marital status 1. Single 2. Married 3. Widowed 4. Divorce
- 3) Total number family in the household _____

Family member	Age	Sex		Age	Year of education	Working Person	Not working Person
		M	F				
Name of husband							
1.							
Name of wife							
1.							
Name of children							
1.							
2.							
3.							
4.							
5.							
Total							

- 4) Education level of household head (in year of schooling) _____
- 5) Are you a member of any cooperative? 1. Yes 2. No
- 6) If your answer for Q5 is yes, what is the name of the cooperative? _____

2. Resource ownership and tenure

- 1) Is your family labor adequate for farm activities? 1. Yes 2. No
- 2) If you say No Q1, what is the source labor for wheat productions and their numbers?
(Multiple answers are possible) 1. Family labor____ 2.Hired labor____
3. Labor exchange____4.Cooperation____ 5.Others_

- 3) Do you own arable land? 1. Yes 2. No
- 4) Total crop land: _____timad_____ ha. (Note: $1\text{ ha} = 4\text{timad}$ or $1\text{ timad} = 0.25\text{ha}$)
- 5) Of the land cultivated, how much of it is under wheat production? Owned land _____timad_____value (birr), rented land _____timad_____value (birr), shared land _____timad_____value (birr), total land holding _____timad_____value (birr)
- 7) Do you have a transportation facility? 1. Yes 2. No
- 8) If yes for Q.7, what is your means of transportation? 1. Head carrying 2. Own Pack animal 3. Animal cart 4. Public transport (Vehicles) 5. Other (specify) _____
3. Crop production and input used
- 1) Farming experience _____years.
- 2) How long (experience) have you in wheat production? _____years.
- 3) How many times do you produce wheat in last production season? _____
- 4) Distance of your residence from the nearest market center: _____km_____walking hour.
- 5) Distance of your residence to the nearest development office center: _____km hour/minutes.
- 6) What is your major means of income generation? (Put the amount of income generated from each per a year)
1. Wheat production _____ 4. *Teff* production _____
2. Pepper production _____ 5. Barely production _____
3. Maize production _____ 6. Other (Specify) _____
- 7) Why do you produce wheat? 1. Sale 2. Consumption 3. Both
- 8) Do you have livestock? 1. Yes 2. No and specify livestock holdings of your household.

Types of livestock	Number owned	Number sold during the year	Income from sale	Income used for the purpose of
Oxen				
Cow				
Sheep				
Goats				
Donkeys				
Horses				
Mules				
Poultry				
Other (specify)				

*total income from livestock sell in 2016/17 _____birr

- 9) What is your general annual income (birr) which obtained from both crop production and livestock activities? _____
- 10) Have you ever used agricultural inputs (fertilizer, chemicals (pesticides and herbicides) and improved seeds etc.) for the production of wheat? 1. Yes 2. No
- 11) If your answer for Q.10 is No, what was the main reason behind? _____
- 12) If your answer Q.10 is yes, where you get it and specify the cost of input incurred for wheat production during 2017 production season?

Inputs type	Item	Amount of inputs used for wheat production	Costs incurred for wheat production (birr/timad)
Implements/ equipments	Mached, Kufar, Maresha, etc.		
Land	Land rented (timad)		
Seed	Local variety (Qt/timad)		
	Improved variety (Qt/timad)		
Fertilizers	DAP (Qt/timad)		
	Urea (Qt/timad)		
	Compost (local unit /timad)		
Labor	Temporary Labor used (units /timad)		
	Permanent labor used (units /timad)		
Pesticides/ Herbicides	Pesticides (Ltr/timad)		
	Herbicides (Ltr/timad)		
Oxen	Oxen days for plowing /cultivation (price/day)		
Others	(Specify)		

13) What type of seeds of wheat do you use?

