WHEAT VALUE CHAIN ANALYSIS IN AGARFA DISTRICT, BALE ZONE, OROMIA REGIONAL STATE, ETHIOPIA

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Wheat Value Chain Analysis in Agarfa District, Bale Zone, Oromia Regional state, Ethiopia

By

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DEDICATIONS

I dedicated this thesis manuscript to my beloved brother, Sure whose contribution to the success of my life is immense.Also to all my family for nursing me with affection and love also for their dedicated partnership in my success.

STATEMENT OF THE AUTHOR

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BIOGRAPHICAL SKETCH

The author was born in Gasara district, Bale Zone of Oromia Regional State in September 1997. She attended her primary education at Birbirsa elementary school from 2004-2010. She attended her secondary school education at Gasara Senior Secondary School in Bale Zone (2010-2011) and Preparatory school at Gasara Secondary and Preparatory School (2012-2013). After she completed her high school education, she joined Jimma University College of Agriculture and Veterinary Medicine in October 2013 and graduated with BSc Degree in Agribusiness and Value Chain Management in June, 2016. Soon after her graduation, she was employed by Jimma University College of Agriculture and Veterinary Medicine in October 2016 and she joined the School of Graduate Studies of Jimma University immediately to pursue her MSc degree in Agribusiness and Value Chain Management in the regular program.

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ACRONYMSANDABBREVIATIONS

AMAP	Accelerated Micro enterprise Advancement Project
ATA	Agricultural Transformation Agency
BDS	Business Development Services
BoDANR	Bureau of District Agriculture and Natural Resource
BZFEDO	Bale Zone Finance and Economic Development Office
CSA	Central Statistics Agency
DA	Development Agent
EATA	Ethiopian Agricultural transformation Agency
EGTE	Ethiopian Grain Trade Enterprise
EPAR	Evans School Policy Analysis and Research
FAO	United Nations Food and Agricultural Organization
GDP	Gross Domestic Product
GTZ	Germany Agency for Technical Cooperation
ICT	Information communication technology
MoFED	Ministry of Finance and Economic Development
MSPA	Mauritius Sugar Producers' Association
OLS	Ordinal Least Squares
PA	Peasant Association
PPS	Possible Probability Sampling
SARC	Sinana Agricultural research center
SCM	Supply Chain Management
SNNP	South Nation Nationalities People
TLU	Tropical Livestock Unit
UNIDO	United Nation Industrial Development Organization
USA	United States of America
VCA	Value Chain Analysis

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ABSTRACT

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

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

1. INTRODUCTION

1.1. Background

Agriculture is considered to be a vital instrument for viable development, source of food and poverty reduction which contributes more than 45% of the GDP, 80% of employment and 90% of the export in Ethiopia (MoFED, 2012). Accordingly, food grains consist the major source of food which accounting for 82% and 70% of total calorie intake and food expenditure, respectively (Tura, 2015).

In Ethiopia, out of these food grains, cereal production or marketing is the means of living for lots of smallholder households and it establishes the single largest sub-sector in the economy. Out of the total grain crop area, 79.69% (8.7million hectares) was covered by cereals. Wheat covered up 13.01 % (1.4 million hectares) of grain crops area. Cereals contributed to 85.11% (about 137.1 million quintals) of the total grain production. The contribution of wheat was 14.36 per cent (23.1 million quintals) of the total cereals produced in the same year (CSA, 2015).

Wheat is one of the most important cereal crops grown in Ethiopia, both for a source of food and for a source of income or liquid cash. It is products contributed to 15% of the total caloric intake in Ethiopia, which made wheat the second most important food, behind maize and it contributes to about 15% of total annual grain productions in Ethiopia (Samuel *et al*.,2017). Now a day, wheat is a preferred cereal food and rising source of income anditsdemand is growing significantly from year to year and from decade to decades. This shows the need to keep wheat productivity through value chain management to improve market efficiency of the crop (Sultan, 2016).

However, having all these importance, in general agriculture and specifically wheat production is facing a number of challenges. From these obstacles, the major ones are: adverse climatic conditions, lack of appropriate land use system, limited use of improved agricultural technologies, the predominance of subsistence agriculture and absence of business oriented agricultural production system, limited market facilities resulting in low

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participation of the smallholder farmers in value chain or value adding activities of their produces (Bezabih, 2010).

CSA (2012) shows that in Ethiopia, wheat is widely cultivated in the highlands of the country at altitudes ranging from 1500 to 3000 m.a.s.l. Ethiopia has established diverse development policies that boost agricultural production and productivity and marketing of the country.The Agricultural Transformation Agency (ATA) which has been established in 2010, to improve productivity and production of smallholder farmers and pastoralists Growth and Transformation Plan (GTP) with the crucial aim of improving agricultural sector transformation by assisting existing structures of government is one of the policies. The Agency has recognized its priority crops and wheat is one of the eight commodities identified (the others are teff, maize, barley, pulses, oilseeds, rice and livestock) for special support(MoFED 2006).

Moreover, ATA (2015) reported that, Maize, teff, wheat, sorghum and barley are the leading cereals crops grown in Oromia region. From the regions with in the country, Oromia region is one of the largest regions that shares largest area coverage of the country and leading region of countries wheat production by 59% followed by Amhara region 27%, and SNNPR 9%. Although, wheat production practiced in all zone of Oromia region Bale and Arsi Zone are leading zone and they are known as belt of or sources of Ethiopian wheat production. Bale zone produces almost all kinds of Agricultural commodities including all domestic animals and it is the major place that is known by wheat producing area of South-Eastern highland of Oromia (Sultan, 2016).

In Agarfa districtwheat production and marketing is an intensive source of income and employment. Although the Zone has ample production potential and being the center of marketing of wheat, the district has low access to both domestic and terminal markets. and it has never reaped the opportunity as it would have supposed to achieve, due to problems like weak quality control systems, week quality based pricing system, less technical capacity of production, weak seed production and distribution, high seed cost, high fertilizer cost, inadequate coordination between research, seed multiplication and extension, lack of market

information, high transport costs, lack of access to appropriate storage and marketing facilities and poor infrastructure and shortage of access to bank credit, these may result in small volume of wheat sold to the market. As a result, the margin share of actors may become low. Besides, poor farming management and post harvesting handling is also among the major problems that affected wheat value chain (Addisu*et al*. 2015).

With this regard, this study focused on investigating the overall wheat value chain, factors affecting household sales volume of wheat and the margin share of each actor with in a chain using value chain analysis approach in Agarfa district of Bale zone, as it is important to develop improved market development strategies to benefit all stakeholders that are participating in wheat value chain in the study area.

1.2. Statement of the Problem

Value-adding to agricultural commodity is a means to increase and/or stabilize farm incomes and to regenerate primary agriculture and the rural economy. Modernized agricultural value chain systems by which food flows from the producer to the end consumer is both a result and reason of economic development (Efa*et al*., 2016).

Regardless of the huge potential for improvements in agricultural productivity and efficient market in Ethiopia, evidence on changes in domestic food value chains in Ethiopia is still limited, due to a lack of accurate and reliable data and information. So Ethiopian agricultural sector is in need to strengthen all actors along the entire agricultural value chain, from input supply and distribution, through aggregation of smallholder production and trading, to downstream processing and export (Sultan, 2016).

The majority of actors across the value chains are small and informal with limited resources and gaps in linkage and technical skills. This brings barriers to agricultural growth, efficient scale of activities, high transaction costs and inefficient information flows from end market to producers. Yet, there was information gap in the flow of commodities, actors involved and their interaction, incentives through the activities, in the value chains (Jerven, 2013).

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According to Tura*et al*., (2016), though Ethiopia has high potential for the production and marketing of wheat, the productions and amount of wheat produced were not supplied in response to customers' needs because of linkage with in actors in the chain is too poor.

Although farmers are the primary producers and actors of wheat, they were not able to share from the growing market benefit of the product who find themselves at the end of an extended market chainin Ethiopia. Therefore, they only receive a very small proportion that final buyers are paying for the wheat products. The hard work of increasing agricultural production and productivity have to be go with a well-acting marketing system which satisfies consumer demands with the minimum margin between producers and consumer prices. A wide margin means usually high prices to consumers and low prices to producers. Higher prices for producer can initiate or motivate farmers to adopt new technologies and increase production (Wolday, 1994). So, analyzing marketing margins was an important means of assessing the efficiency of price formation in and transmission through the system.

According to Mulegata*et al*., (2005) and Best *et al*. (2005) though, markets are essential in the process of increasing agricultural production and agricultural commercialization, volume sold of agricultural products of farm households in different markets could be affected by several drawbacks of market imperfection whichcan be a major constraint to fighting poverty.

The study area is known by production of cereal crops such as wheat, barley, maize, and red teff mainly for market and family consumption. Wheat grain is an ever-growing business sector in Ethiopia, and also in the study area with having several studies with in different parts of a country including Bale Zone.However, no attempt has been made in the past inAgarfa district which has high potential of wheat production and marketability among districts of Bale highlands. By conducting a study, it is possible to understand and find out the specific factors which affecting wheat value chain performance by exploring margin of actors in study area.

Therefore, in order to make interventions this study expected to investigate linkage and role of wheat value chain actors, the smallholder farmers' wheat sold volume and identifying actors margin along the value chain to generate other useful information for different users.

So, this study initiated to conduct value chain analysis of wheat in Agarfa district of Bale Zone.

1.3. Research Questions

This study tried to answer the following research questions:

1. Who are the actors and what are their respective functions along the wheat value chain in the study area?
2. How are the wheat marketing margins shared among the value chain actors?
3. What are the key challenges and opportunities along wheat value chain actors?
4. What factors are determining the volume of wheat sold in the study area?

1.4. Objectives of the Study

1.4.1. General objective

The general objective of the study was to analyze the wheat value chain in Agarfa district of Bale zone, Ethiopia.

1.4.2. Specific objectives

The specific objectives of the study were:

1. To identify wheat value chain actors and their respective functions in the study area,
2. To analyze marketing margins of wheat value chain actors along the value chain,
3. To identify major constraints and opportunities of wheat value chain in the study area
4. To identify factors that influence volume of wheat sold in the study area.

1.5. Significance of the Study

The study may generate valuable information on value chain analysis of wheat that may assist:-to create awareness for smallholder farmers about wheat value chain assessment with the concept of interdependence between actors for common benefit in the district, other researcher to work on the gap founded by the researcher, policy makers at various levels to make relevant decisions to intervene in the development of wheat production, marketing,

processing, smallholder contribution with their margin share along wheat value chain   and designing of appropriate policies and strategies. The study was conducted in one area of source of high potential wheat production of the Zone. And also its significance as a source for further and detailed studies of wheat value chain at the regional and country level.

1.6. Scope and Limitations of the Study

This study was focused on the entire wheat value chain from input supplier to the consumer within the district and role of actors and respective functions, supply of wheat to the market. The study was conducted in one district and important information was collected from sample households and value chain actors involved in wheat value chain in the study area.

It was conducted using a cross-sectional data which only reflects circumstances in a given year and may be affected by the specific climate of the year as agriculture in the country is dependent on weather condition. Moreover, farmers in the study area do not keep records; they might face recalling problems of the past events and most likely they may give wrong information during the survey time. As a result, the study may be subjected to bias to some extent, users of the results should take necessary cautions.

1.7 Organization of the Thesis

The thesis is structured in five main chapters. The first chapter has described the introduction of the study that includes the background, statement of the problem, objectives, limitation and scope of the study. Chapter 2 presents theoretical perspectives and empirical evidences related to the main themes of the thesis. Chapter 3 discusses the methodological approach of the study that includes the method of data collection, analysis and hypothesis of the study. Results obtained from the study are presented and discussed in detail in chapter 4. Finally, conclusions and recommendations of the study are presented in chapter 5

2. LITERATURE REVIEW

In this chapter, an attempt has been made to explain certain concepts and definition of terms used in this study. In addition, this part is intended to critically review the literature of the past research work in relevance to present study objective so that theoretical views and empirical reviews which supported with conceptual frame work enable better understanding of the subject.

2.1. Theoretical Review

2.1.1. Concept and Definition of Agribusiness

Agribusiness sector has critical success factors like: globalization, adding value, achieving profitability, defining organizational capabilities, adapting to change, dealing with technological innovation, securing competence and intellectual capital, and achieving organizational transformation are the key factors that will influence the agribusiness sector in future. Also it found that value added is a very crucial aspect of agriculture today. Producers are now focusing on downstream activities and attempting to form producer alliances and value added cooperatives to capture some of the margin from further processing, this is because value addition has turned out to be the only way to participate in 'new agriculture' (Boehlje*et al.*, 2002).

Value chains are a main framework for understanding how a product travels from the producer to the customer. The value chain perspective provides an important means to understand the business-business relationships, mechanisms for increasing efficiency, and ways to enable business to increase productivity and add value. It provides a reference point for improvements in services and the business environment. It is a vehicle for pro-poor initiatives and for linking small businesses with the market. Value chains reside at the core of high-impact and sustainable initiatives focused on improving productivity, competitiveness, entrepreneurship and SME growth (Bolnick*et al.*, 2005).

World Bank (2007), stated that one way to increase the competitiveness of an industry or product on the global market is to produce more efficiently. Increases in efficiency are captured by measuring the agriculture value added per worker, which is also a proxy for agricultural productivity. The sequence of steps and actors involved in the process from production to delivery of a product to the market is called a value chain. The productivity and efficiency of agricultural value chains are thus basic to the success of rural economies and to the incomes of rural populations.

Value chain concepts

Value addition: It is simply the act of adding value to a product, whether you have grown the initial produce or not. It involves taking any product from one level to the next (Fleming, 2005).

Value chain: It describes the full range of activities required to bring a product or service through the different phases of production, including physical transformation, the input of various producer services, and response to consumer demand (Kaplinsk, 2000). As such, value chains include the vertically linked interdependent processes that generate value for the consumer.

A value chain is made up of a series of actors from design of product, input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring agricultural product from its conception to its end use (Kaplinsky and Morris, 2001). Bammann (2007) has identified three important levels of value chain:

1. Value chain operators or direct actors: The chain of actors who directly deal with the products, i.e. produce, process, trade and consume them.

2. Value chain supporters: The services provided by various actors who never directly deal with the product, but whose services add value to the product.

3. Value chain influencers:The regulatory framework, policies, infrastructures, etc.

The value chain concept entails the addition of value as the product progresses from input

suppliers to producers to consumers. A value chain, therefore, incorporates productive Transformation and value addition at each stage of the value chain.

At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added. Value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing (Anandajayasekeram and Berhanu, 2009) as shown in Figure 1 for the case of a typical agricultural value chain.

Figure 1: Typical value chain analysis
Source: Adapted from Anandajayasekeram and Berhanu (2009).

The value chain perspective provides an important means to understand the business-business relationships, mechanisms to increase efficiency, and ways to enable business to increase productivity and add value (Mohammed, 2009). It addresses the nature and determinants of competitiveness, and makes a particular contribution in raising the sights from the individual firm to the group of interconnected firms. By focusing on all links in the chain (not just on production) and on all activities in each link, it helps to identify which activities are subject to increasing returns, and which are subject to declining returns.

The major objectives of value chain analysis of basic food crops like wheat in Ethiopia should be how to maximize the sales volume and benefits of producers along the whole value chain. This could be achieved either by enhancing their degree and level of participation and make the operation of the whole value chain more transparent and efficiency for their

competitiveness. The main actors in the value chain are smallholder farmers who tend to sell large quantities of their production during and soon after the main (meher) harvest, but further sales may occur as they offload grain stocks to avoid damage and loss caused by storage pests (Walker and Wandschneider, 2005). In agriculture, the concept of value chain is very important as increasingly agricultural products are hardly consumed in the place where they are produced but are transformed, combined with other products, and transported from one actor (owner) to the other with value addition to the product, packaged and displayed until it gets to the final consumer (Roduner, 2007). The final consumer in turn, must be able and willing to pay for the value addition and services involved in the transformation of the product (Fredriksson*et al*., 2009).

2.1.2. Value chain analysis and it is importance

It aims to identify: Appropriate points of intervention for upgrading industries to compete on local, regional and international markets and improving the situation of those currently disadvantaged in the value chain. Value chain analysis is therefore a process of understanding the systemic factors and conditions under which a value chain and its firms can achieve higher levels of performance. The value chain framework includes end markets, business enabling environment, vertical and horizontal linkages among value chain actors, support service markets (value chain finance, ICT), value chain governance, inter-firm relations and upgrading (Roduner, 2007). Value chain interventions often have to do with improving the position of chain actors, linkages in the chain and the environment of the business chain. According to Kithuka*et al*. (2007), there are two basic strategies that can be used to improve the position of producers in the value chain; vertical and horizontal integration.

Vertical integration: means taking on additional activities in the value chain such as processing or grading produce.

Horizontal integration: means becoming more involved in managing the value chain itself such as producers' improving their access to, and management of information, their knowledge of the market, their control over contracts, or their cooperation with other actors in the chain.

A problem, however, is that vertically or horizontally integrating requires capability and capacities that rural poor smallholder commonly lack. At a higher level, given that some basic chain elements are already in place, actors can take up more activities along the chain such as packaging. By so doing they add more value to their produce and consequently earn more for the product than when it is sold without any value addition (Igbinnosa, 2011).

Another direction could be improvement of collaboration of actors at the same level in the form of associations or cooperatives. These associations can greatly improve the bargaining power of local producers by taking charge of more chain management functions by providing economies of scale and mobilizing a large number of previously isolated producers (Kithuka*et al*., 2007).

2.1.3. Mapping the value chain

Value chain mapping is drawing a visual representation of the value chain system. Maps identify business operations, chain operators and their linkages, as well as the chain supporters within the value chain. Chain maps are the core of any value chain analysis and therefore indispensable. It serves both an analytical purpose and a communication purpose, as chain maps reduce the complexity of economic reality with its diverse functions, multiple stakeholders, interdependencies and relationships to a comprehensible visual model (GTZ, 2007).

The first step of a value chain analysis is called mapping. In order to do so, the boundaries to other chains need to be defined. The main idea is initially to identify the actors and then to 'map' the traced product flows within the chain, including input supply, production, processing, and marketing activities. The objective is to give an illustrative representation of the identified chain actors and the related product flows. A mapped value chain includes the actors, their relationships, and economic activities at each stage with the related physical and monetary flows (Faße*et al.,* 2009).

Value chain governance

Governance of value chains is all about the rules and regulations that determine the

functioning of and the coordination in a value chain, the existing and the dominance of certain agents (e.g. buyer/supplier/trade agent power). It also relates to the contractual and informal relationships between the various actors in the chain that help businesses to operate efficiently, absorb and diffuse knowledge, technology and competencies (UNIDO, 2012).

It is a description of the dynamic distribution of power, learning, and leadership in standards and strategy setting among a value chain's firms. While the term can have many meanings, in this instance we use it to describe the sharing of information and systematic standards promoted by the "governing" entity in a value chain. Governance can be characterized along a continuum of four types of value chain governance structure relationships that center on information and the use of market power (Dunne, 2005) like: Market relationship, Balanced relationship, Direct relationship and Hierarchical relationship.

Upgrading

Upgrading is the process of trading up, which allows poor people to access viable value chains or improve their position in existing value chains. Over the past few years, development studies have been developing a language, approach and experience to support poor people in rural areas to upgrade their position in viable value chains. This has necessitated an adaptation of the "traditional" upgrading sequence: that of process upgrading before moving into product upgrading and on into functional and inter-chain upgrading (Kaplinsky, 2000).

It introduces a distinction between material flows within value chains and knowledge flows, placing the latter within the broader concept of knowledge systems. It also attempts to use the competence-based approach to understand the potential and limitations of relationships within value chains for upgrading of developing country firms (Humphrey *et al*., 2006).

The production factor of "know-how" is one core factor regarding the upgrading of value chains (Porter, 1995). Upgrading refers to the innovation that increases firm and/or value chain competitiveness. There are five categories of upgrading:

Process upgrading: Increasing efficiency (that is, more output for same level of inputs or same output for lower level of inputs), achieving standards and certifications (for example, organic, HACCP and ISO).

Product upgrading: Improving product quality, new product development, new varieties, or line extension.

Functional upgrading: Operating at a new level in the value chain.

Intrasectoral upgrading: Operating in a new market channel within the same value chain.

Chain upgrading: moving to a new value chain: Taiwanese firms moved from the manufacture of transistor radios to calculators, to TVs, to computer monitors, to laptops and now to WAP phones). The concept of upgrading explicitly recognizes relative endowments and, hence, the existence of value. Upgrading approaches emphasizes issues of knowledge creation, transfer, and appropriation (Dunne, 2005).

2.1.4. Methods of evaluating marketing performance

Economists understand performance as a well doing market as one in which the allocation of supply and demand works most efficiently, which means that maximum earnings are achieved for each participant (ibid). Market performance can be evaluated by analysis of costs and margins of marketing agents in different chains. A commonly used measure of system performance is marketing margin. It can be useful descriptive statistics which used to show how the consumer's food price is divided among participants at different levels of the marketing system (Getachew, 2002).

Marketing costs and margins: The analysis of marketing costs and margins would reveal how efficient pricing in domestic markets is, and gives an indication of the importance of transaction costs facing traders, farmers and intermediaries (middlemen) and help in identifying and solving bottleneck thus assist in reducing marketing costs. Understanding the concept of market costs and margins requires a priori understanding of the marketing chains or channels under question and a prescription of how long is it (FAO, 2015).

Marketing margins: According to Cramer's and Jensen (1982) marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. Marketing margin is the difference between the value of a product or a group of products at one stage in the marketing process and the value of an equivalent product or group of products at another stage. Measuring this margin indicates how much has been paid for the processing and marketing services applied to the product(s) at that particular stage in the marketing process (Smith, 1992).

The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price. The total marketing margin may be subdivided into different components: all the costs of marketing services and the profit margins or net returns. The 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 market cost (Wolday, 1994).

