Gebreselassie, Samuel; Haile, Mekbib G.; Kalkuhl, Matthias

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Authors' addresses

Dr. Samuel Gebreselassie
Ethiopian Economics Association (EEA)
P.O. Box 34282
Addis Ababa, Ethiopia
Tel. 251-(0)11-6453200: Fax 251-(0)11-6453020
E-mail: sgebreselassie@eeaecon.org
www.eeaecon.org

Dr. Mekbib G. Haile
Center for Development Research (ZEF), University of Bonn,
Genscherallee 3
53113 Bonn, Germany
Tel. 0049 (0)228-73 1841: Fax 0228-731972
E-mail: mekhaile@uni-bonn.de
www.zef.de

Prof. Dr. Matthias Kalkuhl
Mercator Research Institute on Global Commons and Climate Change (MCC) gGmbH
Torgauer Str. 12 – 15
10829 Berlin, Germany
Tel. 0049 (0) 30 338 5537 243: Fax 0049 (0) 30 338 5537 102
E-mail: kalkuhl@mcc-berlin.net
www.mcc-berlin.net

The Wheat Sector in Ethiopia: Current Status and Key Challenges for Future Value Chain Development

Samuel Gebreselassie, Mekbib G. Haile, Matthias Kalkuhl

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Abstract

This paper provides a general overview of the current status and key challenges of the Ethiopian wheat value chain. Wheat is an important staple food crop in Ethiopia. Improving wheat production and productivity is therefore a key part of the agenda in the Ethiopian government's food security policy programs. Policy interventions that aim at improving wheat production or agricultural production for that matter, however, require interventions beyond the farm—at the whole wheat value chain. Both domestic production and import—the two key sources of wheat grain supply to the Ethiopian wheat value chain—have shown a substantial increase since the mid-1990s. Yet, a steady increase in domestic wheat consumption has resulted in rising wheat and wheat product prices over the past two decades. For instance, wheat grain, wheat flour as well as wheat bread prices have all more than doubled between 2000 and 2013. Using a qualitative survey of selected wheat value chain actors and a review of existing literature, this study provides an overview of the wheat value chain, institutional and marketing arrangements, and trader behaviour of wheat value chain actors in Ethiopia. The wheat value chain consists of multiple actors that include several smallholder farmers and the Ethiopian grain trade enterprise (EGTE) at the upstream and urban and rural consumers at the other end. The study stresses the need for formulation of market-enhancing policies, such as quality control and dispute settlement mechanisms as well as better access to market information, to improve wheat productivity as well as marketing efficiency.

Keywords: Value chain, wheat, grain market, food prices, price transmission, Ethiopia

JEL Classifications: L11, M31, Q02, Q11, Q 13

1 Introduction

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

Wheat production has grown significantly over the past two decades following several government programs and initiatives implemented to drive agricultural growth and food security in the country[1]. Production increased from around 1.1 million tons in 1995/96 to 3.9 million tons in 2013/14, which is an average annual growth of 7.5 percent. Although wheat production has grown steadily, consumption of wheat has also expanded significantly. Wheat consumption increased from 2.1 million tons to 4.2 million tons, representing an annual increase of about 4.2 percent between 1995/96 and 2013/14. Wheat import has also grown significantly over the past decade. Wheat is in fact the single most important staple food crop imported from abroad. Wheat import increased by an average of 6.6 percent over the past decade. In 2008 Ethiopia, for instance, imported more than a million tons of wheat, which was equivalent to about 40 percent of the total domestic production and almost 250 percent of the marketed volume (Rashid and Solomon, 2014). In 2013/14 the country imported 1.39 million metric ton, which is about 34 percent of the domestic production and above 160 percent of the marketed wheat in the country (Minot et al., 2015)[2]. In parallel with the surge in wheat import, the country was forced to spend a substantial amount of foreign currency that largely comes from export of other primarily agricultural commodities.

The substantial increase in domestic production and import of wheat, however, has not helped to reverse the increasing trend in wheat price. Official statistics on consumer prices indicate that prices of wheat and wheat products rather increased substantially. Over the eight-year period (between 2005 and 2012), the price of wheat has increased almost 300 percent. The wholesale price of a tonne wheat at Addis Ababa market has increased from 1975 to 7045 Ethiopian Birr (257 percent) and the farm gate price from 1713 ETB to 6709 ETB (292 percent) (FAO, 2014). On the other hand, between 2000/01 and 2012/13 real prices of wheat, wheat flour and bread (in Addis Ababa) increased by 176, 131 and 116 percent, respectively[3]. The current trend seems to continue in the future too. Bergh et al.. (2012), for instance, indicate a growing wheat supply deficit in the coming decades. According to this study, supply is expected to grow by 73 percent (from 2.6 million in 2010 to 4.5 million tons in 2030), whereas demand is expected to increase by 90 percent (from 3 million to close to 5.7 million tons during the same period). A range of factors that include population growth, expansion of agro-processors, urbanization, and increasing household income contribute for wheat demand growth in the future. In general, the upward price trend seems to continue in the near future too.