1. Local varieties 2. Improved varieties 3. Both

14) Where is the source for getting these inputs (seeds)? 1. Own seed 2. BoA 3. Local market 4. Fellow farmers 5. Research center 6. Cooperatives 7. Others (specify) _____

15) How did you get these inputs? 1. through purchase 2. On credit bases 3. As gift 4. Through exchange 5. Others (specify) _____

16) If you have ever encountered problems with the use of improved seeds, what type? (Multiple responses are possible) 1. Seed not available 2. Seed too expensive 3. Not adaptable 4. Susceptible to diseases 5. Low demand to consumers 6. Lack of demand for seed 7. Low quality (taste) 8. Other (specify) _____

17) Do you always get inputs in the quantities that you need at the right time? 1. Yes 2. No

18) If your answer for Q.17 is No, what are the reasons? (Multiple responses are possible) 1. I am not sure of the benefit 2. Too expensive 3. Not available on time 4. Cash shortage 5. Low quality 6. Far distance 7. Shortage of supply 8. Others (specify) _____

19) How did you solve these problems? Your opinion _____

20) Did you store wheat in 2016/17? 1. Yes 2. No

21) If yes, how long did you store it? _____ Month /week /hours.

22) How did you store wheat? 1. Filling in sack 2. In gotera 3. In ground

23) What was the motive behind store? 1. Expecting high price 2. Saving purpose 3. Lack of market demand 4. Lack of transportation 5. Other (specify)

24) Would you like to expand wheat production? 1. Yes 2. No

25) If your answer for Q.24 is yes, why? _____

26) If your answer for Q.25 is no, why? _____

Off /Non-farm activities and their incomes

1) Do you practice non-farm activities to generate income? 1. Yes 2. No

2) How much do you earn from such non-farm activities annually? Birr _____ and the source of income _____ like salary _____,

3) What percent of your household expenditure was covered by this income generating activities cover? _____

4) Determine the annual income (birr) for non-farm activities _____

4. Production service

Extension contact

1) How many days did you contact with extension agent last years _____ in years?

2) What was the extension advice specifically on wheat production? (Multiple responses are possible) 1. Fertilizer (compost) applications 2. Harvesting 3. Transplanting 4. Marketing 5. Post-harvest handling 6. Others (specify) _____

3) Who provides the advisory service? (Multiple responses are possible) 1. Development agents 2. NGOs (specify) 3. Woreda AmARD experts 4. Research centers (specify) 5. Neighbors and friends 6. Others (specify) _____

4) How did you get the advisory service? 1. Farm to farm visit 2. Experience sharing tour 3. Visit to demonstration/model farmer's side 4. Training 5. Other _____

5) Is there a problem for contact with extension agent? 1. Yes 2. No

6) If Q.5 is yes, what is the problem? 1. No service provider nearby 2. Possessed the required information 3. Availability of contact farmers 4. Others (specify) _____

Credit service

1) Have you received credit last years? 1. Yes 2. No

2) How much did you take credit for wheat production purpose?

3) For what purpose did you take the credit in relation to wheat production? 1. To purchase fertilizer and equipment 2. To rent in land to extend wheat production 3. To purchase seed/seedlings of wheat 4. To purchase transporting animals 5. To hire labour

4) From whom did you get credit for wheat production and market?

1. Families 3. Micro finance institution 5. Bank 7. Others (specify) _____

2. Traders 4. Friends/relatives 6. NGO

5) Have you paid the loan? 1. Yes 2. No

6) If your answer for Q.5 is no, what is the reason? _____

7) Is there a problem for using credit? 1. Yes 2. No

8) If your answer for Q.7 is yes, what is the reason? (Multiple answers is possible) 1. Limited supply of credit 2. Short payback period 3. High interest rate 4. Transportation problem 5. Other _____

9) How did you solve these problems? _____

5. Marketing aspect

1) Did you sell wheat in 2016/17 production season? 1. Yes 2. No

2) If your answer for Q.1 is No, why you did not sell? _____

3. If your answer for Q.1 is yes:

i. Total Quantity Produced (Qt) _____ ii. Quantity consumed (Qt) _____

iii. Quantity sold (Qt) _____ IV. Quantity for seed preparation _____

v. Average selling price (Birr/qt in 2016/17) _____

vi. To sell your wheat, mostly which market channel do you use? (Multiple responses is possible) 1) wholesalers (amount _____ price _____) 2) retailers (amount _____ price _____) 3) direct to consumers (amount _____ price _____) 4) processors (amount _____ price _____) 5)

cooperatives (amount____ price____) 6) collector (amount____ price____) 7.others (specify) _____

vii. Place of sale:

a) Farm gate b) Woreda market c) Local market d) others (specify) _____

4) What is the term of sale? 1. Cash 2. Credit 3. Advance payment

5) What do you do if you did not get the expected price for your wheat supply? 1. Took back home 2. Sold at lower price 3. Took to another market on the same day 4. Sold on other market day 5. Other (specify) _____