There are three methods used in estimating marketing margin (Abbot, 1958): (a) following specific lots of deliveries through the marketing system and assessing the cost involved at each of the different stages (time lag); (b) submission of average gross purchase by the number of units transacted for each type of marketing agency; and (c) comparison of prices at different levels of marketing over the same period of time (concurrent method). Because the first two methods are time consuming, this study used the third method.

Marketing costs

According to FAO (2007) marketing costs refers to those costs, which are incurred by actors to perform various marketing activities in movements of products from producers to consumers. Marketing cost includes: handling cost (packing and unpacking, loading and unloading and etc.) transport cost, product loss (predominantly for perishable fruits and vegetable), storage costs, processing cost, capital cost, market fees, commission and other

payments. Moreover, marketing cost varies from commodity to commodity and changes overtime and space.

2.1.6. Wheat trends, production, marketing and consumption in Ethiopia

From the result of Agricultural Sample Survey of 2016, there are 4.7 million wheat farmers in Ethiopia, of these, more than 3/4 (78%) live in Oromia and Amhara. SNNP accounts for 13% and Tigray 8%. Less than 1% of wheat farmers live in other regions of Ethiopia. The average wheat area per farm is largest in Oromia, where farmers plant an average of 0.43 hectares/farm. This is partly the result of the large farms in Bale, Arsi, and West Arsi, the main wheat growing zones of the country. In contrast, the smallest areas cultivated with wheat are found in SNNP, where the average is just 0.19 ha/farm. The average wheat area in Amhara, Tigray, and other regions is between 0.28 and 0.39 ha/farm. Almost all the wheat grown in Ethiopia can be divided into two groups: soft wheat suitable for bread making and harder durum wheat, which is preferred for macaroni and pasta.

According to CSA (2014) estimates, Ethiopia produced 3.9 million tons of wheat in 2013, making it the largest wheat producer in Africa south of the Sahara by a considerable margin. The second largest producer is South Africa with 1.7 million tons, followed by Kenya with just 0.5 million tons. On the other hand, Ethiopian production is relatively small by global standards. Its production is surpassed by two North African countries, Egypt, and Morocco, with more than 7 million tons each, and 27 other countries. Ethiopia represents just 0.6% of the 713 million tons produced globally (FAO, 2015). One implication of this is that changes in the volume of Ethiopian wheat imports are unlikely to have a noticeable impact on world prices.

ATA (2015) conducted that, Distribution of wheat production in Ethiopia is mainly influenced by rainfall and altitude. It grows best at temperatures between 7 ^{0}C and 21 ^{0}C and with rainfall between750 mm/year and 1600 mm/year. Since altitude strongly influences the temperature in Ethiopia, most wheat is grown at an altitude of 1500 meters above sea level and above. For this reason, wheat is grown on the central plateau in the regions of Oromia,

Amhara, Tigray, and the SNNP. In fact, less than 1% of the wheat area is outside these four regions. Furthermore, Oromia accounts for about half the total wheat area and Amhara another third. Tigray and SNNP together represent just 14% of wheat production. Arsi and Bale, the two largest wheat-producing zones account for over one quarter of national wheat production, and more than half of Ethiopian wheat production takes place in the top six zones: Arsi, Bale, West Arsi, East Gojjam, East Shewa, and South Wollo.

Wheat marketing

Wheat marketing refers to a system or process by which wheat transfers from farmers to consumers through different stages. However, most wheat in Ethiopia is not marketed; instead it is retained by the farmer and used for own-consumption, seed, and possibly other uses. However, the share of wheat production sold varies widely across households. Most wheat growers (54%) do not sell any of their wheat output(FAO, 2014).

Patterns in volume of wheat sold: sold volume equals the quantity of items a business sells during a given period of time. The 2012 IFPRI-ATA Baseline Survey provides some useful information on the patterns of wheat sold volume by Ethiopian farmers. On average wheat farmers produce 751 kg of wheat and sell 189 kg, so that the sold volume ratio was 25%. The regional breakdown shows that Amhara has more wheat farmers, but the wheat production and wheat sold per farm are larger in Oromia. As a result, Oromia accounts for about half of all wheat sold. Amhara is the second-largest supplier of wheat sold, followed by SNNP and Tigray region.

The wheat market participants in Ethiopia include smallholder and commercial producers, wholesalers, retailers, part-time farmer-traders, brokers, agents, assemblers, processors, cooperatives, the Ethiopian Grain Trade Enterprise (EGTE), and consumers. Prices generally follow the annual pattern of relatively low post-harvest January prices followed by a period of rising prices that peak during the main rainy season (July and August). However, there is significant price variability in the Ethiopian wheat market (EPAR, 2010).

Since wheat production of Ethiopia fluctuates from year to year based on weather and rainfall conditions, the annual sales volume of wheat does also take that trend. Moreover, regarding the seasonality of wheat supply by farmers, they usually sell their produce between January and March, they sell about 79% of their wheat produce in this period where as the remaining 21% is sold during June-December (Deselegn*et al*., 2001).

Wheat processing: Wheat processing refers to the transformation of wheat grain into wheat flour, as well as related activities such as cleaning, hulling, packaging, and labeling. In Ethiopia, wheat processing involves a wide range of scales and technologies, from small-scale hammer mills to large-scale flour factories (ATA, 2015).

2.2. Review of Empirical Studies

2.2.1. Value Chain Approach

There are a number of studies that have employed the value chain approach to agricultural commodities.The study by Haymanot (2014) on durum wheat value chain analysis in Bale zone of Gololcha district, Oromia Region, Ethiopia showed that the main value chain actors in the district are; input suppliers, durum wheat producers, cooperatives/union, local collectors, rural wholesalers, processors, urban wholesalers, urban retailers, supermarkets and consumers. Indirectly there were also governmental and nongovernmental organization supportive actors who support durum wheat value chain. Sinana agricultural research center (SARC), Oromia credit and saving institution, Oromia cooperative banks, district office agriculture, Oromia seed enterprise, development agents, cooperatives and union, Oromia office of agriculture and rural development, Oromia office of trade and industry, district administrations, district cooperative promotion office, informal credit providers and NGOs (Ethio-Italy and SARC) are the major durum wheat value chain enablers/supporters/ in the district.

Study conducted by Tura (2015) on Market Supply and Value Chain Analysis of Wheat of Tiyo and Hetosa Districts in Arsi, Oromia Region, Ethiopia the primary actors in a wheat value chain in both districts were input suppliers; farmers; traders; brokers; processors; retailers; and consumers. Each of these actors adds value in the process of changing product

title. OoARD, primary cooperatives, micro finance, NGOS and Kulumsa Research center are main supporting actors who play a central role in the stipulation of such services.

Addisu*et al.* (2015) contend that, on value chains analysis of crop and livestock in Sinana district of Bale zone, Oromia Region, Ethiopia The most common challenges facing wheat producers and traders were: high seed prices, shortage of seeds and untimely supply, high production costs relative to selling price, lack of disease resistant/tolerant varieties, storage problem, competition from illegal traders, lack of credit, and high cost of chemicals, lack of uniformity in quality and unstable prices of flour for bread, cakes and cookies all which do not have standards established for them. There are also regular market fluctuations and poor transportation and lack of market information.

Connecting to this, the report of Sultan (2016),revealed that the rapid breakdown of disease resistance in bread wheat varieties is the major production constraint of the crop as per the current study. Grass weeds are other major production constraints due to wheat mono-cropping farming systems of the study area. High input cost, low soil fertility, shortage of seeds of improved varieties, less awareness of farmers about improved crop management practices, extent of weeds and difficulty of saving pure seeds from farmers' own harvest in combine harvested areas, and high cost of combine harvesting are among constraints reducing the productivity, production and return from the crop. The major marketing constraints were: unfair pricing and cheating of traders on balance; lack of timely and sufficient market information; low price of commodities at harvest time; high price of seeds, chemical fertilizers and pesticides; weak market linkages among value chain actors and less bargaining power of farmers.

2.2.2. Determinants of volume of wheat sold to the Market

A study by Sultan (2016) indicated that factors that determine supply of wheat to the market. The variables that were influence volume of wheat sold were: size of landholding, livestock ownership, family size and quantity of wheat produced.

Similarly, Azeb and Tadele (2017) have used multiple linear regression models to examine

the demographic, socioeconomic, and institutional factors that are associated with sales volume by producers.Their study showed that amount of teff production, avail ability of labour force, income from nonfarm activities and price of teff were significantly affect the amount of *teff* sales volume.

Another study by Haymanot (2014) on Durum Wheat Value Chain Analysis in Gololcha District of Bale Zone, employed multiple linear regression model to analyze factors affecting volume of durum wheat marketed in the study area. Her study showed that sex of the household heads, utilization of improved seed, lag market price, amount of credit, land size, and livestock holding affected volume of wheat supply to market.

Leykun and Jemma (2014) in their study of econometric analysis of factors affecting market participation of smallholder farming in Central Ethiopia or demographic and socioeconomic factors determining wheat market participation and market supply of smallholder farmers, by applying multinomial logistic regression analysis to quantify determinants of market participation market supply of small holder house hold by using factors such as: age, education, household size, sex, oxen owned, DAP fertilizer, UREA fertilizer, seed, seed expense, labor expense, water harvesting, hired labor, land size, extension visit and credit use.

Astewel (2017) concludes factors affecting of small holder producer and sales volume in analyzing rice profitability and marketing chain in South Gondar Zone of Amhara Regional state of Ethiopia. In his study four (4) variables were found to be the significant factors affecting the household amount of wheat sold. These variables are quantity of paddy produced, market information access, extension contact frequency and total Livestock value (TLU).

Another study reported by Gebremedhin and Hoekstra (2007) identified determinants of household's market supply of three crops (teff, wheat and rice) from three districts of Ethiopia (Ada, Alaba and Fogera). For analysis, Heckman two-steps estimation was applied. their result showed that distance to nearest market, availability of cultivated land, traction power, and household labour supply, were important factors.

2.3. Conceptual Framework

Conceptual framework is developed in order to analyze value chain of wheat commodity. It consists of different actors and their role at different stage, enabling environment including policies, institutional arrangements and incentives that affect the capacity and efficiency of actors to innovate across the value chain (Biruhalem, 2010). According to Hellin and Meijer (2006), the market map is made up of three inter-linked components: Value chain actors, enabling environment (infrastructure and policies, institutions and processes that shape the market environment) and service providers (the business orextension services that support the value chains' operations). Value chains include process actors such as input suppliers, producers, processors, traders and consumers.

A value chain also includes a range of services needed including technical support (extension), business enabling and financial services, innovation and communication, and information brokering. The value chain actors and service providers interact in different ways starting from the local to national and international levels. The value chain includes direct actors who are owner of the resources (producers, traders, retailers, consumers) and indirect actors or service providers and supporters which contribute for the well-functioning of value chain. Different factors also affect house hold market participation, like; demographic factor, social factor, economic factor, cultural and institutional factors are some of them. Furthermore, the conceptual framework presented below describes different value chain actors and their role, at different stage of the chain and the variables expected to influence house hold sold volume of wheat in the study area
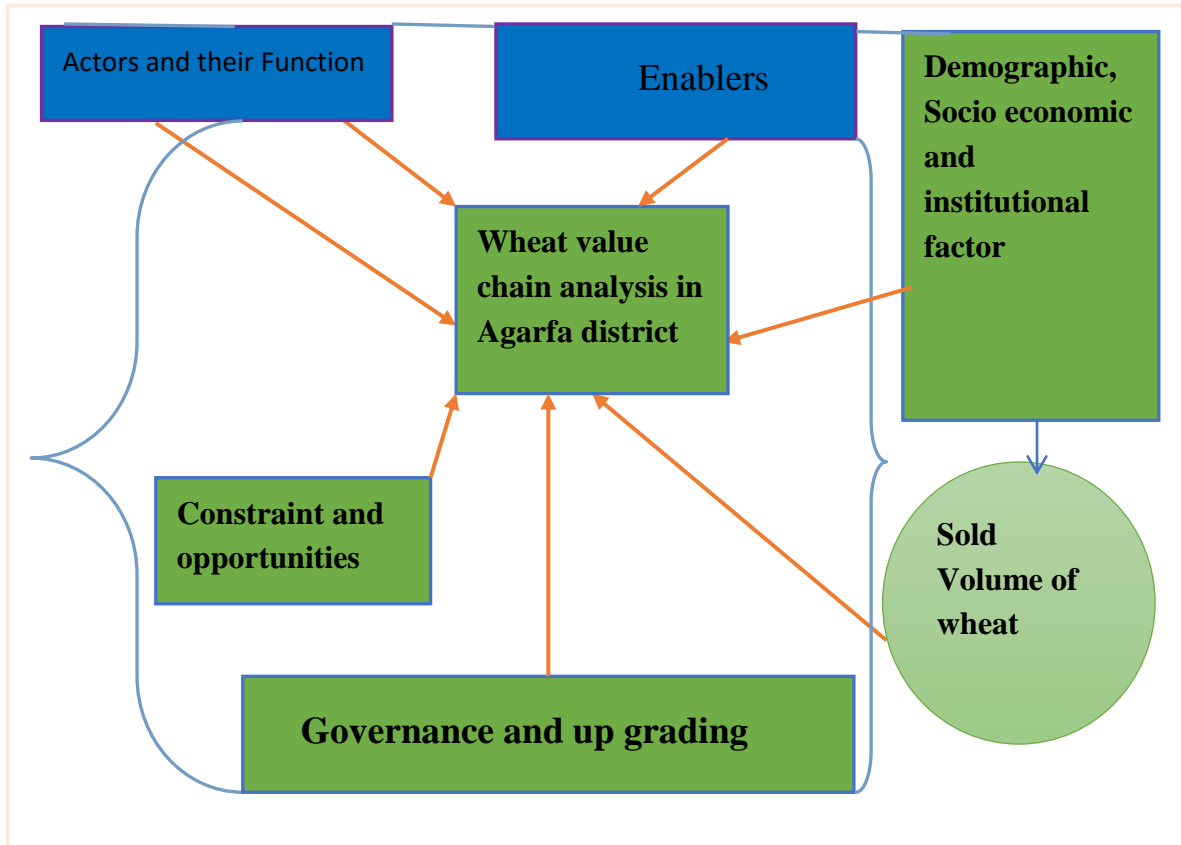
Source: Own sketch

Figure 2 Conceptual frame work

3. RESEARCH METHODOLOGY

In this chapter,description of the study areas, data types, source of data and method of data collection, sampling procedure and sample size, method of data analysis (descriptive statistics and econometric model), hypothesis and variable definition.are presented.

3.1. Description of the Study Area

Overview of Agarfa district

This study was conducted in Agarfa district, which is found in Bale zone of the Oromia Regional State. There are 18 districts and 2 urban administrative towns in Bale zone. Agarfa District is one of those 18 districts (CSA, 2017).

Agarfa district falls between 7017' North Latitude and 39049' East Longitude. Agarfa town is specifically located around 453 km South East direction from Addis Ababa. The total area of the district is 114,084ha which ranked the 15th largest district among the zone districts (BZFEDO, 2017).

The lowest and highest altitude of the district is 1700m and 3000m above sea level, respectively. The mean annual temperature of the district is 17.5^0C. The minimum and maximum temperature is 10^0C and 25^0C respectively. The average annual rainfall is 800ml whereas 760ml and 1200ml is the minimum and maximum annual rainfall recorded in the district, respectively (BZFEDO, 2017).

In Ethiopia during the production year of 2017/2018,out of the total grain crop area, 80.71% (10.2 million hectares), cereals crops took up 23.85% (3.2million hectares), out of this the land allocated for wheat production was 1.7 million hectares. As to production, cereals contributed 87.48% (about 200.8 million of quintals) of the grain production. From this wheat made of up 46.5 million quintals of the grain production with the productivity of 27.36quintals per hectare of land.In Oromia regional state 898,682.57 hectares of land was allocated for wheat production and 26.7 millionquintals of wheat was produced with productivity of 29.71 quintals per hectares of land. In Bale Zone 168,239.00 hectares of land

Figure 3: GIS Map of study area

3.2. DataSources, typesand Methods of Data Collection

3.2.1. Data sources and types

Thesources of data for this study was both primary and secondary sources.There were also both Qualitative and quantitative type of data.

The main data collected were regarding; production, buying and selling, pricing and margin share, input delivery and distribution, volume of wheat sold, constraints and opportunities characteristics of the actors involved in wheat crop production,marketing and other related information in the study area.

3.2.2. Methods of data collection

Primary datawere collected from smallholder farmers (producers), assemblers (local collectors), wholesalers, retailers, processors, cooperative representatives and consumers at different levels by using household survey guided bystructured questionnaires schedule. To be specific, interview schedule, focus group discussion with farmers (about three focus group discussion that consists member of 8-10 per each kebele) were well discussed and key informant interview (DA's at district and kebele level, Model farmers from each kebeles and other well-known governmental and NGO's these established to support district agricultural productivity in the district were interviewed) used for data collection.

Secondary data were gathered from published and unpublished materials, internets, CSA, district agriculture and rural development offices, farmers' organizations, input suppliers, marketing agencies i.e. zone industry and trade office and from different development organizationsof the study area.

3.3. Sampling Procedure and Sample Size Determination

For this study, a two stage random sampling procedure was used to select representative households, because of demographical, ecological and social homogeneity of the study area. There are 19 rural and 3 urban Kebele administrations in the district. In the first stage, out of 19 kebeles of Agarfa district, three Kebeles were selected randomly as all *kebeles* are

producers of wheat in the district. At the second stage, households were selected randomly by using probability proportional to size (PPS) from sample kebeles.

3.3.1. Farmers sampling

Appropriate number of sample farmers from three kebeleswas selected in proportional to population size using Yamane (1967) formula. Accordingly, the required sample size at 95% confidence level with degree of variability of 5% and level of precision equal to 7% are recommended to obtain a sample size required which represent a true population.

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

$$n = \frac{13783}{1+13783(0.07)^2} \approx 201$$

Where:

n = sample size, N= Number of household heads that are wheat producers in the district (13,783) and e = level of precision assumed 7%,

Therefore, based on the formula, 201 farmers were randomly selected using probability proportional to size (PPS) from sample kebeles and interviewed.

Table 1:Sample distribution of producerkebeles(PPS)

Sample *Kebeles*	Number of households Per *Keble's*	Proportion (%)	Samplesize*(n)
Ali	805	38.95	78
Elani	655	31.69	64
Elabidu	607	29.37	59
Total	**2067**	**100.00**	**201**

*Sample ratio=0.0972

Source: Own design from sample survey of (2018)

Note: Here 2067 is total number of household in sampled Keeble'snot total number of household used for sample size determination rather used to sample distribution of each kebelesproducers (PPS)

3.3.2. Assembler, Wholesalers, retailers, millers/processors and cooperatives sampling

In addition to farmer households, sample wholesalers, assemblers, processors, retailers and consumers were interviewed. The lists of assemblers, wholesalers, processors and retailers were obtained from the district Office of Trade and Industry checklist. Accordingly, 25 wholesalers, 20 assemblers as they are low in number, 23 retailers and a total 68 traders were selected purposively and 15 consumersand the researcher was interviewed them. Since there are six processing/milling of wheat is only conducted in zonal town Robe, all five flour mills and one macaroni mill available were interviewed. Finally, three cooperatives, one from each Kebele were interviewed.

3.4. Methods of Data Analysis

Descriptive statistics, value chain analysis, margin analysis and econometric analysis were employed for data analysis.

3.4.1. Descriptive Statistics

 Descriptive statistics like mean, standard deviation, frequency and percentage werecomputed to explain different demographic and socio-economic characteristics of the sample households.

3.4.2. Value Chain Analysis

The analysis of wheat value chain highlights the need for enterprise development, improvement of product quality, and quantitative measurement of value addition along the chain, promotion of coordinated linkages among producers and improvement of the competitive position of individual enterprises in the marketplace. Likewise, individual enterprises may feed into numerous chains; hence, which chain (or chains) was/were targeted depends largely on the point of entry for the research inquiries (Kaplinsky and Morris, 2001). The following four steps of value chain analysis were applied for the study:

1. **Mapping the value chain** to understand the characteristics of the chain actors and their role, for all actors in the chain, the flow of wheatthrough the chain, of employment features, and of the destination and volumes of sales. It was obtained by conducting surveys and interviews as well as bycollected secondary data from various sources.

2. Identifying the distribution of actors' benefits in the chain. This involves analyzing the margins and profits within the chain and therefore determines who benefits from participating in the chain and who would need support to improve performance and gains, since the poor involved in value chain promotion was the most vulnerable.

3. Defining upgrading needed within the chain. By assessing profitability within the chain and identifying chain constraints, upgrading solutions could be defined.

4. Emphasizing the governance role. Within the concept of value chain, governance defines the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional distortions. Thus, governance constituted a key factor in defining how the upgrading objectives could be achieved.Following the above procedure, the main aspects of wheat value chain analysis was done by applying some quantitative and qualitative analysis.

Marketing margin

Marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain. It includes costs and typically, though not necessarily, some additional net income (Mendoza, 1995). Margin is calculated by finding the price variations at different segments and then comparing them with the final price to the consumer. In analyzing margins, first the Total Gross Marketing Margin (TGMM) was calculated. This is the difference between producers˙ (farmers˙) price and consumers˙ price (price paid by final consumer). The formula that used to calculate TGMM is given as:

$$\text{TGMM} = \frac{\text{consumer price} - \text{producer price}}{\text{consumer price}} \times 100 \ldots \ldots \ldots \tag{2}$$

Where: MM = Marketing margin

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

$$GMM_P = \frac{\text{End Buyer Price} - \text{Marketing Gross Margin}}{\text{End Buyer Price}} x100 \ldots \ldots \ldots (3)$$

The net marketing margin (NMM) is the percentage over the final price earned by intermediary as his net income once his marketing costs are deducted. The percentage of net income that can be classified as pure profit (i.e., return on capital) depends on the extent to which factors such as the middlemen's own, often imputed, salary is included in the calculation of marketing costs.

$$\text{NMM} = \frac{Grossmargin - Marketingcost}{consumerprice} 100 \ldots \ldots \ldots \ldots (4)$$

Where; Gross margin = Sales Price(SP) − Purchase Price(SP)

3.4.3. Econometrics Model

Econometric model called 2SLS was employed to analyze factors that determine wheat soldvolumeof farmers in the study area.