The growing structural deficit in wheat supply and the government's active role, both in terms of making large investments in extension programs and adopting protectionist policies to ensure government control of all commercial wheat imports, necessitates studies on the structure and performance of wheat value chain. The present study aims to contribute to this by providing an

[1] For details on agricultural policy in Ethiopia, please Gebreselassie (2003). ftp://ftp.fao.org/es/esa/roa/pdf/1_Policy/Policy_Ethiopia.pdf.

[2] As depicted by official data, wheat production grew at relatively higher rate than wheat consumption in Ethiopia. This, however, failed to decrease wheat import. The increase in wheat import could be either explained by data errors (especially production data) or a parallel surge in wheat export, whereas wheat export is negligible (FAO 2014, Dercon and Zeitin 2009.

[3] These values are computed using consumer prices data from the Central Statistical Agency (CSA).

overview of the current status and key challenges of the Ethiopian wheat value chain. A better understanding of the current status of the wheat sector, its value chain, the institutional marketing arrangements, and microeconomic trader behaviours of wheat market participants contributes to formulation of policies that are market-enhancing as well as that could enhance domestic wheat production.

The remainder of this study is organized as follows. The next section presents an overview of the wheat value chain as well as the current status of the wheat sector in Ethiopia. This section begins with brief description of the existing institutional marketing arrangements of the wheat value chain and proceeds by extensive discussions on the structure of the wheat farms, production and productivity as well as wheat market in Ethiopia. The third section presents findings from a qualitative survey conducted with a range of wheat value chain actors, including wheat wholesale traders and millers. These data are used to highlight key facts on the performance of wheat value chain in the country as well as the behaviour and challenges of traders in the surveyed wheat markets. The last section provides conclusions and policy recommendations.

2 Overview of the Ethiopian value chain

2.1 Value Chain Concept to the Ethiopian wheat sector

Since Ethiopia's market liberalization in the early 1990s many studies (e.g. Gebre-Madhin, 2004; Mohammed, 2009; Demeke and Marcantonio, 2013) have been conducted on commodity market performance and value chain analysis for key agricultural commodities, such as for wheat, in Ethiopia. The development of stable and reliable marketing system has been an important element to enhance productivity and commercialization of smallholder cereal producers. With nearly half of the Ethiopian population depending on the food grain market (Gebre-Madhin, 2004), the performance of the domestic market is vital for food security and economic growth in the country.

Marketing of agricultural products consists primarily of moving products from production sites to points of final consumption. The term value chain is used to characterize the set of interconnected and coordinated links and linkages during this product movement (Kirimi et al., 2011). Value chains are a key framework for understanding how a product moves from the producer to the customer. 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 (ibid). The major objectives of value chain analysis of basic food crops like wheat in Ethiopia should be how to maximise the participation 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 competitive to them.

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 off-load grain stocks to avoid damage and loss caused by storage pests (Walker and Wandschneider, 2005). As shown below in Fig. 1, wheat farmers can either sell the grain to wholesalers or trade small quantities to rural assemblers.