6) In deciding to whom to sell, what factors do you consider? (Multiple responses are possible)

1. Transport availability 2. Better price offered 3. Consistent & pays cash 4. Closeness in distance 5. Expectation of future benefits 6. Others (specify) _____

7) Do you have market information in 2016/17? 1. Yes 2. No

11) If yes, what type of information did you get? 1. Price information 2. Market place information 3. Market channel option 4. Time of year to sell 5. Others (specify) _____

12) How did you get that information about supply, demand and price of wheat market? 1. Wheat trader 2. Radio/TV 3. Personal observation 4. Other farmers 6. Others (specify)

13) Who sets the market price of wheat from the following? 1. Yourself 2. Buyers 3. Set by demand and supply 4. Negotiations 5. Others (specify) _____

14) How is the trend of price of wheat for the 4-5 year? 1. Increasing 2. Decreasing 3. The same

15) If increasing, why? _____

16) If decreasing, why? _____

17) Is the lagged price of wheat can increase your production? 1. Yes 2. No

18) If your answer for Q.17 is yes, what was the price of wheat in 2015/16? ____birr.

19) Are you satisfied with the price sated in the year 2016/17? 1. Yes 2. No

20) Did you face difficulty in finding buyers when you wanted to sell wheat? 1. Yes 2. No

21) If your answer for Q.20 is yes, due to: 1. Far distance of market 2. Lack of transportation facility 3. Low price offered 4. Low price for the last year. 5. Others_____

22. Do you have any value addition on your wheat produce? 1. Yes 2. No

23. If your answer for Q.22 is yes, what are those value adding activities? (*Multiple responses are possible)? 1. Sucking (Storing) 2. Place value (transporting) 3. Grading /sorting 4. Other (specifay) _____

24. What was your reason for adding value? (✓) 1. Improve sale volume 2. Get higher prices 3. Buyers demands 4. Others _____

25. What factors enabled you to add value?)

1. Availability of value addition equipment 3. Enough income/capital for value addition 2. Knowledge of value addition 4. Ready market for the products

26) How much cost did you incurred in the year 2016/17 for wheat production and marketing?

Cost items	Cost (Birr/hectare)
Land clearing and preparation	
Oxen rent	
Labor cost for plowing and seeding	
Inputs/seed, chemicals, fertilizer	
Labor cost for weeding and harvesting	
Land rent	
Tax	
Food and other cost	
Total production cost	
Marketing cost	
Labor/unloading cost	
Packaging material cost	
Labor/unloading cost	
Packaging material cost	
Transportation cost	
Weight loss	
Personal expenses	
Total marketing cost	

B. Traders Questionnaire

1. General information/Questions

1) Name of traders: _____

2) Date: _____/_____/_____

3) Address:

Region Amhara Zone West Gojjam Woreda Dembecha Town _____

4) Age of trader: _____ years

5) Sex of trader: 1. Male 2. Female

6) Marital status 1. Single 2. Married 3. Widowed 4. Divorce

7) Family size: _____ (Female _____ and Male _____)

8) Education (in year of schooling) _____

9) Religion 1. Orthodox 2. Catholic 3. Muslims 4. Protestant 5. Others (specify) ____

10) Major business type 1. Wholesalers 2. Retailers 3. Processor 4. Collectors

5. Cooperative _____ 6. Others (specify) ____

11) Trade: 1. Alone 2. Partnership 3. Other (specify) _____

12) Did you trade wheat last years? 1. Yes 2. No

13) Year involved in trade wheat 1. Year round 2. When purchase price becomes low 3.

During high supply 4. During holiday only 5. Other (specify) _____

14) Total number of persons employed in your business? ____ 1. Male__ 2. Female_____

15) For how long have you been in this business? _____ Years

16) What was the amount of your initial working capital for start this business? _____ Birr

17) What is the amount of your current working capital? _____ Birr.