Model specification

Multiple linear regressions employed to analyze the determinants of wheat market supply since all wheat producer farmers are wheat market participants. 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). Thus, it is important to check the presence of heteroscedasticity, multicollinearity and endogeneity problem before fitting important variables into the regression models for analysis.

The problem of endogeneity occurs when an explanatory variable is correlated with the error term in the population data generating process which causes, the ordinary least squares estimators of the relevant model parameters to be biased and inconsistent. The source of endogeneity could be omitted variables, measurement error and simultaneity (Maddala,

2001). Both Hausman test and Durbin-Wu-Hausman (DWH) test were applied to check the presence of endogeneity. In this study, there was a potentially endogenous variable, which was quantity of wheat produced, included in the explanatory variables that could cause endogeneity bias if OLS is applied. Therefore, in identifying the determinants of wheatsupplied, a two-stage least square (2SLS) model was used. Two-stage least square is similar to OLS except that uses two completely separate stages during the analysis phase in order to avoid problems of endogeneity (Wooldridge, 2010). Econometric model specification of supply function in matrix notation is as follows:

$$Y = \beta o + X_k'^{\beta_1} + \delta Y_1 + U \qquad (5)$$

Where Y is vector of quantity of wheat supplied to market, $X^{'}$ is exogenous variables that is assumed to affect market supply of wheat, Y_1 is vector of endogenous variables which is quantity produced of wheat, while β_0, β_1 and δ are a vector of parameters to be estimated and U a vector of disturbance term. As the name suggests 2SLS involves using OLS regression in two stages, in the first stage a reduced form of the structural equations is estimated where the endogenous variable productivity of wheat regressed on all the exogenous variables. Reduced form is here below:

$$Y1i = \Omega0 + \Omega1Xi + \Omega2Zi + v \qquad (6)$$

Where Y_{1i} is endogenous variable (quantity of wheatproduced) , X_i vector of explanatory variables, Z_i is a vector of excluded instrumental variables Ω is coefficients to be estimated and v is error terms and systematically surrounded around zero.

Specification of errors

Tests for multicollinearity, heteroscedasticity and endogeneity are tested before running the model.

Test for multicollinearity, before fitting important variables into the regression models for analysis, it was necessary to test multicollinearity problem among continuous variables and check associations among discrete variables, which seriously affects the parameter estimates. According to Gujarati (2003), multicollinearity refers to a situation where it becomes difficult

to identify the separate effect of independent variables on the dependent variable because of existing strong relationship among them. The two measures that are often suggested to test them existence of multicollinearity are Variance Inflation Factor (VIF) and Contingency Coefficients (CC). Thus, Variance Inflation Factor (VIF) is used to check multicollinearity among continuous variables. As a rule of thumb, if the VIF is greater than 10 (this will happen if R^2 is greater than 0.90), the variable is said to be highly collinear (Gujarati, 2003). A measure of multicollinearity associated with the variance inflation factors is computed as:

$VIF(Xj) = Rj^2$ or $VIF = 1/1-R^2$ Where, Rj^2 is the multiple correlation coefficients between explanatory variables. If the value of VIF is 10 and above, the variables are said to be collinear. the larger the value of, Rj is, the higher the value of VIF (Xj) causing higher collinearity in the variable (Xj).

Contingency coefficient is used to check multicollinearity or association between discrete variables. The value ranges between 0 and 1, with 0 indicating no association between the variables and value close to 1 indicating a high degree of association between variables. A popular measure of multicollinearity associated with the CC is defined as:

$$CC = \sqrt{\frac{x^2}{N+x^2}}$$

Where, CC is contingency coefficient, χ^2 is chi-square test and N is total sample size. If the value of CC is greater than 0.75, the variables are said to be collinear.

Conversely, test for heteroscedasticity was conducted for this study. There are a number of test statistics for detecting heteroscedasticity. If there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. According to Guiarati (2003) there is no ground to say that one test statistics of heteroscedasticity is better than the others. Therefore, due to its simplicity, Kroenker-Bessett (KB) test of heteroscedasticity was used for this study. Similar to other test statistics of heteroscedasticity, KB test is based on the squared residuals u^2. However, instead of being regressed on one or more regressors, the squared residuals are regressed on the squared estimated values of the regressors and the original model is written as,

$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + + \beta_k X_{Ki} + U_i$

Where Ui is obtained from this model and then U^2 is estimated as

$U_i{}^2 = \alpha_0 + \alpha_1 Y_i{}^2 + U_i$

where Y_i are the estimated values from the original model.

If this is not rejected, then, one can conclude that there is no heteroscedasticity.

The other is **test for endogeneity.** The problem of endogeneity occurs when an explanatory variable is correlated to the error term in the population data generating process, which causes, the ordinary least squares estimators of the relevant model parameters to be biased and inconsistent. Consequently, taking these variables their actual value can introduce endogeneity problem. The source of endogeneity could be omitted variables, measurement error and simultaneity (Maddala, 2001).Both Hausman test and Durbin-Wu-Hausman (DWH)test was applied to check the presence of endogeneity in the case of Hausman test if there is little difference between OLS and IV estimators, then there is no need to instrument, and we conclude that the regressor will be exogenous. If instead there is considerable difference, then we need to instrument and the regressor is endogenous (Cameron and Trivedi, 2009). In the case of just one potentially endogenous regressor with the coefficient denoted by β

In the case Durbin-Wu-Huasman (DWH) test the error term from the first stage added on the structural equations. i.e. $y_{1i} = \beta_{1y2i} + x_{1i} \beta_2 + pv_{1i} + u_i$ where v1 is the error term from the first stage equation (Davison, 2000).

This problem can be overcome by using two stages least square (2SLS) method. The method involves two successive applications. The first stage is made by regressing the suspected endogenous variables over the pre-determined or pure exogenous variables to get their predicted values. Then the predicted values of the endogenous variables in the first stage are used to estimate the supply equation. Here TLU and land allocated for wheat were used as instrument to quantity of wheat produced. These instrumental variables selected from the available variables by checking the correlation between endogenous variable and the instruments and the model was specified as:

Y (VWS) =*f* (Age, Sex, DMkt, Ext, lagpwt, Flysz, Mscop, MInfo, NOFI, (QWprod=TLU, Lnalwt), Credit, HEduc,) where, VWS is volume of wheat sold to the market, QWprod is amount of wheat produced, Mscop is member ship to cooperatives and Lnalwtis land allocated for wheat production in hectare.

3.5. Variables Definition and working Hypotheses

Dependent variable

Volume of wheat sold (VWS): It is a continuous dependent variable and measured in quintals. It represents the actual quantity of wheat sold by the farm household in the year 2016/17.

Independentvariables

The independent variables for the study were identified and listed based on previous theoretical and empirical works. The following explanatory variableshypothesized to affect volume of wheat sold,

Credit use(CRDUS): This is a dummy variable which refers to whether credit received by farmers from different organizations like micro finance institution, cooperatives and other institutions operating in the area these affects volume of wheat marketed. Based on this variable, Mohammad (2011), Haymanot (2014) and Sultan (2016) indicated that credit used hadpositive and significant influence on volume of wheat sold. And also study by Tadese*et al.* (2016) credit used significantly affect farmers' market participation of *teff*. Therefore, it was hypothesized that credit used affectswheat sold volume.

Land allocated for wheat (LAWET): This variable is a continuous variable measured in terms of number of hectares that the farmer allocated for wheat production. A study done by (Haymanot, 2014) showed that household level of wheat supply had positively influenced by land allocated for wheat. This is because, producers who own big area holding can produce more than producers who own less area and thus to supply more to the market. Land is key factors of production which affects volume of wheat supplied to the market and the

availability of land enables the owner to earn more agricultural output which in turn will increase sold volume of the commodity.Also study done by Wolday (1994) observed that output of food grains (wheat, teff and maize) has positive effect on quantity marketed to the market. Thus, this study hypothesized that the amount of wheat sold was expected to have positive relation to land allocated for wheat.

Income from non-farm activities (NONFARIN): It is a continuous variable measured by ETB earned from non-farm activities by the household members. Studyconducted by Azeb and Tadele (2017)indicated that the income of non-farming had a positive relation to the quantity of teff sold or supplied to the market and Tura (2015) also indicated income from non-farming had positive on the amount of wheat supplied to market. This is because of producers checked the income of non-farming for their best benefit. So this variable was hypothesized to affect volume of wheat soldpositively.

Proximity to nearest market (DISMKT): This is acontinuous variable which is measured in kilometers. It refers to the distance between the household's residence and the nearest market centre. The household'smore nearest to the market is the smaller the marketing cost (no broker, less transportation cost) that farmer faces. This is because of, if a farmer's residence is nearest to the market and better access to market information, faces less post-harvest loss caused by spoilage and deterioration of the product. Berhanu and Moti (2010) found out negative relationship between market sold volume and distance to the nearest urban market center. Therefore, this study expected that distance from market center negatively affects wheat sold volume.

Family size (FSIZE): It is a continuous variable measured in number of family in the house hold (Storck*et al*., 1991) i.e. the availability of active labor force in the household, which affects farmers' sold volume of wheat. Since production is the function of labor, availability of labor is assumed to have positive relation with the amount ofsold. A study conducted by Musah*et al*., (2014)identified that family size had positiveeffect on quantity of maize marketed and therefore, this study expected thatfamily size affects volume sold of wheatpositively.

Membership to cooperative(COOPMRSP): This is defined as dummy variable that takes 1 if the household is member of cooperative and 0 otherwise. The presence of agricultural cooperatives in the PA (peasant association)is expected to enhance the sold volume as expected. Farmers who are members of cooperative are supposed to sell to high amount of produce than non-members. This is because of cooperatives works for the benefit of it is members they are working for changing production methods to modernized techniques, to increase their productivity, supplying different agricultural inputs and making fair marketing price over other marketing actor.Musah*et al.*, (2014), owlande and Mathenge (2012) and Matungul*et al.* (2001) found that membership to cooperative direct relation with amount of marketable supply.Their result indicated that membership of farmer to farmer based organization increase information necessary to production and marketing and strengthens farmers lobbying and bargaining power and facilitate institutional solutionsto some problem and coordination for those households who were members of cooperatives wereincreased the amount of their produce.So it was expected to affect wheat volume of wheatsold positively.

Access to market information (**ACMKT-INF**): It is a dummy variable and assigned as 1 for those households who have access to market information and 0, otherwise. Farmers marketing decisions are based on market price, supply and demand information, and poorly integrated markets may convey inaccurate and inadequate information on price, number demanded and supplied as well as quality. Nega*et al.* (2015) revealed that access to market information was positively related to household market participation and market supply. Thus it was expected that access to market information affects positively volume of wheat sold.

Quantity produced (QUANPROD): It is a continuous variable which is measured in quintals (Qnt), when the amount of wheat produced during the year is increased, the farmer household decides to sold it in large amounts which increases his/her supply curve for the market and when the quantity produced during the year is decreased the farmer decides to sale wheat for the market in small amount or decides not to sold and use it for family consumption and farm services. Sultan (2016) found similar idea. Mohammad (2011), Kindie (2007), Bosena (2008), and Assefa (2009), who found that the amount of wheat, grain, rice,

red pepper, respectively, produced by household affected marketable volume of each of the commodity significantly and positively. Therefore, this study hypothesized that quantity produced of wheat affects wheat sold volume positively.

Wheat farming experience (FARMEXP): It is a continuous variable and measured in number of years stayed in wheat production and marketingor value addition related business running. A household with better experience in wheat production is expected to produce more amounts of wheat and, as result, he/she is expected to supply more amounts of wheat to market than those with only less experience. Farmers with longer farming experience are expected to be more knowledgeable and skillful According to Tadese*et al*. (2016) study indicated that the increase of Teff farming experience increases teffsold volume. Abraham (2013) andAyelech (2011) proved that farmers who have more experience provide more of their potato product to market. Therefore, this study hypothesized that farming experience affects sold volume of wheatpositively.

Education of the household head (EDUHH): This variable was measured using years of attending formal schooling of the household head and hypothesized to affect volume sold positively. Sultan (2016), has indicated that the household head level of education affects marketable volume of wheat significantly and positively. According to Tadese*et al.* (2016) also identified that farming experience and literacy status of household head were statistically significant factors influencing farmers' market supply. So it was expected to affect positively volume of wheat sold.

Sex of household head (SEXHH): This is dummy variable that takes a value of 1 if the household head is male and zero otherwise. This variable help in this study to understand whether male or female are significantly affecting wheat marketable volume. Dawit (2010) revealed that sex of the household head is affect the volume of sold.In this study hypothesized that male headed farm household positively affects sold volume of wheat.

Livestock ownership (LIVOWN): It is a continuous variable which is measured in TLU which plays major role to increase wheat production which is directly involved to raise the ability of farmer to participate in wheat supply for the market in large amount. Having large

number of livestock contributes positively raising of wheat sold volume to the market.Farmer those who have large number of oxen can easily plough land which is proposed to be cultivated for wheat production in large amount which directly contributes to participate in marketable volume and value addition of the crop.Haymanot (2014),Tura (2015) and Sultan (2016) their result indicated that having more TLU is positively related to supplying more volume of wheat to the market. So the study expected that it affects positively volume of wheat sold.

Lagged market prices (LMKPW): This is categorical variable that measure ashigh, medium and low price per quintal of last year of wheat a market. It is a one year lagged price of wheat which might be high, medium or low. When wheat price is high in the market in the previous year, farmers would be interested to produce and supply more. The study of Hymanot (2014) and Muhammed (2011) showed that the lag product price has direct relations with sales volume.Therefore, price is expected to have positive relation with volume sold.

Frequency of extension contact (EXTCON): it is a continuous variable and measured by number of visits made by the extension agents to sample households with in a month. Extension visits will help to reinforce the message and enhance the accuracy of implementation of the technology packages. More frequent DA visits, using different extension teaching methods like attending demonstrations, field day, and participation on on-farm trials can help the farmers to adopt a new technology.The finding of Rehima (2006) identified that extension visit was positively related to pepper market entry decision and marketed pepper volume. Sultan (2016) found that access to agricultural information services makes farmers to be aware of and get better understanding and ultimately leads to decision to take risk for improved agricultural practices. So this study expected that, it affects volume of wheat sold positively.

Table 2: Summary of variables definition and working hypothesis

Independent Variables	Definition	Type	Measurement	Expected Sign
NONFARIN	Non-farm income	Continuous	In ET Birr	+
FSIZE	Family size	Continuous	In number of family member	+
ACMKT-INF	Access to market information	Dummy	1, if household is access to market information, 0 otherwise	+
COOPMRSP	Membership to cooperative	Dummy	1, if household if member,0 otherwise	+
CRDUS	Credit used	Dummy	1, if used, 0 other wise	+
QTYPROD	Quantity of wheat produced	Continuous	In quintal	+
FARMEXP	Farm experience	Continuous	In years of start farming	+
EDUHH	Educational level of household head	continuous	In years of attending school	+
LPWET	Lagged price of wheat	Categorical	1, if high, 0 other wise	+
SEXHH	Sex of household head	Dummy	1 for male, 0 for female	+
LAWET	Land allocated for wheat	Continuous	In hectares	+
LIVOWN	Livestock ownership	Continuous	TLU	+
EXCONT	Frequency of extension contact	continuous	number of contact per month	+
DISMKT	Distance to the market	continuous	Measured in Kilometers	-

Source: Own design (2017). *Expected sign shows sales volume of wheat

4. RESULTS AND DISCUSSION

This chapter of the thesis deals with results and discussion of the findings from descriptive and econometric analyses. Description of wheat value chain actors, their functions and relationships among them are discussed in detail. The chapter also deals with the analysis of marketing margin of actors, and results of econometric analysis which contains the determinants of volume of wheat sold by using multiple linear regression modelalso presented and discussed.

4.1. Socio-Demographic Characteristics of Sample Farmers

In this section, socio-demographic characteristics of farmers (demographic characteristics, market, extension, credit and information access, farming and non-farming experience, income, resource ownership, production, and input used.) are discussed one after the other.

4.1.1. Demographic characteristics of sample farmers

Descriptive statistics of the demographic characteristics of farmers defined in terms of sex, education level, age, farming experience and family size of household head are presented in Table 3.

Table 3: Demographic characteristics of the sample households both for continuous and dummy variable

Continuous Variable	Mean	Std. Dev.	Min	Max
Age of house hold head	42.01	10.25	19	67
Family size of house hold	6	2	1	17
Education of house hold in years of schooling	2.24	2.46	0	10
Farming experience in years of wheat production	13.71	6.7	2	35

Dummy Variable Frequency Percent			
Sex of household head	Female	41	20.5
	Male	160	79.5

Out of the total interviewed wheat producers 79.5% were male-headed households and only 20.5 % were female-headed.

Age of the household head is one of the demographic factor which affects the amount of wheat produced and marketed. Accordingly, the minimum and maximum ages of the sample farmers were 19 and 67 years respectively with mean age of 42.01 years (Table 3).

family size. The average family size and active labor in the study area were 6 and 4 with standard deviations of 2and 2 respectively.

Educational background of the sample household heads is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. Also it is affect technology adoption decision. It plays major role in decision-making processes that change people life. More educated farmers are expected to adopt new technologies to increase their land and labor productivity. Educational status of the sample household heads in the study area ranges from illiteracy to grade 10 completed (Table 3).

Farming experience is taken to be the number of years that an individual was continuously engaged in wheat production. The sampled respondents have an average of 13.71 years of farming experience in wheat production with a standard deviation of 6.75 (Table 3). In study area, those farmers having more experience are more knowledgeable on efficient marketing activities and producing large quintals of wheat per acre of land which helps them to increase volume of wheat supplied for market than those less experienced farmers

4.1.2. Socio-economic characteristics of farmers

Table 4: presents Socio-economic characteristics of sample producers both for continuous and dummy variables

Continuous variable	Mean	Std. Dev.	Min	Max
Total land size of household	4.480	3.28	1	23.54
Land allocated for wheat	2.831	3.310	0.5	14.75
Quantity of wheat produced in quintals	119.605	66.098	11	370
TLU	10.554	6.78	1.25	45.02
Annual farm income	47126.8	1154	1800	191211.3
Income from sales of wheat	24879.71	758.88	1000	71335.6
Income from sales of other cash crop	9937.67	277.28	0	11234.3
Income from sales of livestock	11200.25	211.71	0	14595.4
Non-farm income	2471.714	153.59	0	10342.7

Dummy Variable	Frequency	Percent
Source of income of household Agriculture	160	79.50
Agriculture and trade 41		20.50
Total		100.00

Land is one of the most important factors of physical input of agricultural production for rural households whose primary means of livelihoods is farming and measure of wealth in the study area. It is important factors that determining agricultural production and market participation of households. It is the main source of income and increases the status of people in the community and land size allocated for the crop of interest shows how farmers intended to produce the commodity. The local unit of measurement for land size in the study area is "*middee* or *tindi*" which is one *middee* equal to 0.166 hectare or one hectare equal to 6 *middee*. Sample farm households owned an average of 4.48 ha of farm land. The average wheat production area was 2.83 ha in the year 2017/18(Table 4). In the district, farmers those who have large land size participates in supplying larger volume of wheat for the market. Almost all of the sample respondents indicated that they are participating in wheat production and marketing activity. In general, small farm land restricts them to produce the amount and type of wheat they need, which determine volume of wheat thesold market. The production of wheat is the main source of cash for farmers in the study area. Production of wheat in the study area is a rain-fed with two seasons in a year harvest.

The survey result shows that quantity of wheatproduced affects quantity of wheat sold to the market. From sampled households those who produces many quintals of wheatsearches for better market price and gathers market information on price charged for their products and quality expected by traders from them. In the study area quantity of wheatproduced during 2017 by sample households were 119.605quintals.

The total annual income of the households in study area is a function of other farm income, livestock, wheat productions and employment on off-farm/non-farm activities. Also the household cash income was estimated based on the sales of other crops, wheat, livestock and their products and off-farm income that the farmer or any of the household members earned in the year. The total income from other cash crop income sources of sample respondents was

Birr 9937.67.The average total income from wheat income sources of sample respondents was Birr 24, 879.71. The total income from sale of livestock income sources of sample respondents was 11, 200.25Birr/year.

The average annual farm income of sample respondents was birr 47,126.8(Table 4). The livelihood of rural farm households mainly relies on agriculture. Farming or agriculture was the main occupation and source of livelihood for all sample producers where the major ones are crop production and animal husbandry that requires more labor for various activities like land preparation, planting, weeding, cultivation, harvesting, threshing, animal keeping, fetching water and fire wood collection and so on. Moreover, in addition to the farming activities, some respondents have also engaged in non-farm activities like minor trading and transport services using donkey and horse carts to earn additional income.

Those farmers who earn non-farm income by participating in non-farm activities supplies less amount of their wheat products i.e. they prefer to store, expects its future price increases and uses more of it for family consumption and prefers for efficient markets. The total income from non-farm income sources of sample respondents was 2471.714/year with standard deviation of 153.59 (Table 4).

Farm animals have a key role in rural economy. They are source of food, such as, milk and meat, cash, animal dung for organic fertilizer and fuel and means of traction power. Beside this, livestock are important sources of cash in rural areas to allow purchase of farm inputs and to finance value adding activities (combiner harvesting, storage facilities, transport facilities and the like) thereby increase quantity sale of producers. Having large number of livestock in study area is seen as a dignity or store of value and easy for those households to prepare their own organic fertilizer from dung's of livestock which contributes to increase wheatproductivity and increases volume of wheatsold to the market. To assess the livestock holding of each household, the Tropical Livestock unit (TLU) per household was calculated. From sampled households the maximum and mean of TLU owned is 45.02 and 6.78 respectively and shown in (Table 4). The types of livestock found in the study area were cattle, horse, donkey, mule, sheep, goat, bee colony and poultry chicken.

4.1.3 Institutional factor

Provision of extension service: The rural extension services are on the verge of a major shift in extension service delivery through the farmer training center system. Access to agricultural extension services is expected to have direct influence on the production and marketing behavior of the farmers. The higher access to the extension service, the more likely that farmer adopt new technology and innovation and also it provides assistance for farmer's, improvement of production and productivity; it also enables flow of information and transfer of knowledge and scientific findings to practice. Making contact with agricultural information services makes farmers to be aware of and get better understanding and ultimately leads to decision to take risk for improved agricultural practices. In addition, proper contact with agricultural extension agents helps to facilitate dissemination and adoption of improved technologies and ensure the local availability of these technologies for the majority of smallholders.

Table 5. Institutional factors of house hold both for Continuous and dummy variable.

Continuous Variable		Obs	Mean	Std. Dev.	Min	Max
Frequency of extension contact in month		201	2.462	1.4	1	7
Distance from the nearest market in kilometers		201	8.59	2.8	2	15
Dummy Variables	**Response**	**Freq.**	**Percent**			
Accessibility of credit	no	15	7.5			
	yes	186	93			
Utilization of credit	No	151	75.50			
	Yes	50	25.0			
Access to market information	No	7	3.50			
	Yes	194	97.0			
Membership to cooperative	no	70	35.00			
	yes	131	65.5			
Perception on lagged price of wheat	Low	96	48.00			
	medium	56	28.00			
	High	48	24.00			

To this end, the government has been attempting to fill the required knowledge and achieve food self-sufficiency in the country by placing in each Kebele administration three development agents (DAs) and building a farmer training center (FTC). The kebele level development agents are the most important sources of extension services to transfer agricultural technologies and innovations to farmers. The effort to disseminate new agricultural technologies is influenced by the efficiency of communication between the development (change) agent and the farmers at grassroots level. From the sampled households the minimum and maximum number of farmers contact with extension agents is 1 and 7 times respectively with a mean contact of 2.5 times monthly (Table 5).

Distance from producer's house to the nearby market was also the other factor which determines producer's participation in wheat marketing. District market is taken as market center because of almost all of sampled farmers sold their wheat product at district market. The study result indicated that sample producers in the study area travels average distances ranging from 2 to 15 kilometers to reach the market center (district market) with mean distance from district market of 8.59 kilometers as shown in Table 5.

Credit is an imperative source for financing the agricultural activities of smallholder farmers' credit and it is one way of improving smallholder farmers' production and productivity. Farmers' ability to purchase inputs such as improved seed, weed killers and fertilizer is tied with access to credit. Farmers having better access to credit can minimize their financial constraints and buy inputs more readily than those with no access to credit. (Table 5) shows that 93% of respondents have access to credit. However, only 25 % of the respondents have taken credit from the available sources in the study area, mainly due to religion or lack of interest free credit service and self-sufficiency. In study area the major source of credit service is Oromia Credit and Saving Institution and others sources such as cooperatives, local money lenders and microfinance are less contributors of credit provision for farmers in study area in comparison to Oromia Credit and Saving Institutions. However, the credit provision is based on group collateral but farmers are not much interested in this way in order not to pay for defaulters in their group.

Provision of market information: Access to timely and accurate market information is the basic element not only in wheat market but also in other commodity marketing. For farmers, knowing where and when to sell their output is one of the most difficult challenges and their marketing decisions are based on market price information, and poorly integrated markets may convey inaccurate price information, leading to inefficient product movement. If they have no knowledge of current market prices, they can easily be misused. Price obtained by producer depends on the reliability, source and channels of market information. It has been postulated that farmers will choose a profitable mode of transaction if they can receive reliable market information on the prevailing market conditions. Among sampled households 3.5% of household heads are not accesses to market information while 96.5% has access to market information from neighbors, radios, and traders on prices, quality, and market demands for their products (Table 5).

Membership to cooperatives improve understanding of members about market and strengthen the relationship among the members. Of the total interviewed sample respondents 65.5% were members of farmer primary cooperatives while 35% were not members of farmer primary cooperatives.

Perception on lagged price of wheat affect the quantity of wheat supplied to market, if the price is high, the producer produces more and supply. The product price has direct relations with marketed surplus and hence, it affected the household marketed supply of wheat positively in such a way that prices of 2016/17 can stimulate production of wheat in 2017/2018, and thus marketed surplus for 2017/18.

4.1.4. Input utilization

The most physical inputs used by farmers of the study area are fertilizer, seed, herbicides and pesticides. These inputs are supplied to farmers either by agricultural bureau, cooperative/unions and private traders. Cooperatives and private traders are major suppliers of inputs for producers in the study area. Government (National Input Supply Enterprise) supplies to the unions with DAP and Urea fertilizers, other chemicals (pesticides and herbicides) and improved seed and then the unions can either sell to primary cooperatives,

state farm, university, national and international research institutions or sell directly to investors who are engaged agricultural activities. Inputs application rate is one of the most important agricultural practices that are used by wheat growers in the study area. Moreover, proper application of the recommended input rate is important to obtain the required production and marketable supply. However, farmers in the study area apply inputs at varying rate, which is below the blanket recommended rate given by district agricultural office and Sinana Agricultural Research Centre. The recommended rate given by Sinana Agricultural Research Centre and district agricultural office is to apply 100kg of DAP (NPS) and 50kg of UREA, 150kg of wheat seed, 50kg of herbicide and 50kg of pesticideper hectare.

Table 6:Sum of input utilized with maximum and minimum application rate of sampledhousehold per hectare and recommended standard per hectare of the district

Input and its amount in Qnt/liter/hec	Sum	Mean	Std. Dev	Min	Max	Recommended
Improved seed	356.49	10.23	5.68	1.5	2.5	1.5
DAP s	250.96	3.78	1.64	0.5	1.5	1.00
UREA	150.77	2.69	2.26	0	1.0	0.5
herbicides	229.15	2.76	1.89	0.5	1.5	0.5
pesticides	124.54	1.83	3.61	0	1.5	0.5

Table 7: Farmers input suppliers

Input source	Freq.	Percent.
from agricultural office	56	28.00
Cooperative	61	30.50
Private traders	83	41.50

Harvesting and threshing

In the study area, a wheat harvesting and threshing are mostly done by combine harvesters and sometimes at summer season of production they were use family labor. All sample respondents reported to have used combine harvester. The average cost for renting a combine harvester is about 48.55 Birr per quintal of wheat grain harvested. Other combine harvesting cost include improper harvesting like the driver did not had interest to harvest from small elevated kind of farm land rather than leaving it for animal feed, no common method of paying cost for harvester rather depending on the productivity of wheat (i.e.it may per quintal

or per hectare, it is decided by the interest of driver based on the attractiveness of the crop standing on the farm if wheat on farm attract people or it looks like good it will be paid per quintal and if not seems good it will be paid per hectare), transportation cost from the farm to producer's storage place. According to focus group discussion, participant producers said since all wheat producers used combine harvester, the owners of the combine harvesters sometimes increase cost of harvesting. This is because all producers need combine harvester at similar time period (harvesting time) and these lead producers for unnecessary competition like giving bribe for the driver.

4.1.5. Demographic Characteristics of Sample Traders

These are characteristics of wheat traders which affect the trading of wheat in the study area such as sex, age, family size, marital status of traders, trading experience, literacy status, and access to credit, initial working capital, current working capital and others.

Age is one of the demographic factors that is useful to describe traders experience and networking. The age of sample traders ranged from 23 to 54 years. The average age of all sample traders was 38.25 years and its standard deviation was 6.26. With respect to the sex, unfortunately all sample traders were male. Table 6 depicted that 98.53% of sample traders were married. Moreover, 73.53% of sample traders were Muslim and 26.47% were orthodox Christians. Experience plays an important role in improving trading activities and marketing efficiency. The trading experience of sample traders ranges from 2 up to 26 years (Table 6). The average trading experience of sample traders' respondents was 10.07 years and the standard deviation was 5.81.

The average family size of all sample traders was 5 with standard deviation of 1.94. The family size of sample traders ranged from 2 and 9 years. Table 6 also depicted that the educational level of sample traders ranged from grade 0 (illiterate) to grade 11. The average educational level of the sample traders was 6.44 with standard deviation of 2.86. Table 6 revealed that the average nominal value of current working capital of sample traders (Birr 2 million) was much higher than their initial working capital of Birr 150,000. The initial average working capital of traders ranged from Birr 2000 to 150,000 with the average amount

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of Birr 30,2,65.03. Likewise, the amount of traders' current working capital ranged from Birr 5000 to 2,000,000 with an average amount of Birr 342,426.5. Furthermore, all sample traders used their own capital for trading activities.

Table 8: Demographic characteristics of traders

Continuous Variable	Obs	Mean	Std. Dev.	Min	Max
Age	68	38.25	6.263	23	54
Family size	68	5	1.931	2	9
Educational level	68	6.441	2.861	0	11
Experience of wheat trading	68	10.073	5.811	2	26
Initial working capital	68	30265.03	42616.06	2,000	1,50,000
Current working capital	68	342426.5	538972.6	5,000	2,000,000

Dummy variable		Freq.	Percent
Sex	Female	0	0
	Male	68	100
Marital status	Married	67	98.53
	Single	1	100.00
Religion	Muslim	50	73.53
	Orthodox	18	26.47
Accessibility of credit	Adequate	40	58.82
	Not Adequate	28	41.18
Total		68	100.00

Source; own survey result 2018

4.2. Result of Value Chain Analysis

According to the VCA framework, the actors in the value chain refer to those individuals or entities who engage in a transaction for moving a product from inception to end use. They must exchange money (or an equivalent service) as well as a product, which generally increases in value with each transaction (Campbell, 2008).

Based on the survey result the primary wheat value chain actors are those functions which have directly involved in the production, processing and distribution of the product. These actors are input suppliers, producers, farmer primary cooperatives, assemblers, union, local collectors, wholesalers, processors, retailers and ultimate consumers. Whereas the supportive

actors are those not directly involved in production and movement of the product, but they have significant impact on the quality, efficiency of production and distribution. Support activities serve as the value chain's enabling environment. These actors are finance providers, research centers, government, cooperatives, union, district administrators and the like. In general, actors and their role are described as follows:

4.2.1. Wheat value chain operators (Direct actors) and their characteristics

Input suppliers: This segment of the value chain consists of the actors in the value chain that provides inputs like seed, fertilizer, herbicide and pesticide. Value chain function starts providing inputs that used to produce wheat and value added products. There are many actors who are involved directly or indirectly in agricultural input supply in the district. Currently, according to the collected data the district primary cooperatives and union, district bureau of agriculture (DBoA), OoARD, Oromia seed enterprise (OSE), Sinana Agricultural Research Center (SARC), District Administrations,traders/ private input suppliers/ and NGOs.

Producers: Wheat producers are the main actors who perform most of the value chain functions right from farm inputs, preparation of their farms or procurement of the inputs from other sources to post-harvest handling and marketing. The major farming and value adding activities that wheat producers perform include input preparation, ploughing, sowing, fertilizing, weeding, pest/disease controlling, harvesting and post-harvest handling.

Assemblers: Assemblers play an important role in collecting produce from smallholder producers at farm gate and delivering to wholesalers at different levels. They are the first actor that links producers to other participating traders. The major market places where wheat assemblers in and around the district undertake transactions are: Robe, Ali, Agarfa town, Gasera town, Birbirsa, Shallo, Maliyu and Homa.

Cooperatives: Cooperatives were established in the district with the aim of increasing farmers' bargaining power and their profit share in the chain exchange processes. Among these, three primary cooperatives from three sample kebeles (WaldaahojiigamtaaQonnamaraa Ali kejewa from Ali, Walta'iiQonnamera from Ilani, EeleBiduWaldaQonnaMaraafrom EeleBidu.) were surveyed in this study area. The cooperative is governed by elected members

that negotiate on purchase price with the producers and bargain selling price with processors with assist of their union.

They keep stocks using both members' working capital and loan. According to the survey result, the existence of cooperatives in wheat value chain has two functions. Initially, cooperatives perform as supporting actors who brings inputs from Sinana agricultural research center and other supplier by adding transport and other costs and then resale it to both member and non-member wheat producers. Secondly, cooperatives are acting as major actors of wheat value chain that has a stabilizing role in the local market through purchasing the product with fair price against other traders in the district additionally, plays major role by free storing smallholders wheat produces in cooperatives ware house for it is member until it is prepared for sale. Whoever whomwant be cooperative member should be free from alcoholic drink and should have constructive idea for the organization is other law of to be cooperative member ship.

Wholesalers: these were those participants of the marketing system who used to buy wheat on the farm field with a larger volume than other actors. They are traders who have permanent market place or stores and may or may not move from one market to another to buy and resale grains. Wholesalers buy wheat grain mainly from individual farmers, some collectors/small traders and a few other wholesalers within and around the district. Like that they also sell grain to individual farmers, processors, collectors and wholesalers from and within the district and outside district.

Processors: They entail the transformation of wheat into a variety of value-added products including flour, macaroni, cake and biscuits in and around the Zone. Wheat processors are the key towards improving wheat quality as well as increasing the volume of domestically produced wheat products sold to consumers. Currently, out of six wheat processors these found in Robe Town sampled for this study, only one processor is make macaroni. The surveyed flour and macaroni processors purchase wheat grain from individual farmers, cooperatives, wholesalers, university and commission agents within the district and the surrounding districts.

On average, 4,67,740 kg is purchased per week per flour processor and 1,52, 453 per macaroni factory. The main sources of wheat for factories are Gasera, Agarfa Sinana, Gindhir, Goro, and Adaba districts by buyer who use hired vehicles. Some suppliers pick wheat to processors by using their own vehicles. Processors process grains into flour as well as wheat macaroni before selling to end consumers, retailers and wholesalers. On the other hand, bakeries process flour into bread, cakes, and/or cookies and then sell to end consumers. All processors have stores with capacities of 360,000 kg for flour processors, 320,000 kg for macaroni and 280,000 kg for bakeries. The highest grain supplies to processors are made at peak season of the produce (January to March) while the situation is at its worst in between July to November where there is low supply of wheat to the market. Processors engage in grading, labelling and packaging before selling the products. The value added is reflected by the differences in prices charged per kilogram of processed products. Limited domestic wheat supply, quality problem, tax regulation problem, input and output price fluctuation, shortage of raw materials like ferns oil, packing materials etc. are the major challenges that the processors encountered.

Retailer: Retailers in the study area mostly purchase wheat from producers, cooperatives, wholesalersand also flour from wheat processors. This is one of the final relations or links in the chain that delivers wheat or wheat products to consumers or end users. They are the last link between producers or processors and consumers. They mostly buy directly from farmers and processors and sell to consumers. Sometimes they could also buy from wholesalers and cooperatives and sell to consumers.

Wheat consumers: Consumers are those purchasing the wheat produce for consumption. About three types of wheat consumers were identified: households, higher education institutions, prison house and hospitals. The private consumers are employees, and urban and rural dwellers who produce or purchase and consume wheat.

4.2.2. The enabling environment / supporting actors/

Defines the boundaries of what is possible. They are globally imposed, but affect the performance of local value chains. It is the dominant factor limiting the

competitivenesspotential of wheat value chain. In analyzing the enabling environment in value chain analysis it is essential to look at the environment affecting wheat value chain ability to serve all its final markets. The enabling environment consists of the critical factors and trends that are shaping the value chain environment and operating conditions, but that may be amenable to change. The purpose of charting this enabling environment is to understand the trends that are affecting the entire value chain and to examine the powers and interests that are driving change. Sinana agricultural research center (SARC), Oromia Credit and Saving Institution, Bank, District Office of Agriculture, Oromia Seed Enterprise, Cooperatives and Union, Oromia, Oromia office of Trade and Industry, NGO's and private traders are the major wheat value chain enablers/supporters/ in the district. Among the above mentioned supportive actors major are discussed below.

Value chain finance is financial products and services that flow to or through a value chain to increase returns on investment and growth and competitiveness of that value chain (Schiff and Stallard 2009). The study indicated that formal credit (Oromia Credit and Saving institution and Bank) and Informal Credit (Cooperatives and Union, NGOs and Traders) are major sources of finance in the district. Both sources contribute in wheat value chain improvement. However, high collateral requirements, long credit process, lack of interest free credit services and limited number of credit institutions are the major challenges that discourage the users in the area.

Sinana Agricultural Research Center (SARC) is mandated for the highland and lowlands of Bale and working to generate gain, and popularize agricultural technologies for the farming communities of the area. The study indicates that SARC provides improved seed varieties and technical knowledge for the district wheat seed producers, cooperatives and union. Beside it facilitates laboratory sampling testing services for the district union thereby creates linkage with processors.

Bureau of District Trade and Industry: It plays a major role in coordinating all private and cooperative/union traders by providing licenses, training, collecting legal payments from traders to increase government revenue for public welfare. This organization coordinates and

manages each and every each of wheat traders in the district and works to create competent firms who create job opportunity for next generation in a sustainable manner.

Oromia Credit and Saving Institution: It is a part of microfinance institution which provides credit services for smallholder wheat producers in the study area. It is a major source of financial service for farmers and it stands to finance smallholders and financially inefficient actors. Even though there is accessibility, all farmers are not using from this institution because of lack of interest free credit services in the district.

Bureau of District Agriculture and Natural resources management: This actor plays an important role in improving wheat productivity and volume sold of wheat to satisfy highly increasing population demand. This sector working for wheat productivity by structuring, providing and coordinating extension service or development agents for each kebele households under their supervision. This organization provides training, adoption of new technologies of production, input in collaboration with cooperatives/unions such as fertilizer, herbicides, pesticide and improved seeds and with their appropriate method of application on field to increase productivityof wheat and to change traditional farming system to modernized one in the district.

Banks: It is the most financial source for cooperatives and input suppliers of wheat production. But this sector is not providing credit service for smallholder farmers because they lack collateral assets and the sector was not working in rural areas to finance this important crop for both national economy and consumption.

Cooperatives/Union: cooperatives jointly established one union in the district named as "Ali union" which located in Ali kebele for the purpose of increasing producers barging power or profitability and supplying the large volume of wheat to the traders. As stated earlier they stand for two functions: purchasing input (specially improved seed,fertilizer and chemicals) based on input demand from government and NGO's and DBoA following and auction process. Ultimately, they distribute the purchased input to DBoA and sale inputs directly to producers at cooperatives and union office. Furthermore, the availability of seed cleaner

machine also plays vital role on quality of the seed there by increase the quality of final produce of wheat in the area.

4.2.3. Value chain map of wheat

Functional and institutional analysis approach of a value chain mapping was used to identify the different actors involved in the wheat value chain, and to understand their roles and linkages. For this study identified actors, their functions, supporters, information and money flow between actors, input and service flow and product flow was included. The current value chain map of wheatin Agarfa district is depicted according to the figure below. Service, product, input and information flows between each actor through buying and selling as well as giving credit and selling the product as a credit for each other and while product flows to one way from one actor to others.

But the flow of information and money between actors for the study area was mapped by using two-way dash arrows because of the flow of information and money between actors were not efficient. Input and service flow was mapped by one arrow (one direction) which indicates inputs flows from suppliers to farmer for production rather than more exchange activities and also service flows on one direction especially from district bureau of agriculture and natural resources and unions. And also product flows on one direction on each channel from producer to consumers. The below map of wheatvalue chain in study area also shows respective functions of actors along the value chain.
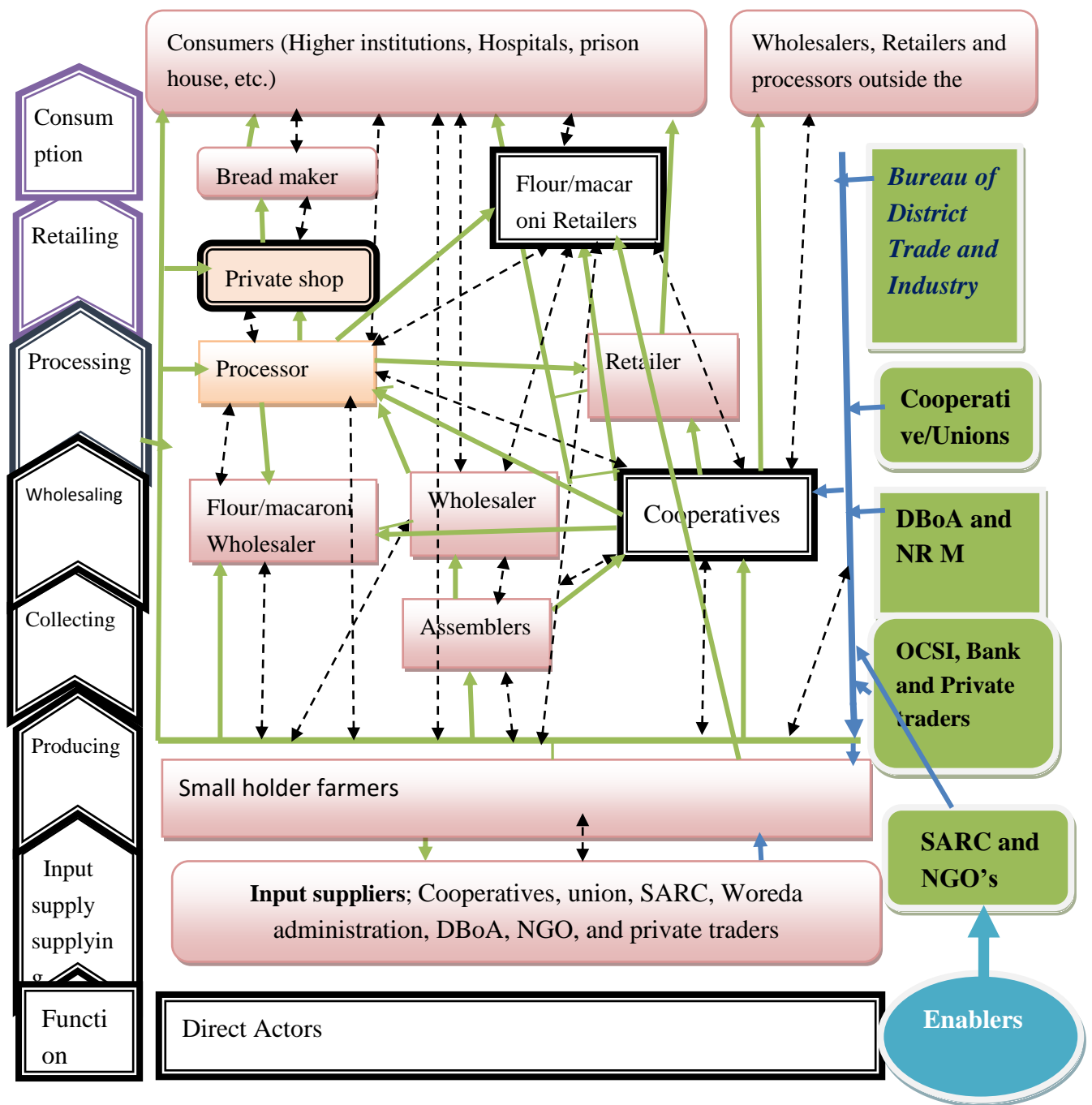
Figure 4 Value chain maps of wheat in study area

Where; ⟶ Input and service flow

⟶ Product flow

◄┈┈┈┈┈┈┈►Flow of information and money along the wheat value chain

4.2.4. Value chain governance

Governance refers to the way business activities in a value chain are vertically coit is a dynamic feature of value chains that characterizes the relationships or linkages among stake-

holders in the chain. So it is important as it relates to the ability of a stakeholder to determine, control and/or coordinate the activities of other actors in the value added chain. At any point in the chain, a firm (or organization or institution) can set parameters under which others in the chain operate. Governance is important for the generation, transfer and diffusion of knowledge leading to innovation, which enables firms to improve their performance and sustain competitive advantage.