18) Source Capital 1. Own 2. Loan 3. Gift 4. Share 5. Others (specify) _____

19) If loan from what you get; 1. Relative/family 2. Private money lenders 3. Friend 4. Other traders 5. Micro finance institution 6. Bank 7. Others (specify) _____

20) Reason of credit; 1. To extend wheat trading. 2. To purchase wheat transporting vehicles/animals 3. Others (specify) _____

21) Linkage; 1. Farmers 2. Wholselers 3. Retailers 4. Consumers 5. Others _____

22) Is there an increase in your income by wheat trading activity? 1. Yes 2. No

23) Do you think there entry barriers in wheat trading? 1. Yes 2. No

- 24) If your answer to Q.23 is yes, what are the reasons? 1. Capital 2. License 3. Means of acquiring customers 4. Others (specify) _____
2. Purchasing activities
- 1) How do you attract your suppliers? 1. by giving credit to purchase inputs 2. by giving better price relative to others 3. by fair weighing 4. by visiting them 5. others (specify) _____
- 2) From which market you buy wheat most of the time in 2016/17? 1. Farm gate 2. Village market 3. Woreda market 4. Zonal market 5. Regional market 5. Other _____
- 3) Why do you prefer this market? 1. Better quality 2. High supply 3. Shortest distance 4. Others (specify) _____
- 4) From whom you purchase wheat in 2016/17? 1. Farmers (amount in Qt_____ price _____) 2. Wholesalers (amount in Qt_____ price _____) 3. Retailers (amount in Qt_____ price _____) 4. Cooperatives (amount in Qt_____ price _____) 5. Collector_____ 6. Others (specify) _____
- 5) How do you measure your purchase? 1. by sack 2. By basket 3. By weighing (kg) 4. By see the size 5. Others (specify) _____
- 6) Do you pack your purchase? 1. Yes 2. No
- 7) If your answer for Q.6 yes, what were your packing materials? 1. Sisal sack (quintal, Jonia) 2. Plastic Sack (Madaberya) 3. Basket (Kirchat) 4. Others _____
- 8) What is the cost of packing? _____Birr.
- 9) Who sets the purchase price? 1. Myself 2. By the market 3. Sellers 4. Negotiation 5. Others _____
- 10) If you decide on the purchasing price, how did you set it? 1. Agreeing with other traders 2. Individually 3. Other (specify) _____
- 11) Is your purchasing price higher than your competitors? 1. Yes 2. No
- 12) If your answer to Q.11 is yes, what was the reason? (Multiple answers are possible); 1. To attract suppliers 2. To buy more quantity 3. To kick competitors 4. To get better quality
- 13) When did you set purchasing price? 1. Early in the morning of the market day 2. One day before the market day 3. At midday of the market day 4. At the time of purchase 5. At the evening of the market day 6. Others (specify) _____
- 15) Did you have wheat trade license? 1. Yes 2. No
- 16) How much did you pay for wheat trade license? _____birr
- 17) Estimated average costs incurred in trading of wheat in 2016/17 E.C.?

Cost of marketing (ETB/qt)	Cost incurred birr/qt
Transportation	
Storage	
Cleaning/ packing	
Packing material	
Weight Loss	
Processing cost	
Telephone cost	
Broker	
Loading/unloading	
Personal expense	
Total marketing cost	

3. Selling practice

- 1) To which market and to whom did you sell wheat in 2016/17?

Sold to Market (Location name)	Sold to buyers	Quantity sold on market days Qt	Average price per Qt	% share of buyers
1.village market 2.woreda market 3.zonal market 4.regional market	1.farmers 2.retailers 3.wholesalers 4.processors 5.consumers 6.Cooperatives			

- 2) Purpose of selecting this market? 1. High price 2. High consumer 3. Short distance
 3) What percent (quintal) of the total produce is sold on local market____ Woreda market____ Domestic market____ Zonal market____ Regional market____?
 4) When did you get the money after sale? 1. As soon as you sold 2. After some hours 3. On the other day after sale 4. Others (specify) _____
 5) Do you know the market prices in different markets before you sold? 1. Yes 2. No
 6) If you say Yes for Q 5, how did you get information on supply, demand & price?