Therefore, Power asymmetry is central to value chain governance. Accordingly, the dominant value chain actors play facilitation role. They determine the flow of commodities 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. The study result from key informal and focus group discussions indicate that the whole wheat value chain is governed by processors. Processors usually have strict quality standards/parameters/ and expect their wheat suppliers to meet these standards. Thus, processors fixe the price based on their quality requirements while they purchase wheat. Moreover, processors fixe price of their value added products (Flour and macaroni) as they distribute. Processors are always complaining that the traders are not providing quality wheat while traders are blaming the processors for offering low prices. Due to limited capital capacity of farmer primary cooperatives and union, producers are not governing the value chain. Hence, they are price takers.

There is no significant vertical linkage between producers and other actors along the value chain. However, there is small extent of horizontal linkage between producers with producers, cooperatives with union, and traders with traders. Overall, the governance of the wheat value chain in the district is in line with the statement of developing countries governance structure which describes or says that those chains where the critical governing role is played by a buyer at thetop of the chain or simply it is buyer driven chain which Power asymmetry is in the hands of processors.

Table 9: Farmer's response on price determination

Variables	Responses	Frequency	Percent
how much adequate market information did you get?	Adequate	0.00	0.00
	Medium	125	62.5
	Low	70	35.0
	No	6.00	3.50
What is your Decision if price of wheat falls at the market?	Take back to home	56	28.0
	Sold at low price	135	67.5
	Sold at another market	10	5.00
how much did you trust buyer?	Very trusted	35	14.5
	Moderately trusted	41	20.5
	Little trusted	81	40.5
	no trusted	43	21.5
Do you have linkage with buyers?	No	81	40.5
	Yes	46	23.5
Did you get any difficulty to find buyers?	No	170	85.0
	Yes	31	15.5
By whom price sated?	Buyers	125	68.5
	Farmers	11	5.50
	Market demand and supply	46	23.0
	Negotiations	33	16.5

4.2.5. Value chain upgrading

As discussed in chapter two of this paper from the definition of (Kaplinsky 2002) value chain upgrading is a process oftrading up, which allows poor people to access viable value chains or improve their position in existing value chains or it is the innovation that increases firm and/or value chain competitiveness which can be resulted in organizational improvements and it is commonly similar to the advanced value chain development. Kaplinsky (2002) distinguishes that four categories of upgrading: Process upgrading, Product upgrading, Functional upgrading and Intrasectoral upgrading here no need of defining each up grading types since it was discussed in detail under chapter two.

Having this concept of value chain upgrading I have tried to over view the types of value chain upgrading that exists in wheat value chain of Agarfa district. So that, in the district some of the sampled producers and other actors in wheat value chain were engaged in some value chain upgrading activities. Changes like use ofinput supplies such as appropriate application of fertilizer, pesticides, herbicidesper hectare to increase production and to prevent different diseases and insects,crop diversification, and improved seed used have been

seen behind small number of producers. Some of producers were used improved seed for production of both types of wheat (bread and durum wheat) Bulala, Tasfaye, AlamxenaHetosa, Lemu:these are some of improved varieties of bread and durum wheat practiced by some producers in the district but saying this is not there was appropriate improved seed supply. Thus the use of improved seed, pest side, insecticide and fertilizer by smallholder producers may be considered as product and process upgrading which introduces new products and increasing efficiency of internal process for production.

In the study area almost all sampled respondents used herbicides, pesticides and fertilizer to increase productivity of wheat. Upgrading entails not only improvements in process or products, but also endowment inknowhow, experience, human and capital resource, equipment and promising work situations.

However, when analyzing the status of farmers inall types of upgrading it shows too poor because of many draw backs: high cost of input,inadequate extension contact and service, shortage of input supply and low price of their produce which prevents them from entering into the new marketing channel of the commodity and to new level in the chain which implies there were no intersectoral and   functional upgrading in the district.

 In the studyarea upgrading and work for up grading is too low specially in the area of making the producers profit able, by minimizing different production and marketing cost and maximizing their market share, profit share and revenues to allow them entering into new value chain level or to new market channels in the chain. functions, interaction between actors, improving win-win strategies, and improvement of poor participation and the way wheatmarket is functioning is not proficient.

Table 10: Upgrading activity performed by wheat producers

Variables	Responses	Frequency	Percent
Types of seed used	Local seed	115	57.5
	Improved seed	86	43
Apply fertilizer	Yes	201	100
Apply herbicide	Yes	201	100.00
Use pesticide	Yes	121	60.5
	No	80	40
Differentiation	Yes	135	67.5
	No	66	33.00
Ways of differentiation	By type of wheat	68	34.00
	By Purity of product	78	39.00
	Types of seed (Improved, Local)	45	22.5

4.3. Results of Margin Analysis

4.3.1. Wheat marketing channels

Marketing channel is alternative routes of wheat flow from producers to consumers. It starts at the farm-gate and ends at the consumer's front door. The sequence through which the whole of value chain wheat passes from farmers to consumers. The analysis of marketing channel was intended to provide a systematic knowledge of the flow of the wheat and services from producer to the final destination of ultimate consumers with margin share of actors in each channel. During the survey, the following wheat marketing channels were identified.

During the winter production season of the year, the estimated total production of wheat in the study area was 100,584.6 quintals (CSA, 2017). Out of this total production, wheat marketed was 80,452.67 quintals. From the total quantity marketed, 4985.83qts of wheat was supplied by sampled farmers. As clearly depicted in the figure wheat market channels constructed based on the data collected from markets. The survey result obtained revealed that ten marketing channels of wheat were identified. The main receivers from farmers were, wholesalers, cooperatives, assemblers and processors, with an estimated percentage share of 20.3, 27.7, 15.51 and 36.49 percent in that order.

Channel I; Producer → Consumer (543.75) (10.90%)

Channel II: Produce → Wholesaler → Consumer (310.15Qnt)(6.22%)

Channel III: Producer → Assembler → Wholesaler → Consumer (475.24Qnt) (9.53%)

Channel IV: Produce → Cooperatives → Assembler → Wholesaler → Processer → Flour Wholesalers → Retailers → Consumer (805.6Qnt) (16.2%)

Channel V: Producer → Wholesaler → Retailer → Consumer (333.58Qnt) (6.67%)

Channel VI: Producer → Cooperative → Retailer → Consumer (378.69Qnt) (7.6%)

Channel VII: Producer → Retailer → Consumer (220.4Qnt) (4.42%)

Channel VIII: Producer → Wholesaler → Processor → Consumer (402.35Qnt) (8.1%)

Channel IX: Producer → Processor → Consumer (689.69Qnt) (13.83%)

Channel X: Producer → Assembler → Processor → Consumer (794.7Qnt) (15.93%)

Figure 5: Wheat market channels of the study area

Source: Survey result, 2018

4.3.2. Marketing Margin analysis

The performance of wheat market was evaluated by considering associated costs, returns and marketing margins. The methods employed for analysis of performance were channel comparison, profit share and marketing margin. The distribution of costs and gross income is important in wheat value chain. In wheat value chain, actors marketing cost mainly includes the cost of post-harvest activities (harvesting, packaging, grading), loading/unloading and transportation which are incurred before reaching the processor.

Marketing costs and margin

Marketing costs

Wheat producing farmers of the study area incur costs mostly during the production phase rather than during marketing their produce. They incur production cost of 492.29 birr per quintal. The estimated land value, oxen and labor cost is opportunity cost of land which is rental value of land and labor value is hiring value of labor in the study area. Furthermore, in

the study area, wheat is produced using family labor and hired labor. The largest cost item in the study area is input cost which accounts for 39.37 % of total cost of production (Table 11).

Tables 11 and 12 represent different types of cost associated with production, processing and marketing by producers, cooperatives, assemblers, wholesalers, processors and retailers; and the benefit share of each value chain actors.

Though wheat producers received different price, as they sale to cooperatives and local collectors the average price was taken on analysis of benefit share of the actors. Likewise, ultimate consumers purchase from retailers and processers.

Table 11: Production cost/quintal of wheat producers in 2018

Production Cost Items	Cost /quintal (Birr)	Share%
Input; seed, fertilizer (DAP and Urea), pesticide and herbicide	193.76	39.37
Labour for farming activities Plowing, sowing, weeding and input and chemical application	178.6	36.28
Land rent	27.50	5.58
Oxen drafting power	12.73	2.58
Value adding, Combiner harvesting (harvesting, threshing and storing),sack, sisal rope, storing	79.7	16.19
Total	492.29	

Marketing margin is one of the commonly used measure of the performance of a marketing system. It is defined as the difference between the price the consumers pay and the price the producers receive. Computing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer, expressed in percentage (Mendoza, 1995).Gross marketing margin (GMM) is the gap between prices at consecutive levels in the marketing channel. The number of intermediates involved in various channels of the marketing has a strong effect on the marketing margin.

Table 12: Marketing costs and benefit shares of actors in wheat value chain

Items/quintal/birr	Producer	Cooperative	Assembler	Wholesaler	Retailer	Processor	Horizontal sum
Purchasing price	-	770	850	940	1050	1140	4750
Production cost	492.29	-	-	-	-	112	604.29
Marketing cost							
storage cost	1	-	2	0.5	0.2	-	3.7
Loading	3	2.5	2.5	1	-	5	14
Unloading	3	2.5	-	-	4	-	9.5
Transport	20	10	17	19	5	9	80
Loss	40	30	25	20	5	15	135
Overhead cost	5	4	3	2	1	10	25
Packaging	5	5	5	5	-	10	30
Tax	-	3	4	3	3	7.5	20.5
Telephone	-	0.5	-	0.5	0.3	1	2.3
Commission fee	-	-	-	7	-	-	7
Totalmarketingcost	77	57,50	58.50	58	18.50	57.50	327
Total cost	569.29	57.50	58.50	58	18.50	169.5	931.29
Total cost (%)	61.13	6.17	6.28	6.23	1.99	18.2	1
Sale price	693	850	940	1050	1140	1470	6213
Market margin	200.71	80	90	110	90	330	900.71
%share of margin	22.29	8.89	9.99	12.21	9.99	36.63	1
Profit margin	123.71	22.5	31.5	52	71.5	160.5	461.71
% share of profit	26.80	4.87	6.82	11.26	15.49	34.76	1

Each of the wheat value chain actor adds value to the product as the product passes from one actor to another. In a way, the actors change the form of the product through improving the grade by sorting, cleaning, processing, creating space and time utility. Compared to producers, traders' (assemblers, wholesalers, and retailers) operating expense is 4.22 times less than that of producers but their profit share is nearly 1.33 times higher than that of producers. That means by simply buying and selling, traders took 34.89 % share of margin. While producers, performing all the work of producing quality wheat and bearing the associated risks, took only 22.29% share of margin.

Moreover, if we compare producers with processors, processors' operating expense is 3.36 times less than that of producers. However, processor profit margin is 1.3 times higher than that of producers. In addition, out of total operating expenses, producers incurred about 61.13% while 73.2% of the profit share is taken by other value adding actors. Generally, these indicated that disproportionate share of profit is the indication of power asymmetry

relationship among actors. Wheat producers added 26.8% of the total value in the district. Cooperatives, assemblers, wholesalers, retailers, and processors are responsible for 4.87%, 6.82%, 11.26%, 15.49%, and 34.76%, respectively. The price change from wheat producers to consumers is 777 ETB.

Marketing margins of wheat in different channels

The survey results in Table 8 showed the marketing margins in different marketing channels in which actors involved. The total gross marketing margin is highest in channel IV (47.62%), it is channel in which a lot of the actors involved and the next largest TGMM which is 42.18% that occurs at channel X, the reason behind being highest in this channel is large consumer's prices received by processors and the lowest TGMM in channel VII (7.89%) followed by channel II (10.48%). The gross marketing margin of Producer's (GMMp) is highest in channel I which shares 100% from the total consumer's price due to direct sell to consumers without any interference of other actors and lowest in channel IV which is 52.38%. This difference is support theory states that as number of marketing actors increases the producers share decreases. The result also illustrated that the extreme gross marketing margin from traders and processors was taken by processors, which accounts about 36.05 %, of the consumer's price in channel X. The lowest gross marketing margin (5.44%) is taken by cooperatives at channel IV. The net marketing margin is highest at channel IX which is about 36.09% that is captured by processors and the next highest is also obtained by processors themselves which is 24.52% occurred at channels X.

Table 13: Marketing margins of wheat in different channels

Market Margin (%)	I	II	III	IV	V	VI	VII	VIII	IX	X
TGMM	0	10.48	19.05	47.62	17.54	32.46	7.89	36.05	22.45	42.18
GMMp	100	88.52	80.95	52.38	82.46	67.54	92.11	63.95	77.55	57.82
GMMp	-	-	-	5.44	-	24.56	-	-	-	-
GMMa	-	-	8.57	6.12	-	-	-	-	-	19.73
GMMw	-	10.48	10.48	13.61	7.89	-	-	13.61	-	-
GMMr	-	-	-	-	7.89	7.89	-	-	-	-
GMMpr	-	-	-	28.57	-	-	-	28.57	22.45	36.05
NMMc	-	-	-	1.53	-	19.52	-	-	-	-
NMMa	-	-	3	2.17	-	-	-	-	-	15.75
NMMw	-	4.95	4.95	9.66	4.56	-	-	9.66	-	-
NMMr	-	-	-	-	8.03	23.82	6.27	-	-	-
NMMpr	-	-	-	17.04	-	-	-	17.04	36.09	24.52

Note: TGMM is total gross marketing margin, GMMp, GMMc, GMMa, GMMw, GMMr, and GMMpr are gross marketing margins of producers, cooperatives, assemblers, wholesalers, retailers and processors, respectively. NMMc, NMMa, NMMw, NMMr, and NMMpr are net marketing margins of cooperatives, assemblers, wholesalers, retailers and processors, respectively.

4.4. Determinants of Volume of Wheat sold to Market

Factors that affect volume of wheat supplied to the market were identified by using OLS model since all respondents supplied their wheat to the market. fourteen explanatory variables (twelve independent variables and two instrumental variables those which are not correlated with both endogenous and exogenous variables) were included in the model to know their effects on quantity of wheat supplied to the market in the study area. Those hypothesized variables were: Access to market information, family size, credit use, land allocated for wheat production, lagged price of wheat, livestock holdings in Tropical Livestock Unit (TLU), extension contact, experience of household farming in years, membership to cooperatives, income from non-farm activities in ET birr, educational level of household head in years of formal schooling, sex of household, distance from the nearest market centre in kilometer and quantity of wheat produced in quintals.

Breusch Pagan test showed that there was problem of heteroscedasticity because of (chi2 (1) = 17.85, Prob> chi2 = 0.000).Robust regression option was used in STATA13 software to correct heteroscedasticity problem. Multicollinearity problem was also tested using VIF (Variance Inflation Factors) and the result showed that there was no multicollinearity problem since VIF value 2.32 is less than 10 (appendix 4). Coefficient of multiple determinations (R^2) was used to check goodness of fit for the regression model. Hence, R^2 indicates that 82.7% of the variation in the quantity of wheat supplied to the market was explained by the variables included in the model as shown in (Table 14).

Test of endogeneity indicated that the quantity of wheat produced was endogenous to the model. To overcome the problem of endogeneity we have to apply two stages least squares (2SLS) estimations method because instrumental variables are used to cut correlations between the error term and independent variables. The method involves two successive applications. The first stage is made by regressing the suspected endogenous variables over the pre-determined or pure exogenous variables to get their predicted values. Then the predicted values of the endogenous variables in the first stage are used to estimate the supply equation. Here, livestock holding in TLU and land allocated for wheat production were used as instrument to quantity of wheat produced. The instrumental variable should fulfill two requirements to be used as an instrument. One of the requirement was that the instrument must be uncorrelated with the error term and second requirement is that it has to be correlated with the endogenous variable. Secondly, there were linear projection between endogenous variable (Quantity of wheat produced) and exogenous variables was checked for this study. Post estimation after indicated that Wu-Hausman F (1,189)   = 15.6951 (p = 0.0001) and Durbin (score) chi2(1)   = 15.3351 (p = 0.0001), First Stage Summary statistics checked shows that F (2,111) = 14.04 and P=0.000, significant at 1% significance level which shows there is no endogeneity problem of the model. The other issue tested under post estimation endogeneity was test of over identifying restriction and the result showed that the Score chi2 (1) = 1.61395 (p=0.2039) is insignificant and fits the model accordingly and showed no endogeneity problem (Table 14). From fourteen explanatory variables including two instrumental variables six variables such as quantity of wheat produced, memberships to

cooperative, sex of household, lag price of wheat, family size of household and Experience of household heads were affected volume of wheat supplied to the market significantly.

Quantity of wheat produced: It is amount of wheat produced by the farmer in quintals in 2017 production year in the study area. It was hypothesized that quantity produced of wheat was expected to affect volume of wheat supplied to the market positively and significantly. Also the study result indicated that quantity of wheat produced affected quantity supplied to the market positively at 1% significance level. Positive sign of the coefficient indicates that as quantity produced increases by 1 quintal the quantity of wheat supplied to the market increases by an average of 0.553 quintals,other things remaining constant. This result indicates that farmer who produces large quantity of wheat supplies large quantity of produce for the market, because of a farmer that obtains high yield can supply more to the market which is home consumption surplus than a producer who had fewer yields. This result is in line withstudy done by Sultan(2016), Mohammed (2011)and Azeb*et al.,* 2017 who they found that quantity produced affects market supply positively and significantly.

Farming experience of household head: It is a continuous variable measured by years of farming and hypothesized to affect volume of wheat supplied to the market in the study area.It affects volume sold of wheat positively and significantly at 10% significance level. The result suggests that as farmers have high Wheat production experience the amount of wheat sold to the market increased. Thus, the result implied that, as farmer's experience increased by a year, wheat supplied to market increased by an average of 0.362 quintals,citrus paribus.This is because of a household with better experience in wheat production is expected to knowledgeable andskillfullwith regard to wheat production know how and produce more amounts of wheat and, as result, he/she is expected to supply more amounts of wheat to market than those with only lessexperience. Farmers with longer farming experience are expected to be more. This is in line with the result of Tadese*et al*. (2016) who foundthat farmer's experience and the amount of *teff* sold to the market have direct relationship, Abraham (2013) also proved that farmers with more farming experience had provide more of

their vegetable product to market., and Abay(2010) who illustrated as farmer's experience increased the volume of tomato supplied to the market increased.

Family size: It is the number of members living household. The variable affects sales volume ofwheat to the market unexpectedly as it was hypothesized, it showed negatively and significantlyat10% significance level. As the member of household is increased by one, volume of wheat supplied to market is decreased byaverage of0.06 quintals.This is because of, as the number of household members increased, more part of wheat produce is allocated for household consumption. This is in line with the result of Sultan (2016) and Tura (2015) whom their result indicates that as family size of house hold increases theamount of wheat supplied to market is decreased.

Table 14: 2SLS result for factors affecting volume sold of wheat to market.

Variables	Coef.	Robust Std. Err.	P>z
Quantity of wheat produced	0.553***	0.082	0.000
Amount of nonfarm income	-0.001	0.001	0.114
Credit Used	-0.805	4.184	0.847
Distance from the nearest market	-0.568	0.760	0.455
Farming experience of household	0.362*	0.187	0.053
Cooperative membership	9.006**	3.844	0.019
Access to market information	3.138	4.930	0.524
family size of household	-0.062*	0.645	0.084
Sex of household	12.610***	4.751	0.008
Extension contact of house hold	3.125	4.506	0.652
Education status	.119	.681	0.861
Perception to lag wheat price	0.57**	6.451	0.045
Constant	-21.116*	11.180	0.059

Instrumental variables (2SLS) regression, Number of obs =201, Wald chi2 (12) = 1796.50, Prob> chi2 =0.0000, R-squared = 0.827, Root MSE =23.346, Mean vif = 2.32

Source: Survey data computation (2018)

Sex of household head: It is a dummy variable and male headed household were hypothesized to affect volume of wheat supplied to the market positively. The study result indicated that male headed household was positively affected the volume of wheat supplied to the market at 1% significant level. The positive coefficient showed that as the head of the household were being male the volume of wheat supplied to the market increases by an

average of 12.61 quintals, other factors remain constant.This is because of females were mostly participated in child caring, house work and preparing food. Also other explanation for this can be by the fact that males have relatively better labor force (ME) advantage to produce and supply more volume compared to women and males are also responsible to different family income and home expenditures like need of cash for expenditure made them to supply higher volume of wheat to the market.It is consistent to study byTadele*et al*, (2016), Mohammad (2011) andDawit (2010) were also showed that sex of the households affects volume and value sold positively.

Cooperative membership: It is dummy variable and hypothesized to influence volume of wheat market supply positively and significantly. The result of 2SLS indicated that as the producer is being member of cooperatives the volume of wheat supplied to the market influenced positively and statistically at 5% significance level. The positive coefficient shows that as household is being member of cooperatives the amount of wheat supplied to the market increases by an average of 9 quintals, ceteris paribus. This is because of cooperatives work for the benefit of it is members and they are working for changing production methods to modernized techniques, to increase their productivity, supplying different agricultural inputs and making fair marketing price over other marketing actor. Similar study was found byMusah*et al*., (2014), owlande and Mathenge (2012) and Matungul et al (2001) found that being membership to any cooperative direct relation with volume of commodity sold to market.

Lagged market prices (LMPDW): From the time when wheat price is high in themarket in the previous year, farmers would be interested to produce and supply more. As it washypothesized, this variable had a positive and significant effect at5% significance level. It shows that the increment of one birr in previous year market prices leads to0.57 quintals increase in sales volume of wheat. Because of that if the last year price of wheat is good, the small holder producers of wheat have planned to produce more wheat produce than other relative crops for the next year by seeing it is opportunity cost and supplied more wheat to the

market.This is in line with the result of Haymanot (2014) she argued thatthe lag product price has direct relations with marketable supply.

4.5. Constraints and Opportunities of wheat value chain

4.5.1. Constraints and opportunities of wheat production

Farmers' production problems

The problems of sample farm households are usually associated with unstable and relatively lower prices and incomes. Despite the current volume of wheat produced and offered to the market, farmers face a number of problems in the production and marketing process. Based on farmers' perception the major production and marketing problems reported were dependence on unfixed rainy, higher fertilizer price and delayed delivery, prevalence of disease, poor extension support services, lack of draft power, labor shortage, unfair pricing and scaling (weighing), lack of market information providing institutions, multiple taxation, high cost of harvesting by combiner and chemical herbicide adulteration.

Limited access to and supply of agricultural inputs

The most important physical inputs for wheat production in study area are improved seeds, fertilizers and pesticide/herbicides. Research and extension services, information and appropriate technological support are non-physical inputs that are equally important for higher yields. Among the total sample of respondents, 23.5% replied limited access and supply of inputs as their production problem (Table15). This is caused mainly due to absence of shortage of supply, high input price, inappropriate delivery mechanisms and delayed supply. Delay in input supply happened because of prolonged chain of input supply especially for improved seeds and chemical fertilizers.

Higher input price and delayed delivery: The majority of the respondents reported that their major production problem is attached to high price of input and delayed delivery of inputs. Although all mentioned above inputs important for wheat production and to increase

its productivity in the study area, all farmersuse fertilizers since it plays crucial role for Bale highland producers to improve wheat productivity without money consideration whether they have money or not, or borrowing from neighbors. However, price increase of fertilizer has forced farmers specially those who have no enough income to buy it, to use lower quantity of fertilizer with low productivity and low produce supplied to market. Beside this untimely delivery of inputs by BoDANR Dwas also causing a serious challenge to the farmers. Thus, the increase in the price of improved seed and fertilizer and untimely delivery made farmers not only to use lower quantity of fertilizer but also forced them to switch to private dealers where there is no assurance of the quality. This in turn resulted in lowering yield and marketed surplus. Thus, higher price.The study result showed that 55% of respondents faced problem of high price of input as shown in (Table 15).

Lack of credit utility: Although the availability of credit is important source of cash for farmers to buy agricultural inputs needed to increase production and marketed surplus of wheat, only few of the respondents accessed credit from formal sources. As a result, farmers were forced to use input below the recommended rate. 7.5 % of respondent had shown this problem.

Prevalence of crop diseases: prevalence of disease was one of the production problems encountered by farmers in the study area. Based on its occurrence, the most commonly occurred diseases were rust for wheat. 8% of the respondents suffer from this problem.

High taxes: Of the total sample respondents, 36% reported that high land taxation was one of the production problems they faced during production of products.

Table 15: Problem of wheat at production level

Problem of wheat production	Freq.	Percent
High price of input includingimproved seed and not delayed delivery	110	55.00
Limited access to and supply of agricultural inputs	47	23.5.0
High Taxes	72	36.00
Prevalence of disease	16	8.00
Credit in utilization	15	7.50
Poor linkages with other actors in the chain	18	9.00

Wheat production opportunities

The study area has also diversified opportunities that need to be exploited. Consequently, production and marketing efficiency and effectiveness could be increased. Among the different opportunities that prevailed, the majors are tried to be mentioned as follows.

Suitable agro ecology of the area for production; it is the area endowment with fertile soil type for agriculture, peoples ready to accept new technologies, the presence of perennial Wabe rivers for irrigation, farmers having better land holding than the average Ethiopian farmer, and plain topography is some of natural endowment opportunities the woreda had. These opportunities are important for the growth of grain crops, vegetables and other perennial crops like fruits. The result of 56% respondents were show this (Table 16). Moreover, since mixed farming experiencing is well known in the area it also has potential contribution for livestock production.

Increasing potential demand is other potential opportunity of the area for the products produced in the area. Obviously the increased demand would be followed by better farm price for producers. As a result, farmers will have an incentive to expand their output by 18% (Table 16). Furthermore, the increasing wheat processing factory to flours and macaroni Robe town and other regional or country's larger processor who took the wheat produce directly from the farmer is creating additional demand for agricultural commodities like wheat. Consequently, this contributes for commercialization of rural economy and creates many off-farm jobs opportunities.

The deployment of three development agents at each kebeles based on their academic back ground animal production, Natural resource management and plant science are also important policy dimensions they play major role by giving training and creating linkage among different marketing stakeholders, establishing knowledge centre that facilitate knowledge sharing among peoples of different background, and displaying weekly market price information on notice board at different markets (Table 16) 5% show this result.

Furthermore, provision of infrastructure facilities like roads, telecommunication, power supply and financial institutions are the infrastructural advantages that facilitate the production and marketing of wheat in the study area. There are also various organizations such as MedaWelabu University, AGP, Sinana research center, World Vision Ethiopia and Action Aid Ethiopia that provide production inputs and technical services to the farmers.

The other potential opportunity of the area is its proximity to highly populated urban centers. Obviously the increased population would be followed by better wheat consumption.

Table 16: Opportunity of wheat production

Opportunities of wheat production	Freq	Percent
suitable agro-ecology	112	56.00
low cost of production with indigenous seed	20	10.00
adequate infrastructure	12	6.00
adequate policy	10	5.00
Proximity to urban center	12	6.00
Increasing demand	36	18.00
Total	201	100.00

4.5.2. Farmers' marketing problems and opportunities

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

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

Higher input price: The increasing price of agricultural inputs in the woreda is not only the production but it is also marketing problem farmers faced while buying agricultural inputs inthe market prior to production. Thus 22% of the total sample respondents reported that they face higher input price at marketing stage.

Poor linkage between actors: The other marketing constraints that farmers and other respondents raised were weak linkage between actors along wheat value chain due to lack of efficient information or two-way information. Thus 16% of the total sample respondents reported this problem.

Capital shortage: Sample traders faced capital shortage to conduct and expand their trading activities. Capital shortage was mainly due to lack of free interest credit access. This problem was mainly related to religious factor as most of traders in Agarfa are Muslims in their religious background, they did not like to take loan with interest. Provision of quality products by farmers to the market were followed by better prices, traders indicated that they face capital shortage to conduct and expand their business.

Table 17: Constraints of wheat Marketing

Wheat marketing constraints	Freq.	Percent
lack of market information	12	6.00
price fluctuation	20	10.00
Unfair pricing	16	8.00
capital shortage	5	2.50
Higher input price	44	22.00
Weak linkage between actors	32	16.00

Marketing opportunities

On the other hand, availability of market demand throughout the year, growing number of buyers, high experience in wheat trade and growing price were some of the opportunities of wheat by most of the producers. Natural proximity to market, rising population number of the district and willingness for wheat consumption, creating additional demand and being found nearly proximity to zonal town Robe are the opportunities that enhance level of commercialization to Agarfa woreda. Furthermore, provision of infrastructure facilities like telecommunication, power supply and financial institutions (Banks, Micro-Finance) supports the marke Table 18: Summary of constraints and opportunities along wheat value chain

ting activities in the study area.

Stage of value chain	Constraints	Opportunities	Intervention needed
Inputs supply	- High cost of good quality seed, herbicides/pesticides, farm implements -Delayed supply	-High demand for purchase quality seed, chemicals and farm implements -Being neighbors of SARC	-Government support for easy access to inputs with low price -Strengthen linkage between input suppliers and farmers -strengthening research center
Production	-Limited knowledge on recommended pre and post-harvest handling and shortage of storage facility -Diseases and pest attacks -High land taxation -Credit in utilization -Poor linkages with other actors in the chain -High combiner price	- Increasing demand -Availability of daily laborer and human resource development -Favorable climatic conditions and fertile land for wheat production -Enabling policy environment and support from public organization and NGOs	-Concerned bodies should give attention to reduce land taxation -Conduct trainings to farmers for improved quality production and post-harvest handling -Training to smallholders on disease/pest control method --Strengthen free interest credits service providers institutions and improve storage facility
Marketing/Trading	-Price setting problem - Unfair pricing - capital shortage -Lack of product standard -Low price for the products Price fluctuation -Limited function of cooperatives -Limited market research and credit utilization	-Government investment on infrastructure development -Establishment of cooperatives -High market demand for wheat -Government encourage research center	-Strengthen functions of farmer'scooperatives -Control cheater traders -improve free interest credibility and market linkages of wheat value chain actors -Improving farmers bargaining power by supporting farmers cooperatives
Processing	-Lack of processing facility -Lack of skilled man power	-Active involvement of private sector in the industry	-Encourage private to invest on the sector
Consumers	-Income shortage -Lack of consumer's cooperatives -High price of product	-High consumption preference	-Improve consumers awareness on consumption habits of wheat

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1.Summary

Wheat production provides an opportunity for market integration for smallholder farmers in Agarfa District. It is suitable for wheat production and marketing due to its favorable agro-ecology and availability of Gibe river for irrigation water and high practice of wheat production for home consumption and market in the District.

This study was focused on value chain analysis of wheat in Agarfa district, Bale zone of Oromia Region. The specific objectives of the study include identifying wheat value chain actors and their respective functions;analyze marketing margins of actors in wheat value chain and examining factor affecting volume of wheat soldto market in the study area.

Both quantitative and qualitative data type were used. The data were generated from both primary and secondary sources. The primary data were collected through personal interviews from a total of 284 respondents (201 producers, 68 traders and, 15 consumers), through focus group discussions and key informants' interviews. The data collected was analyzed by both descriptive statistics such as mean, percentage, frequency and sum.Moreover, value chain analysis and econometrics model were used.

The findings of the study were summarized below: Out of 201 interviewed wheat producing households, 79.5were male headed and the rest 20.5% were female headed households. Sample farm households owned an average of 4.48 ha of farm land. Out of these, the average wheat production area was 2.83 ha. The production of wheat is the main source of food and cash for farmers in the study area and wheat Production in the study area is a rain-fed with two seasons in a year harvest.All the sampled farmers were wheat producers and suppliers.

Value chain analysis of wheat in the study area revealed that the main value chain actors involved were input suppliers, wheat producers, assemblers, wholesalers, cooperatives, processors, retailers and consumers. Most producers sell their products to the traders and cooperatives while some of them sale for consumers. The study results indicated that the

processors were the main wheat value chain governors. The producer's position in all stage of value chain concerning most important factors like price negotiation and product quality definition is not good in the study area.

About ten different wheat market channels have been identified with each channel having different marketing margin. The result shows that total gross marketing margin is highest in channel IV (47.62%), and the lowest TGMM in channel VII (7.89%). The gross marketing margin of Producer's (GMMp) is highest in channel I which shares 100% from the total consumer's price and lowest in channel IV which is 52.38%. The result also illustrated that the extreme gross marketing margin from traders and processors was taken by processors, which accounts about 36.05 %, of the consumer's price in channel X. The lowest gross marketing margin (5.44%) is taken by cooperatives at channel IV. The highest net marketing margin is highest at channel IX which is about 36.09% that is captured by processors.

The result of the 2SLS model indicated that quantity produced, sex of house hold, cooperative membership, lagged price of wheat, family size of household and farming experience of the house hold were significantly affected sold volume of wheat.

The overall wheat value chains are constrained by a number of factors which hinder the development of wheat value chain. At farm level, the major production constraints are: high cost of inputs, lack of availability of adequate pesticides/herbicides, and post- harvest handling activities, diseases and pest attacks, lack of capital, and inadequate credit service. At marketing/trading stage, poor road and transport facility, price setting problem, poor link age between actors, in market chain, poor market information, product quality problem, lack of product standard, price fluctuation are the major problems of wheat marketing.

The identified opportunities of production and marketing in the study area were; suitable agro-ecology expansion of urbanization which raises demand for wheat consumption, government organization support and availability of buyers, existence of factories in in the Zone, increasing price of wheat, experts were adopting of technology and existence of human resource and knowledge improvement.

5.2 Conclusions

Value-adding to agricultural commodity enhance farm incomes and regenerate rural economy. Diversifying land uses, using inputs, making extension contact with agents, membership to cooperatives, improved seed and herbicides were used to increase productivity of wheat which contributes for sold volume increment. Knowledge of wheat value chain analysis can play a significant role to make relevant decisions to intervene in the development of wheat production, marketing, processing, smallholder contribution with their margin share along wheat value chain and designing of appropriate policies and strategies.

The main value chain actors involved in the study area, were input suppliers, wheat producers, assemblers, wholesalers, (in and outside the district) cooperatives, processors (in and outside the district), retailers (in and around the district) and consumers. Processors were the main wheat value chain governors in wheat value chain. The most important factors or challenges that weaken producer's position in all stage of value chain concerning in the study area, were lack of good price negotiation, lack of farmers knowhow of value chain concept, and inappropriate information on product quality definition. Thus, one of the most practical solutions to this dilemma is the division of responsibilities between government sector and Non-Governmental Organizations. As example, District office of trade and industry can make valuable interaction between farmers and other and equal distribution of revenues and margins over the actors in the value chain to make smallholder farmers profitable from the commodity and also NGOs can aware farmers through capacity building activities such as farmer group strengthening and business training activities. This encourages farmers to enhance their productivity of wheat and then helps them to increase sold volume of wheat.

The major wheat production constraints in the study area were; high cost of inputs, lack of availability of adequate pesticides/herbicides, and post- harvest handling activities, diseases and pest attacks, lack of capital, and inadequate credit service. Whereas price setting problem, poor link age between actors, in market chain, poor market, product quality problem, lack of product standard and price fluctuation were major wheat marketing problems.

Being male headed household, having more quantity produced of wheat, lagged price of wheat, membership to cooperatives and having more experience on wheat production have a positive and significant influence on sold volume of wheat. While having large family size has a negative and significant effect on sold volume of wheat.

5.3. Recommendations

Based on the findings of the study the following recommendations for policy makers and all other stakeholders participating in increasing wheatproductivity, improving competitive market and wheat value chain were drawn:

Starting with the result of econometric analysis of significant variable that; the results of econometric analysis indicated that volume of wheat marketed is affected by quantity of wheat produced positively and significantly. Therefore, district agriculture and natural resources office should promote land allocation, guide small holder farmers for appropriate use age of different agricultural inputs specially focusing on improving improved variety usageand innovative technologiesto increase productivity per unit area and work on increasing quantity of wheat produced per acre of land.

Sex of the household also affects volume sold of wheat to the market positively and significantly. To improve the volume sold across farmers there is a need to focus on the female head households by improving, facilitating and giving priority for increasing production and volume sold to ensure equal participation and benefit. Therefore, respective governments and stakeholders should provide credit access, training, rewards leadership position in the cooperatives etc. So that female wheat producers become better accessed to the market facilities and increase their volume of wheat marketed like male wheat producers.

The results of econometric analysis revealed that volume of wheat marketed was positively and significantly affected by promoting potentially collective organizations (cooperatives). Therefore, cooperative promotion office should work on establishing wheat cooperative at each kebeles of the district.

Wheat lagged priceis positively and significantly affected on volume of wheat marketed. Previous wheat market price has impact on the volume of wheat marketed in this year. Therefore, prices determining bodies in the market should be considered for the effect of perception of lagged price on volume of wheat sold and provide the real information accordingly.

As wheat are the major cash and consumption crops in the area improving technical knowhow of farmers on wheat farming experience and facilitating improved wheat production technology are recommended for improvement of production and productivity of wheat from year to year.

Encouraging the interaction between farmers and other actors in wheat value chain is important to make smallholder farmers profitable from the commodity. So the district trade and industry office should have to strengthen the governance system between traders and farmers.

Wheat value chain was not functioning properly consequently leading farmers forced to earn less profitso that, the producers are not adequately benefiting from the further value adding profit. The district bureau of trade and industry should have to solve such problems by proper distribution of costs over the actors in the wheat value chain in order to make the producers enter to the chain or to make the chain more efficiency, likewise there should beproper distribution of revenues and margins over the actors in the value chain in order to make the actors and particularly the poor can increase margins in a value chain.

In the district, there was no proper upgrading of wheatvalue chain. Only product upgrading and some forms of process upgrading were functioned in little amount.To upgrade the position of the poor in the chain by making the chain more efficient (decrease costs) and effective (increase value) the integration of NGO, and governmental organizations in the district should take such problem into consideration.

Finally, further studies on wheat value chain and marketing related topic should have to undertake to improve actor's linkage, value chain governance system, margins, benefit share of producer's market chain, market integration and value addition activities related issues by well-organized institutions to improve livelihood of smallholders from wheat producing and marketing.

6. REFERENCES

AbayAkalu. 2010. Market chain analysis of red pepper: the case of Bureworeda, west Gojjam zone, Amhara National Regional State, Ethiopia (MSc. Thesis, Haramaya University). pp70.

Abbott, J.C.1958.Marketing problems and improvement program.Food and AgriculturalOrganizations of United Nations.1: 5- 41.

Abraham Tegegne. 2013. Value Chain Analysis of Vegetables: The Case of Habro and KombolchaWoredas in Oromia Region, Ethiopia. MSc Thesis, Haramaya University, Haramaya, Ethiopia.

AddisuAsfaw, Sultan Usman, Dawit Abate, Ahmed Aliye, EliudBirachi, Dirk Hoekstra, Wellington Jogo, AnnahKimeu and Edith Wairimu. 2015. *Crop and livestock value chains in Sinana district, Ethiopia, International Center for Tropical Agriculture*.

Amentae, T.K., Hamo, T.K., Gebresenbet, G. and Ljungberg, D., 2017. Exploring wheat value chain focusing on market performance, post-harvest loss, and supply chain management in Ethiopia: *The Case of Arsi to Finfinnee Market Chain.Journal of Agricultural Science, 9(8), p.22.*

Anandajayasekeram, P. and BerhanuGebremedhin. 2009. *Integrating innovation systems perspective and value chain analysis in agricultural research for development: implications and challenges.* Improving Productivity and Market Success (IPMS) of Ethiopian farmer's project working paper 16.

Assefa, A. 2009. Market Chain analysis of honey production in Atsbiwemerta district, Eastern zone of Tigray National State. An MSc Thesis presented to School of Graduate Studies of Haramaya University. 67-69p.

AstewelTakele, 2017.Market Participation decisions of farmers in rice production at Fogera district, Northwest Ethiopia. Bahir Dar University, College of Agriculture and Environmental Sciences, Department of Agricultural Economics, P.O. Box 5501, Ethiopia.*A Journal of RadixInternational Educational and Research Consortium Volume 6, Issue 1 ISSN: 2250-3986*

AstewelTakele. 2010. Analysis of rice profitability and marketing chain: The case of Fogera Woreda, South Gondar Zone, Amhara National Regional State, Ethiopia. M.Sc thesis presented to School of Graduate Studies, Haramaya University. 76p.

ATA (Agricultural Transformation Agency). 2015. Agricultural Transformation Agenda. Annual Report of 2016-17. Addis Ababa, Ethiopia.

AyelechTadesse, 2011. Market chain analysis of fruits for Gomma woreda, Jimma zone, Oromia National Regional State.M.Sc thesis presented to School of Graduate Studies, Haramaya University.p110.

Azeb Bekele, TadeleMelaku and Latha, D.A. 2017. Determinants of smallholder farmers in *teff*market supply in Ambo district, West Shoa Zone of Oromia, Ethiopia. *International Journal of Advanced Research in Management and Social Sciences*, *6*(2), pp.133-140.

Bammann, H., 2007.Participatory value chain analysis for improved farmer incomes,employment opportunities and food security. Pacific Economic Bulletin, 22, (3):125.

BerhanuGebremedhin, and Hoekstra, D. 2007, August. Cereal marketing and household market participation in Ethiopia: the case of *teff*, Wheat and rice. In *AAAE Conference Proceedings* (Vol. 2007, pp. 243-252).

BerhanuGebremedhin and MotiJeleta. 2012. Market Orientation and Market Participation of Smallholders in Ethiopia: Implications for Commercial Transformation International Maize and Wheat Improvement Center (CIMMYT), P.O.Box 5689, Addis Ababa, Ethiopia.

Best, R., Ferris, S. and Schiavine, A. 2005. Building linkages and enhancing trust between small-scale rural producers, buyers in growing markets and suppliers of critical inputs. In: F.R. Almond and S.D. Hainsworth (eds.). Beyond agriculture-making markets work for the poor: Proceedings of an international seminar. Westminster, London, UK. 176p.