	Use code *	Source of information multiple answer is possible)
Supply		1) Other wheat traders (direct) 2) Radio
Demand		3) Television 4) Telephone
Price		5) Personal observation 6) Broker
		7) Newspaper 8) Other

- 7) Are you willing to pay for market information in the future? 1=Yes 2=No
 8) Was there transportation problem? 1= yes 2= No
 9) If yes what was the problem? 1 No transportation service 2 high fare 3. seasonal
 10) How was this market roads look like in rainy season for vehicle transport?
 1 It was difficult 2 No problem
 11) If it was difficult, for how long impassable for vehicle? ____ Months
 12) How did you get vehicle transport to come to this market? _
 1 Daily 2 only market day 3 contract 4 other----
 13) What mode of transportation did you use from collection point to store? _
 1 Head/back load 2 Trucking/Vehicle 3 Pack animal 4 Cart
 5 other-----
 14) How did you attract your buyers? 1. By giving better price relate to others 2. By visiting them 3. By quality of the product 4. By providing credit selling 5.By giving bonus
 6. By advertising
 15) What is the accessibility of vehicles for transportation? 1. Difficult to get 2. Easy to get
 16) What is the trend of wheat price between scarce and abundant seasons?
 17) Who decided on your selling price 2016/17? 1. Myself 2. Purchaser 3. Negotiation
 4. By the market 5. Other traders 6. Other (specify) _____
 18) If you decided on the selling price, how did you set the price? 1. Individually 2.Consult with other traders 3. Other (specify) _____
 19) When did you set selling price? 1. Early in the morning of the market day 2. One day before the market day 3. At midday of the market day 4. At the time of selling
 5. at the evening of the market day 6. Others (specify) _____
 20) Is there a tax imposed by government or community officials in a market? 1. Yes 2. No
 21) If your answer to Q.20 is yes, _____amount (birr) based on sales value of product?
 22) Do you pack your purchase? 1. Yes 2. No

- 23) If your answer for Q.21 yes, what were your packing materials? 1. Sisal sack (quintal, Jonia) 2. Plastic Sack (Madaberya) 3. Basket (Kirchat) 4. Others_____
- 24) What is the cost of packing? _____Birr/qt
- 25) Do you want to expand wheat trading? 1. Yes 2. No
- 26) If your answer to Q.25 is yes, why?
- 27) If your answer to Q.25 is no, why?

Consumers Interview Schedule

1. General information/Questions

- 1) Name of respondent_____
 - 2) Zone_____: Woreda_____: Kebele: _____ Village: _____
 - 3) Sex of household head: 1. Male 2. Female
 - 4) Marital status 1. Single 2. Married 3. Widowed 4. Divorce
 - 5) Education level (year in schooling)_____
 - 6) Religion 1. Orthodox 2. Catholic 3. Muslims 4. Protestant 5. Others (specify) _____
 - 7) Household size: _____
 - 8) Means of income generation 1. Farming 2. Trade 3. Employment 4. Others (specify) ____
 - 9) What is the amount of income earned per monthly_____birr?
 - 10) What proportion of your income spent on wheat purchase_____birr?
 - 11) How long do you experience in wheat consumption_____years?
 - 12) What is the source of getting wheat?
1=Own produce 2=purchase 3. Others (specify) ____
 - 13) Do you think wheat value chain is complex and many intermediaries? 1. Yes 2. No
 - 14) Do you think wheat marketing is efficient and competitive? 1. Yes 2. No
 - 15) If your answer for Q.14 is No, what is the problem of traders? 1. High competition with unlicensed traders 2. Supply poor quality 3. Cheat scaling weighting 4. Price setting problem 5. Government policy problem 6.Others (specify) _____
2. Purchase of wheat
- 1) Please respond the following questions?
 - A. Quantity purchased for consumption in qt_____
 - B. Low price paid (birr/qt)_____
 - C. No. of months you may buy at lower price_____
 - D. High price paid (birr/qt) _____
 - E. No. of months you may buy at higher price_____
 - 2) From whom do you buy wheat most of the time? 1. Farmers 2. Retailers 3. Wholesalers
 4. Processors 5. Others (specify) _____

Thanks for your cooperation!!!!!!!!!!!!