BezabihEmana. 2010. Market assessment and value chain analysis in BenishangulGumuz Regional State, Ethiopia; Final Report, SID-Consult-Support Integrated Development. Addis Ababa;

BiruhalemKassa,., 2010. *Rice value chain in Metema District, North Gondar, Ethiopia: Challenges and opportunities for innovation* (Doctoral dissertation, Addis Ababa University).

Boehlje, M.D., Akridge J.T., Kalaitzandonakes N.G., 2002. Preparing for success in the agribusiness market place, Journal of Agribusiness, pp : 31-39.

Bolnick, D.I. and Near, T.J., 2005. Tempo of hybrid inviability in centrarchid fishes (Teleostei: Centrarchidae). *Evolution*, *59*(8), pp.1754-1767.

BosenaTegegne. 2008. Cotton market chain analysis: The case of Metema Woreda, North Gondar Zone, Amhara National Regional State.*An M. Sc* Thesis, Haramaya University. 123p

BoDANR (Bureau of District Agriculture and Natural Resource). 2017. Total area of land for wheat production, population size, and quantity estimated from hectar of land during the current year. Agarfa district, Oromia, Ethiopia.

BZFEDO (Bale Zone Finance and Economic Development Office), 2009.Physical and socio economic profile of Bale Zone.Pp 1-77

Cameron, C. and K. Trivedi, 2009.Microeconometrics using Stata.Stata press publications, Stata Corps LP, Collage Stations, Texas
Campbell R, 2008.The Value Chain Framework Briefing Paper. ACDI/VOCA, United States Agency for International Development, New York.

Cramer, G. L. and Jensen, W., 1982.Agricultural Economics and Agribusiness, 2nd Edition. McGraw Hill Book Company, USA 222p.

CSA (Central Statistical Agency).2012. Agricultural Sample Survey 2011/2012: Report on area production of major crops. Addis Ababa: Central Statistical Agency.

CSA (Central Statistical Agency)2014. Agricultural sample survey 2013 / 2014 Volume I Report on area and production of major crops. Addis Ababa, Ethiopia.

CSA (Central Statistical Agency) 2015.Agricultural Sample Survey, Addis Ababa, Volume I (Private Peasant holdings, meher season).Agricultural Development Office (Unpublished). Bale-Robe,

CSA (Central Statistical Agency). 2017. Agricultural Sample Survey 2016/2017. Report on Area and Production of Major Crops. Addis Ababa, Ethiopia.

DesalegnDebelo, BedadaGirma, ZewdieAlemayehu and Solomon Gelalcha, 2001.Droughttolerance of some bread wheat genotypes in Ethiopia.*African Crop Sci. J*. 9(2):385-392

EATA (Ethiopia Agricultural Transformation Agency). 2014. Annual Report TRANSFORMING AGRICULTURE IN ETHIOPIA (EATA) Addis Ababa

Efa,Gobena.,DegeyeGoshu,Tinsae, Demise. andTadese, Kenea., 2016. Determinants of market participation and intensity of marketed surplus of Teff producers in Bacho and Dawo districts of Oromia state, Ethiopia. *Forthcoming: Agricultural Economics*.

EPAR (Evans School Policy Analysis and Research), 2010. Yield Gap and Productivity Potentialin Ethiopian Agriculture: Staple Grains & Pulses prepared for the Farmer Productivity Team ofthe Bill & Melinda Gates Foundation, EPAR Brief No. 98, Ethiopia. Ethiopian cooperative coffeeproducers to international markets.ACDI/VOCA, Addis Ababa.

Dawit, G. 2010. Market chain analysis of poultry: The case of Alamata and Atsbiwombertaworeda of Tigray Region. MSc thesis submitted to the School of Graduate Studies, Haramaya University. 80p.

Dunne, A. 2005.*Supply chain management: fad, panacea or opportunity? Occasional paper Vol 8(2) 1–40.School of Natural and Rural Systems Management, University* of Queensland, Gatton, Queensland, Australia.

Faße, A., Grote, U., and Winter, E. 2009. Value chain analysis methodologies in the contextof environment and trade research. Discussion Paper//School of Economics and Managementof the Hanover Leibniz University. No. 429. September 2009.

FAO(International Food and Agriculture Organization) 2014a. Food loss assessments: causes and solutions: case studies in small-scale agriculture and fisheries subsectors in Kenya. Food & Agriculture Organization of the United Nations, Rome.

FAO (International Food and Agriculture Organization) 2007. Addressing marketing and processing
constraints that inhibit Agri-food exports: A guide for policy analysts and planners. Agricultural Service Bulletin *160*. Rome. Italy.

Fleming, K. 2005. Value added strategies: Taking agricultural products to the next level. Honolulu (HI): University of Hawaii. Agribusiness; Pp: 16. 2.

Gereffi, G., Humphrey, J. and Sturgeon, T. 2005. The governance of global value chains. Review of International Political Economy, 12(1): 78–104

Getachew, B.2002. Cattle Marketing in Western Shewa.An M.Sc Thesis Presented to the School of Graduate Studies of Alemaya University,

Fredriksson., L,Davidova, S. and Bailey, A., 2009. Subsistence and semi-subsistence farming in selected EU new member states. *Agricultural Economics*, *40*, pp.733-744.sity. Ethiopia. 118p.

GTZ (German Agency for Technical Cooperation), 2007. Value chain analysis and "Making Markets Work for the Poor" (M4P) – poverty reduction through value chain promotion. Eschborn: GTZ.

Gujarati, D. 2003. Basic Econometrics.4th edition.Tata McGraw-Hill Publishing CompanyLimited, New Delhi, India. 614p.

HaymanotAsfaw, 2014. Durum wheat value chain analysis: the case of Gololcha district of Bale Zone, Ethiopia. A Thesis Submitted to the School of Graduate Studies, In Partial

Fulfillment of the Requirements for the Degree of Master of Science in Agriculture (Agricultural Economics) Haramaya University

Hellin, J. and Meijer, M. 2006. Guidelines for value chain analysis. Food and Agriculture Organization.*International Educational and Research Consortium*, Volume 6, Issue 4 ISSN: 2250 – 3994.

Humphrey, J. and O. Memedovic, 2006.*Global value chains in the agri-food Sector UNIDO* Working Paper, Brighton.

Igbinnosa, M.A., 2011. *Opportunity for Value Chain Development by Improving Beef Processing Practices in Rural Tanzania*.

Jema Haji. 2008. Economic efficiency and marketing performance of vegetable production in the Eastern and Central Parts of Ethiopia. PhD Dissertation, Swedish University of Agricultural Sciences, Uppsala, pp64.

Jerven, M., 2013.*Poor numbers: how we are misled by African development statistics and what to do about it*. Cornell University Press.

Kaplinsky, R. and M. Morris. 2001. A handbook of value chain analysis. Working paper prepared for the IDRC, Institute for Development Studies, Brighton, UK.

Kaplinsky, R. 2000. Globalization and Unequalisation: What can be learned from value chain analysis? *Journal of Development Studies,* 37: 117-146.

KindeAysheshm. 2007. Sesame market chain analysis: The case of Metemaworeda, North Gondar Zone, Amhara National Regional State. M.Sc thesis presented to the School of Graduate Studies, Harmaya University. 102p.

Kithuka, J., Mutemi, J. and Mohamed, A.H., 2007. 10. Keeping Up with Technology: The use of mobile telephony in delivering community-based decentralised animal health services in Mwingi and Kitui Districts, Kenya.

LeykunDemeke and Jemma Haji. 2014. *Econometric analysis of factors affecting market participation of smallholder farming in Central Ethiopia*, Adama Science and Technology University, Haramaya University MPRA Paper No. 77024,

Maddala, G.S., 1997. Limited Dependent and Qualitative Variables in Econometrics.Cambridge University press, Cambridge. pp. 175-181.

Matungul, P.M., Lyne, M.C. and Ortmann, G.F., 2001.Transaction costs and crop marketing in the communal areas of Impendle and Swayimana, KwaZulu-Natal.*Development Southern Africa*, *18*(3), pp.347-363.

Mekdes D, Teshale W, Getachew M. 2017. Value Chain Analysis of Red Pepper: The Case of Abeshge District, Guragie Zone, South Ethiopia. International Journal of Environmental Sci Nat Res. 2017; 2(3): 555590. DOI: 10.19080/IJESNR.2017.02.555590

Mendoza G. 1995.A primer on marketing channels and margins. Lyme Rimer Publishers Inc., USA

MoFED (Ministry of Finance and Economic Development). 2014. Growth and Transformation Plan Annual Progress Report for F.Y. 2012/13, Addis Ababa.

MoFED (Ministry of Finance and Economic Development), 2006. Building on Progress: A Plan for Accelerated and Sustained Development to End Poverty (PASDEP), Addis Ababa, Ethiopia.

MoFED (Ministry of Finance and Economic Development), 2012. Ethiopia: Building onprogress. A Plan for Accelerated and Sustained Development to End Poverty (PASDEP) 2005-2010. Volume I: Main Text, Addis Ababa.

MulegetaSimeret, GeremewYehenew and Tamerat k, 2005. Agricultural Commodity Marketing
System Project, Wheat Marketing System Study, Bahir Dar. No.1, with special reference to Vietnam.

Mohammed Hassena. 2009. Value chain analysis for developing rural agri-business: value chain concept and its application to wheat in Ethiopia. Proceedings of the Value Chain Seminar: Addis Ababa, Ethiopia. P 75-80.

Mohammed Urgessa, 2011. Market chain analysis of teff and wheat production in Halaba special woreda, Southern Ethiopia.M.Sc thesis submitted to the School of Graduate Studies, Haramaya University. Haramaya, Ethiopia

Musah, A.B., Bonsu, O.A.Y. and Seini, W., 2014.Market participation of smallholder maize farmers in the upper west region of Ghana.*African journal of agricultural research*, *9*(31), pp.2427-2435.

Nega, 2015. Market chain analysis of agro-forestry products: the case of fruit at Tembaro District, KembataTembaro Zone South Ethiopia. International Journal of Business and Economics Research. ISSN: 2328-7543 (Print); ISSN: 2328-756X (Online)

Olwande, J. and Mathenge, M., 2012. Market Participation among the Poor Rural 178 Households in Kenya, *a paper prepared for presentation at the International Association of Agricultural Economists* (IAAE) Triennial Conference, Foz do Iguaçu, Brazil.

Porter, M. 1985. Competitive advantage: creating and sustaining superior performance. The Free Press, New York.

Ramakumar R. 2001. Costs and margins in coconut marketing: some evidence from Kerala.Indian*Journal Agricultural Economics: Vol: 668-680.*

RehimaMusema. 2006. Pepper marketing chains analysis: the case of Alaba and Siraro districts, Southern Ethiopia. M.Sc. Thesis, Haramaya University, Ethiopia.

Roduner D, 2007. Report on Value Chains: Analysis of existing theories, Methodologies and Discussionsof value chain approaches within the development cooperation.

Samuel, Gebreselassie, Mekbib G, Kalkuhl, Matthias. 2017. *The Wheat Sector in Ethiopia: Current Status and Key Challenges for Future Value Chain Development*: ZEF Working Paper Series, *ISSN 1864-6638.*

Smith, D., 1992. Costs and returns in agricultural marketing. Marketing and agribusiness development paper.Department of Political Economy, University of Glasgow. Glasgow, Scotland.

Storck, H., BerhanuAdnew, BezabihEmana, and Shimelis W/Hawariat, 1991. Farming system and farm management practices of smallholders in Harareghe highlands. Farming systems and resource economics in the tropics, vol. 11, Wirtschafts-Verlagvauk, Kiel, Germany .

Sultan Usman. 2016.Analysis of wheat value chain: The case of Sinana district, Bale zone, Oromia region, Ethiopia.A Thesis Submitted to School of Agricultural Economics and Agribusiness, Postgraduate Program Directorate of Haramaya University, Haramaya, Ethiopia.

Tadele, M., Mulu, D. and J. Poul, M. 2015. Determinants of teff and wheat market supply in Dendi District, West Shoa Zone, Ethiopia. Prime Journal of Social Science,.4(10), PP.11224 – 1130.

TadeseKenea, EfaGobena, Girma G., and David L. 2017.Exploring value chain and post-harvest losses of Teff: The case of Bacho and Dawo districts of central Ethiopia.*Journal of Stored Products and Postharvest Research.ISSN 2141-6567.Vol. 7(1), pp.11-28,*

Tura Kaso. 2015.Market Supply and Value Chain Analysis of Wheat: The case of Tiyo and Hetosa Districts in Arsi, Ethiopia;

Tura, E.G., Kenea, T. and Kaso, T. 2016.Determinants of Demand for Credit among Wheat and Teff   Smallholder Farmers in Central of Ethiopia (Arsi and South West Shewa).

UNIDO (United Nations Industrial Development Organization). 2012. Agro-value chain analysis and development. The UNIDO approach; A staff working paper, Vienna.

Walker, D.J., Wandschneider, T. and Maritime, C., 2005.Local Food Aid Procurement in Ethiopia.*Case study report.DFID*.

Wolday, Amha, 1994. Food Grain Marketing Development in Ethiopia after Reform 1990, A Case Study of AlabaSiraro, The PhD Dissertation Presented to VerlagKoster University. Berlin.

World Bank. 2007. Explaining sources of food price inflation in Ethiopia. A just in time policy note, World Bank (Draft), pp. 14-28.

Yamane, Taro. 1967. Statistics: An Introductory Analysis, 2nd Edition, and New York: Harper and Row.

ZewdieHabte, BelainehLegesse, Jima Haji and MotiJeleta 2016; *Supply analysis in wheat industry: contributions of value chain analysis in* Ethiopia: Cases from Arsi and East Shewa Zones in Oromia National and Regional State;23-26, 2016, Addis Ababa, Ethiopia.

7. APPENDICES

Appendix A Appendix Tables

Appendix Table 1: Conversion factors for Tropical Livestock Unit (TLU)

Animal Category	Tropical Livestock Unit
Oxen	1.1
Cow	1
Heifer	0.5
Bull	0.6
Calves	0.2
Sheep	0.01
Goat	0.09
Donkey	0.5
Horse	0.8
Mule	0.7
Poultry	0.01

Source: Storck, *et al.* (1991)

Appendix Table 2: Conversion factors used to calculate Adult Equivalent

Age Category in years	Male	Female
<10	0.6	0.6
10-13	0.9	0.8
14-16	1.00	0.75
17-50	1.00	0.75
>50	1.00	0.75

Source: Storck, *et al.* (1991)

Appendix Table 3: Test of endogeneity

Tests of endogeneity, Ho: variables are exogenous

Durbin (score) chi2(1) = 15.3351   (p = 0.0001), Wu-Hausman F(1,189) = 15.6951 (p = 0.0001)

estat first stage, force non-robust

First-stage regression summary statistics

```
-------------------------------------------------------------------------------------------------
                       Adjusted    Partial     Robust
Variable          R-sq.R-sq.R-sq.   F (2,189)  Prob> F
-------------+-----------------------------------------------------------------------------------
TOQNTYPRO  0.7997    0.7891    0.4768    41.1214   0.0000
-------------------------------------------------------------------------------------------------
```

Minimum eigenvalue statistic = 86.1037

Critical Values   # of endogenous regressor: 1

Ho: Instruments are weak   # of excluded instruments: 2

```
--------------------------------------------------------------------------------
                                     5%     10%    20%    30%
2SLS relative bias                   (not available)
---------------------------------+----------------------------------------------
                                     10%    15%    20%    25%
2SLS Size of nominal 5% Wald test    19.93  11.59  8.75   7.25
```

LIML Size of nominal 5% Wald test   8.68   5.33   4.42   3.92
----
estatoverid
        Test of over identifying restrictions: Score chi2(1)   = 1.61395 (p=0.2039)
Source: own computation from survey result, 2018

Appendix Table 4: Variance Inflation Factor for continuous variables

Variable	VIF	1/VIF
TOQNTYPRO	4.99	0.200320
LANALLWET	4.88	0.204943
TLU	3.83	0.261184
EDU	2.24	0.447362
DMKT	2.15	0.465451
EXP	1.55	0.643517
EXN	1.43	0.69407
LAPWT	1.23	0.813081
MKTINF	1.17	0.857132
AMNFINC	1.11	0.904807
FALS	1.01	0.903608

Mean VIF 2.32

Appendix Table 5.Multicollinearity test for discrete variable

	SEX (1)	CRDUT (2)	COOPMRSP (3)
(1)	1.000		
(2)	-0.177	1.000	
(3)	0.186	0.041	1.000

Appendix B: Data collection tools

JIMMAUNIVERSITYCOLLEGOE FAGRICULTUREAND VETERINARY MEDICINE DEPARTMENOFAGRICULTURALECONOMICSANDAGRIBUSINES

Survey Questionnaire on WheatValue Chain Analysis: The Case of Agarfa District

By: Zera Kedir

Name of *Kebele* _____

Name of Household head _____

Phone number _____

Name of interviewer_____

Signature _____

Part I. Checklist of Farmers Questionnaire

Household Characteristics

1. Sex of respondent: 1. Male 2. Female

2. Religion 1) Muslim 2) orthodox 3) Protestant 4) Catholic 5) Others (specify)_____

3. Ethnic background 1)Oromo 2) Amhara 3) Somali 4) Gurage 5) others

4. Age of household _____Years

5. Family Size in number_____

Number of family size in their age category

Age category	Male	Female
1-14		
14-35		
36-65		
>65		
Total		

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

7. Education status of the household head 1. Unable to read and write 2.Able to read   and write 3.Religious education 4. Formal education (please indicate in years):

8. Years of schooling of the household head: _____

9. Years of schooling of the spouse: _____

10. What is your main source of income? [ ] 1= Agriculture 2= Trade 3= Agriculture and trade 4= Salary [ ] 5=other sources of income

11. Farming experience of household head: _____ years

12. Number of children in school: [ ] Male_____ [ ] Female_____ [ ] Total_____

14. Number of Dependents in the family (< 14 and >64 ages): [ ] 1= Male ---2= Female ------ [] Total_____

2. Production and land use information

15. Total land holding ------------------hectare

16.Total grazing land: -------- ha.

17. Cultivated area --------------------hectare

18. Total crop land: _____ ha

19. Farm size allocated for wheat _____hectares

20. Experience in wheat production in years: _____ years

21. Production of Wheat, grain and other cash crops in the survey year 2009/10

Type of	Area	Qty	Qty lost	Family	Qty	Income

crop	in heck	Produced in Qt	in Qt	consumption in Qt	sold in Qt	earned from sale of each crop
Bread wheat						
Durum wheat						
Barley						
Teff						
Maize						
Bean						
Oats						
Sorghum						
Pea						
Linseed						
Others						

3. Livestock ownership

Did you have livestock? (√) [ ] 1= Yes [ ] 0= No

22. If yes, please specify livestock holdings of you during the survey year

type	number	number sold last year	price per animal sold	total revenue gained
Oxen				
cow				
bull				
heifer				
calf				
donkey				
horse				
mule				
sheep				
goat				
Hen				
other specify				

4. Wheat production

Input utilization

23. Did you get enough amounts and types of seed as you need? 1. Yes 2. No

24. If no, for question 23 what are the possible reasons? 1. High price 2. No credit facilities 3. Limited supply 4.Quality problem 5. Others (specify) -----------------------------------

25. Is there any problem relating to improved seed supply? 1. Yes 2. No

26.If yes to Q no 25, what are these problems? --

27. Did you use fertilizers and chemicals? 1. Yes 2. NoIf yes, where did you get? 1. Own 2. Agricultural office 2.Cooperatives 3.Traders 4. Others specify ---------------------

28. How did you get? 1. Cash 2. Credit 3. Others specify----------------------

29. Did you get enough amounts and type as you need? 1. Yes 2. No

30. If no for Q 29, what are the possible reasons? 1. high price 2. No credit facilities 3. Limited supply 4.Quality problem 5. Others (specify) ---

Type of in put		Did you used for wheat production? Yes 2. No	price per(Qnt/Lit)	amount used per hectare
Improved seed				
Organic Fertilizer				
In organic Fertilizer	DAP			
	UREA			
Herbicide				
Fungicide				
insecticide				
other specify				

31. Is there any problem relating to fertilizers and chemicals supply? 1. Yes 2. No

32. Ifyes,what are theseproblems? ---

33. How do you cultivate your land for wheat production? 1. Hand tool 2. Oxen 3.Tractor 4. Others specify --

35. If you rent oxen, what is the rate of payment for your farm operation per day? ------------ Birr/day/pair and total days rented------------------------

Labor source for wheat production

36. What do you use to plough your land? 1. Own Oxen 2. Rented Tractor 3. Rented oxen

37. If rented tractor how much it costs you per hectare _____birr, how about if rented oxen _____birr/hectare

38. Do you weed wheat manually? 1. Yes 2. No

39. If Q38 is yes, from where do you get labour for weeding? 1. Family 2. Casual labourer 3. Daily labourer

If Q39 is causal laborer, how much do you pay him/her per month ....birr

40. If Q38 is daily labourer, how much do you pay per man day ....birr

41. If you employ daily labourer to spray chemical for you, how much it costs you per hectare_____birr

42. What do you use to harvest your wheat? 1. Manually harvested 2. Combine harvester

43. If you used combiner for harvesting how much you paid per quintal in 2008/9 harvesting time? _____birr, how if manually _____birr/man day.

44. Are you selling wheat immediately after harvesting? 1. Yes 2. No

45. If no, how long have you kept it before selling it? ----- ------- ---------- -----------

46.Why you kept it? --

47. Do you have storage facilities in your home? 1. Yes 2. No

48. If no, where do you store? Specify --

49. Is there any problem relating to storage, transportation and combiner facilities? 1.Yes2.No

50. If yes to Q no 49, what are these problems? --

5. Source of income

Farm income

51. What are major source of your income? 1= Sale of livestock and their products, 2= sale of crop, 3=Off/non-farm income, and 4= Others (specify)

52. Estimate of yearly cash income from different sources:1. Sale of livestock _____Birr/year 2.Sale of crop _____birr/year, 3.Off farm income_____birr/year 4.Other income_____birr/year 5. Sale of livestock product (butter, cheese, milk etc) _____birr/year

53.Which crops do you sale most of the time? 1= *wheat,* 2= Barley, 3= Maize, 4= teff, 5=Daguja,6=nouge,**7**=,bean,8=pea,

9=Others(specify)_____

Off/Non-Farm income

54. Do you earn non-farm income 1=Yes, 2= No (If your answer is yes fill the below table)

Non-Farm income source	Annual income of household	Household head responsible
Trade		
Employment		
Daily labour		
Fire wood sale		
Broker		
Other(Specify)		

1= Wife, 2=Husband, 3= Daughter, 4= Son respectively

6. utilization of credit service

55.Have you been in need of credit in 2009? 1. Yes 2. No

56. If your answer for question No 55 is yes, which source you use?

[ ] 1= Micro finance [ ] 2= Credit and saving associations [ ] 3= Banks [ ] 4=from rich People. 5 Other(Specify)_____

57. If yes to question # 55, did you get credit as per your need? 1. Yes 2. No

Did you face any problem in accessing credit? [ ] 1= Yes [ ] 0= No

58. If your answer for Q. 57 is yes, what was the problem? (Multiple response is possible)

[ ]1= Limited supply of credit [ ] 2=Limited access to transport [ ]3=Huge bureaucracy[]4.=unavailabilityofinterestfreeloan5.Others(specify)_____

59. What is the amount of loan you received in Birr_____

60.Forwhat purposedidyouusedthecredit?_____

61. What are the opportunities of wheat production in the area? (multiple answers) [ ] 1=suitable agro-ecology [ ] 2= adequate infrastructure [ ] 3= Government organization support [ ] 4= adequate irrigation facility [ ] 5= Low cost of production with endogenous seed 6. Others specify_____

7. Extension and Information Services

62. Who provides the advisory service for you in the process of wheat production? (√) (Multiple response is possible) [ ] 1= Development agents [ ] 2= NGOs [ ] 3= Research centers (specify) [ ] 4= District office of agriculture &natural resources, & Irrigation development Authority experts [ ] 5= Neighbors and friends 6. Others 7. Specify

63. In what way you get the advisory service? (√) (Multiple response is possible) [ ] 1= Farm to farm visit by the development agent [ ] 2= experience sharing tour [ ] 3= Visit to demonstration/ model farmers" site [ ] 4= Training 5. Others (specify)_____

64. What is the average number of days the Development Agents visit you/your farm_____ days/year.

8. Marketing and Information access

65. How many hours it will take for you to reach the nearest market for your wheat sale? _____ KM _____hours

65. Did you have your own transportation facilities? (√) [ ] 1= Yes [ ] 0= No

66. If your answer for 65 is yes, what type? (√) [ ] 1= Vehicle [ ] 2= Transport animals[ ] 3= Cart [ ] 4= other

67. Did you have access to market (potential buyers) for your produce? [ ] 1= Yes [ ] 0=No

68. What is the selling price per Kg/Quintal? In the survey year (2009) _____ETB

69. How many times you visit the market to sale your wheat per week during peak season? [ ] 1= Once per week [ ] 2= Twice per week [ ] 3= Three times per week [ ] 4= More than 3 times

70. How many years you practiced wheat marketing _____years

71. What is your perception on the lagged wheat price? (How did you see last year price) []1= Low [ ] 2=Medium [ ] 3= High

72. What about the perception of current year wheat price? (How are you see year price) 1=very low 2=slightly lower 3=as expected 4. slightly higher 5. Very high

73. What was the average price of wheat per Quintal/kg in the last 3years _____, _____, _____birr/Quintals

74. What are marketing costs you incur when you take your produce to the market?

Item	cost incurred per quintal
Loading and un loading	
infrastructure cost	
Transportation cost	
Market information fee	
Sales tax	
Loss of product	
other expense specify (if any)	
total cost	

volume of total sales

75. Did you sell your wheat produces during 2009 production period? 1. Yes 2. No

76. If yes to question 75, what is the total sale volume of your wheat produces during the year?

Category of wheat	amount marketed/Qnt	average price
Bread wheat		
Durum wheat		

Membership to cooperatives

77. Are you member of cooperatives? 1. Yes 2. No

78. If Q77.is No, why? _____

79. If Q77 is yes, why you joined? **1.** Provides better price **2**. It is guaranteed outlet **3**. Price setting is fair **4.** It makes timely payment **5.** It tries to hold cost down **6.**Gives trains **7.**others(specify)_____

9. Source and market information

80. Do you get market information before you supply *wheat* to the market?

1. Yes 2. No

Source Category	List of Sources	Yes 2. No
Personal/Professional networks	Traders	
	Friends/Neighbors	
	Development agents	
	Others	
Public Information System	Radio,	
	Television	
	ECX board	
	Others(specify)	

81. What problem you faced by brokers [ ] 1 = took to limited traders [ ] 2= unfair scaling (weighing) [ ] 3= high brokerage charge [ ] 4= unreliable price 5
        Others

80. How is price set for wheat [ ] 1= by the will of the producers [ ] 2= by the will of buyers [ ] 3= by the existing Market (Supply and Demand)

81. Did you frequently contact with traders that buy your wheat [ ]1 = yes; [ ]0 = no

82. If yes to Q 81, did they provide you with market information before you sell your wheat? []1 = yes; [ ] 0 = no

83. What type of information did you get? [ ] 1 = Price information [ ] 2= Market place information [ ] 3= Buyers information [ ] 4. Quality required [ ] 5. Demand Other (specify)

84. At what time interval do you get the information? [ ] 1= Daily [ ] 2=Weekly [ ] 3= Monthly 4. Other (specify) ___

85. Was the information you get is valuable? [ ] 1= Yes[ ] 2= No

86. Did you face difficulty in finding buyers when you wanted to sell wheat? [ ] 1.= Yes 0=No

87. If your answer for Q. 86 is Yes, due to: [ ] 1= Inaccessibility of market [ ] 2= Lack of market information [ ] 3= Low price offered 4. Others_____

88. How is the trend of price per unit ofsold of wheat products during the last 5 yars? [ ] 1= Increasing [ ] 2= Decreasing [ ] 3= fluctuating [ ] 4=the same

89.Ifincreasing,why? --

90.If decreasing,why? ---

91. What are the major opportunities in wheat marketing [ ]1= availability of buyers [ ] 2 =high price [ ] 3 =proximity to urban center [ ] 4= adequate value chain linkage.

92. Would you like to improve your volume of selling?[ ] 1= Yes [ ] 2.=No

93.To whom did you sold more of your wheat product? _____

Marketing Constraints

No	Constraints	Yes 2. No	remark
1	Lack of market information		
2	Price fluctuations		
3	Low bargaining power		
4	Lack of buyer		
5	Other(specify)		

94.Value adding activities of actors (fill the below tables) 1. Cleaning 2.Packaging 3.Storing 4.Transporting 5.Processing 6.Loading/Unloading 7. Others

95.Is there product quality required by buyers? **1**. Yes   **2**. No

Actors(Fill above number)	Value adding activity by each actors	Intermediate cost	Selling Price	Buying Cost	Value added
Producers					
Local collectors					
Wholesalers					
Retailers					
Consumer price					
Cooperatives					

96. If Q no 95 yes, do you keep quality that is required by buyers? 1. Yes 2. No

97.Ifyeswhatvalueadding   activities   you made1.Cleaning,costperquintal__2.Storage,costperquintal ___3.Transportation, cost per quintal to reach sale outlet __4. Commission forbroker's birr/qt5. Others (specify, cost) _____

98. Is there price difference due to value addition? 1. Yes   2. No

99. If Q no.98 is yes, do you estimate price difference due to value addition? _____birr/kg

10. Distance from the nearest Market

100. How far you from the market center?

From village market _____KM or Walking on foot _____minute/hr.

From District Market _____KM or Walking on foot_____minute/hr.

From National Market _____KM or

Walking Farm gate_____Km/walking hours on foot _____minute/hr.

101. To whom you sold your product (Wheat)? 1. Wholesalers 2. Main roadside traders 3.Retailers 4. Consumers

102. Where could (did) you get them? 1. at the farm level 2. at the woreda market 3. On the main roadside 4.At the local market 5. Others/ specify_____

103. How much you sold for 1. Wholesalers _____ quintals 2. Local market (if there is) _____ quintals 3. Main roadside market (if there is) _____quintals 4. The district market _____ quintals   5.Local   assembler   _____quintals   6.others   specify _____

Checklist for traders (Wholesalers, local collectors, retailers)
Demographic Characteristics
Name of traders: _____Tel: _____1.Age: _____
1.Sex: 1. Male   2. Female

2. Marital status: 1. Married 2. Single 3.Widowed 4. Divorced

3.Religion_____District_____Kebele_____

4. Family Size: Male _____Female _____Total _____

5.Type of traders: 1. Wholesaler 2. Retailer 3.Assembler 4. Processor

6. Education level of respondent_____

7. Position of respondent on the business? 1. Owner 2. Employed manager 3.Relative of business owner 4.Spouse of owner 5. Other

8. How long have you been operating the business? _____

9. Did you trade alone or in partnership? 1. Partnership 2. Alone 3. In other forms(specify)

10. If in partnership how many are you in number? _____

11. Total Number of people employed in your business? 1. Male__2. Female_3. Total___

12. In how many number of market days in a week do you participate? _____

13. What was the amount of your initial working capital when you start this wheat trade business? _____ Birr.

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

15. What is your source of working capital?   1. Own 2. Loan 3.Gift 4.Share   5. Others (specify) _____

16. If it was loan, from whom did you borrow? 1. Relative/family 2. Private money   lenders 3.) NGO (specify 4. Friends 5.Other traders 6.Micro finance institution 7.   Bank8. Others

17.What was the reason behind the loan? 1. To extend wheat trading 2. To purchase transporting vehicle 3.For storage construction   4. Others (specify)

18. How is the repayment schedule? 1. Monthly   2. Quarterly   3.Semi-annually 4.Annually   5.When you get money   6. Others (specify)

19. How is the change in accessing finance for wheat trade now a day?

20. How did you transport wheat from point of purchase to point of sale? 1. On foot   2. On animal-drawn carts/vehicles 3.Car 4.Bus or public transport   5. Lorry or truck (e.g. Isuzu)   6. Other (specify): _____

21. How much did you pay per quintal to transport wheat from point of purchase to point of sale? _____ Birr.

22. Do you store the purchased wheat? 1. Yes 2. No

23. If your answer to Q.22 is yes, for how many days do you store from the time of purchasing until sale? 1. One month   2. Two months 3. From one month to six months 4. Up to a year

I. BUYING PRACTICE

1. From which market place and supplier do you buy wheat? (*Multiple market area is possible).

2. Are all the purchasing market centers accessible to transport? 1. Yes 2. No

3. If your answer to Q.2 is yes, what proportions are accessible? _____%

4. Who sets the purchase price?

1. Myself 2. Set by demand and supply 3. Sellers 4. Other (specify)

5. Which are the months of the year when prices of wheat are lowest?

6. Which are the months of the year when prices of wheat are highest?

7. How many regular suppliers do you have? Producers _____, collectors _____, Small-traders _____, large-traders _____, others _____

8. Have you ever stopped purchasing due to lack of fund? 1. Yes 2. No

9. If your answer to Q.8 is Yes, for how long? _____month or years.

10. Have you ever stopped purchasing due to lack of supply? 1. Yes 2. No

11. If your answer to Q.10 is Yes, for how long? _____ Years

II. Selling Practices

12. To which market and to whom did you sell wheat. (Multiple market area is possible)

wheat	Where	1.On local markets 2. On district market 3.On zone markets 4.Other, specify:	To	2. Collectors 3.Small traders 4.Large traders 5. Other, specify:	No of quintal Sold	Average price/Qnt	Payment 1. Cash 2. Credit 3.Advance payment

13. How many regular buyers do you have? Producer's _____, Collectors _____, small traders_____, large-traders _____others _____

14. What is your source of information? _____

15. Who sets selling price? 1. Myself 2. Set by demand and supply 3. Buyers   4. Other (specify)_____

16. With who commercial value chain actors more linkage do you have? (Multiple responses is possible)

1. Farmers 2. Small traders   3.Large traders   4.Consumers 5.Collectors 6. Processors
    8. Others (specify) _____

17. Indicate your average cost incurred per quintal in the trading process of wheat.

Cost components	Cost incurred in birr/quintal
Purchase price	
Labour cost	
Tax payment	
Transport cost	
Other cost (specify)	
Total cost	
Selling price	

Value addition

18. If you store *wheat* which type of material, you use?

Plastic sack	
Warehouse (locally called Magazine)	
Others(Specify)	

19. What is your motive to store wheat? 1. Expecting high price 2. For saving 3.Lack of demand 4.For consumption 5.Others(specify)

20. Value adding activities of actors (fill the below tables) 1. Cleaning 2.Packaging 3.Storing 4.Transporting 5.Processing 6. Loading/Unloading 7.Others

Actors(Fill above number)	Value adding activity by each actors	Intermediate cost	Selling Price	Buying Cost	Value added
Farmer trader					
Local collectors					

Wholesalers					
Retailers					
Consumer price					
Cooperatives					

Check list for consumers

1.Consumer Name: _____

2. Zone: _____ District: _____Kebele

3. Sex_____

4.Age: _____

5. Marital status: 1. Single 2. Married 3.Widowed 4. Divorced

6. Education Status 1. Primary School completed 2. High school completed 3. Above

7. Education level of respondent_____

8. Distance from nearest town in Kilometers _____

9. Means of income generation _____

10. Monthly income of consumer_____

11. Experience in *wheat* consumption_____

12. Family size_____

13. Source of income 1. Farming 2. Others (Specify)_____

14. Source of *wheat* 1. Own produce 2. Purchase

15. Proportion of your income spent on *wheat*_____

16. With which types of value chains actors you linked? Multiple responses are possible

1. Farmer 2. Rural collectors 3.Wholesalers 4.Retailers 5.Consumers 6. Others

17. Do you think that *wheat* value chain includes many intermediaries (complex)? 1.Yes 2.No

18. Do you think wheat traders are efficient and competitive? 1. [] Yes 2.[] No

19. If your answer for question No 18 is No what are the major problems of traders?1. Existence of unlicensed traders 2.Supply poor quality 3. Cheat scale weighting 4. Price setting problem

Purchase of *wheat*

20. What type of wheat products purchased for consumption? Please respond to the following questions. (*Multiple responses are possible):

Type of *wheat*	Quantity purchased Per week	Number of market day per week	Low price Paid/Kg	No. of months You buy at lower price	High price paid(birr/kg)	No.of months you buy at higher price	From whom do you buy?
bread *wheat*							
Durum wheat							

21. As a buyer, do you have difficulty in obtaining sufficient supplies? (√) 1. [ ] Yes 2. [ ] No

22. As a buyer, do you have a particular seller? 1. [ ] Yes 2. [ ] No

23. If the answer to Q 22 is yes, how many farmers could be your potential sellers with respect to a particular crop? Approximate for *wheat*_____

24. Do you consider any quality requirements to purchase *wheat*? 1. [ ] Yes 2. [ ] No

25. If yes for Q.24, what quality requirement do you consider for; _____

26. What are the constraints hindering consumption of *wheat*? Rank horizontally (1= most severe, 2= second severe and etc.)

Type of crop	Shortage of supply	Income Shortage	Lack of market information	Poor product handling	High price of product	Others (Specify)
wheat						

27. Do you think that the price of wheat reduced if the value chain actors" linkage is improved? (√) 1. [ ] Yes 2.[ ]No.

28. If your answer for Q.27 is No, why? _____

29. If your answer for Q.27 is yes, where intervention should be needed_____

30. What should be done to increase wheat consumption? _____

Checklist for Key Informant Interview

District: Agarfa

Kebele: _____

Date: _____

Name of Interviewee_____

1. Name of Organization: _____-

2. Role of the interviewee in the organization: _____

3. Location and contact information:

 Region/Zone/Woreda/ Kebele/ P.O. Box/telephone_____

4. Type of the organization: public/private/NGO/CBO.

5. Organizational mission, vision and objectives--

6. What is the role of your organization in wheat value chain in the study area? -----------------
----

7. What are the core processes in the wheat value chain your organization have? ---------------

8. Who are the actors involved in these processes and what do they actually do?

A. input supply

i. _____

ii. _____

iii. _____

b. production

i.. _____

ii. _____

iii. _____

c. Marketing

i. _____

ii. _____

iii. _____

d. Consumption

i. _____

ii. _____

iii. _____

9. Where does wheat originate from and where does it go?

10. How does the value change along the chain?

11. What types of relationships and linkages exist among actors?

12. What types of services are feeding into the chain?

13. What is the location and position of the poor in the value chain?

14. What key constraints exist at various levels in the wheat value chain and what arePotential solutions to those constraints?

15. What are loss factor during various function along wheat value chain?

Checklist for Focus Group Discussion

Participants: wheat producers from selected Kebeles

1. District AgarfaKebele:_____Date: _____

2.Whatare constraints and opportunities related to inputs suppliers (Availability, accessibility, on time delivery, quality, cost of inputs and etc)? _____

3. What are major constraints and opportunities at wheat production stage (land Preparation, crop management practice and, disease and pests control &etc)?

_____

4. What you suggest to solve these hindrances?

_____

5. What are the major constraints and opportunities at in marketing stage of wheat (sales price setting, brokers interferences &etc.?)

_____

6. What are the major constraints and opportunities at processing stage of wheat?

_____

7. What are the major constraints and opportunities at consumption stage

_____

8. Linkage /interaction/ partnership/ coordination between wheat value chain actors?

_____

9. How do traders influence farmer's participation in *wheat* value chain?

10. What are the major problems relating to marketing of *wheat*?

11. Linkage /interaction/ partnership/ coordination between value chain actors_____?

12. How all *wheat* value chain actors" benefited from this business equally? Your opinion_____

Questionnaires for processor

1. Name of respondent: _____

2.Zone: _____District: _____Village_____

3. Age of respondent :(_____) years

4. Sex of the respondent: 1. Male 2. Female

5. Education level of the respondent: 1. Illiterate 2. Primary 3. Secondary4. Others_____

6. Marital status: 1. Single 2. Married 3.Divorced 4.Widow 5. Others

7. What is your major means of income? 1. Farming 2. Trade 3.Employment 4. Others

8. If you sold "wheat flour" to other person/business institution, what service you obtained from government? _____

9. What is the selling price of one Kg of wheat flour? _____

10. How much income do you earn per year: _____birr

11. Do you consider any quality requirements to purchase wheat you process? 1. Yes1.No

12. If yes, what quality requirement do you consider for? _____

13. What are the constraints hindering sell of wheat flou*r*? Rank horizontally (1= most severe, 2= second severe and etc.)

14. How long can you store the products in the storage before sale? _____

15. Do you believe that losses (quality and quantity) of wheat products are there in your wheat chain? 1. Yes   2. No

16. How much loss (in %) you have encountered during storage of your wheat Products (max estimate)? _____

18. What are the causes of losses during storage? 1. Poor package/container 2.Accidental Physical Loss 3.Quality loss (color change) 4.Weather condition 5.Other/s(list)_____

20. What are the causes of losses during transport in general? 1. Poor package/container 2. over loading 3. Accidental Physical loss 4.Quality loss (color change) 5.Weather condition 6.Other/s(list): _____

21. Do you process the wheat flour before selling or storage? 0. Yes 1. No

22. If your answer is 'Yes' what kind of processing you do? _____

23. Did you store your wheat Products before selling? 0. Yes F 1. No F

24. If your answer 'Yes' for above question where did you store your products? 1. Atown site 2. At collections centers 3. At own site and ground store 4. Other pleasespecify

25. What are wheat value chain actors in your area (the flow of produce and other)? List _____

Questionnaire for cooperatives

1. Name of organization _____

2. When this was organization established: …………………Years

3. What is the role of this organization in the market channel? 1. Wholesaler 2. Collectors   3 Broker 4.Retailer 5. Other

4. What was the establishment capital_____ETB_____sources.

5. What is the source of establishment capital? _____

6. How many members your cooperatives have? _____

7. What are the criteria to be the member of your cooperatives? _____
_____

8. How many labor forces involved in Wheat Product trading/processing/collecting activities in this organization? Male _____ Female_____

9. How do you attract your supplier? 1 By giving better price relate to others 2 by giving fair dividend 3 by fair scaling weighing 3 by visiting them 4 other (specify)

10. What are the impacts of your organization on other wheat traders? _____

11. How do you attract your buyers? 1. By giving better price relate to others 2. Quality of your
product 3.by fair scaling weighing 4.by visiting them 5 by giving credit 6. other

12. When do you do your business? 1. Year round 2. When purchase price becomes low

3. during high supply 4. Other (specify)_____

13. How much and from whom did you purchase wheat Product last month?

5. What are the contributions of these organization/cooperatives to local society/farmers?

_____

16. What wheat processing related activities your organization involved in?

_____

17. What are the causes of losses during transport in general? 1. Poor package/container

2. Over loading 3. Accidental Physical loss 4. Other/s(list): _____

18.Do you process the wheat products before selling or storage? Yes 1.2. No

19.If your answer is 'Yes' for above question what kind of processing you do?

_____

20. Did your organization store your wheat Products before selling? 0. Yes 1. No

21.If your answer 'Yes' for above question where did you store your products? 1. At own site

2.At collection center 3. At own site and ground store 4. Other please specify _____

22. How long can you store the products in the storage before sale? _____

23.How much loss (in %) you have encountered during storage of your wheat (estimate)?

24.What are the causes of losses during storage? 1. Poor package/container 2. Accidental

Physical Loss 3.Quality loss (color change) 4.Weather condition 5. Other/s(list)_____