2.2 Wheat producers, production and productivity

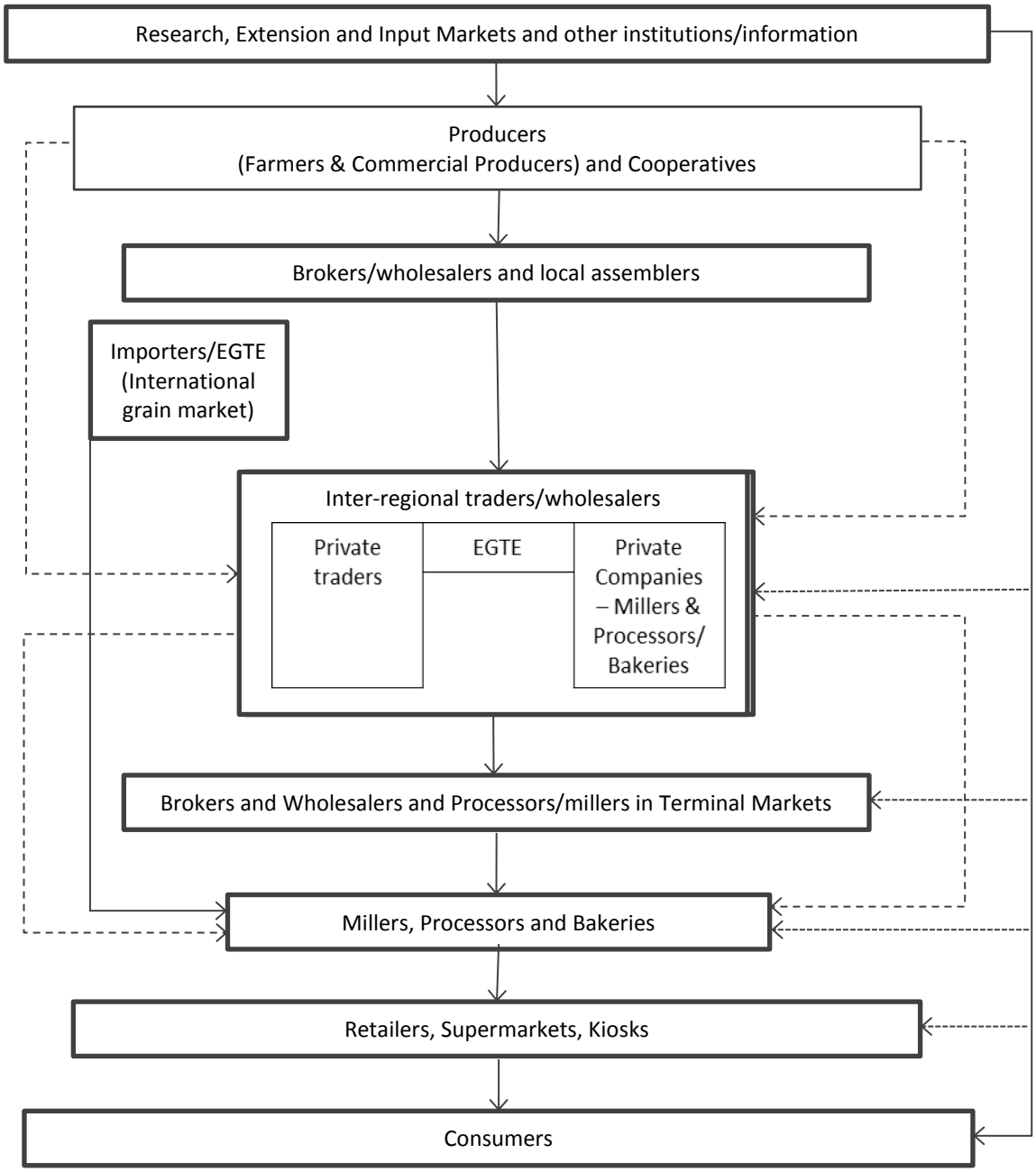
Ethiopian agriculture is dominated by smallholders. As of 2014, close to 5 million wheat farmers engage in wheat production in Ethiopia. This is about a third of all smallholder farmers in the country (CSA, 2014). Despite their vast number, Ethiopian farmers in general cultivate small plots/acreage. Above half of the smallholders cultivate farms less than a hectare (EEA, 2015). The average farm size has also declined over time. Official statistics, for instance, indicate that over the past five years alone (2009/10–2013/14) the proportion of smallholders who cultivate farms less than a hectare has increased by 5.2 percent while those who cultivate farmland that vary between 1 and 2 hectares and over 2 hectares declined by 5.4 and 7.1 percent, respectively. The average wheat farmland in 2014 was only 0.34 hectares, and varies between 0.28 and 0.39 hectares. Despite such miniature plot sizes, there is high degree of inequality in access to farmlands. As shown in Fig. 1 below, 57 percent of smallholder farmers cultivate only 20 percent of cultivated farmlands, whereas 46 percent of cultivated farmlands are operated only by 17 percent of farming households.

Although small-scale farmers dominate wheat production in Ethiopia, there are some large-scale commercial farms that grow wheat. However, large commercial wheat producers account only 3 to 5 percent of all wheat cultivated land (Minot et al., 2015). Wheat is the fourth largest cereal crop produced in Ethiopia (FAO, 2015a). Production of wheat has significantly increased over the past 20

years. It has increased from 890000 metric tons (MT) in the 1991/92 marketing year to 3.11 million MT in 2009/10 (Bergh et al., 2012) and to 4.04 million MT in 2014/15 (Minot et al., 2015).

Growth in wheat production has, however, been characterized by significant annual fluctuations, primarily due to variations in rainfall. The coefficient of variation of wheat production during the 1996-2013 periods was 44 percent, whereas the Cuddy-Della Valle index is 12 percent. The latter index implies that wheat production deviates from the trend wheat growth by an average of 12 percent. On the other hand, the proportion of cereal area cultivated with wheat has fluctuated between 15 and 18 percent over the past ten years with no discernible trend (Minot et al., 2015)[4].

Figure 1: Supply/value chain actors of the wheat market in Ethiopia



Note: The solid and dashed lines indicate strong/regular and weak/intermittent relationship/support respectively, whereas the dotted arrow shows the flow of regulatory activities.
Source: Authors' illustration based on literature and survey.

[4] This implies that other cereals have expanded their cultivated areas at similar rates over the past 20 years.

Figure 2: The Structure of Ethiopian farms by farm size (percent of farmers)

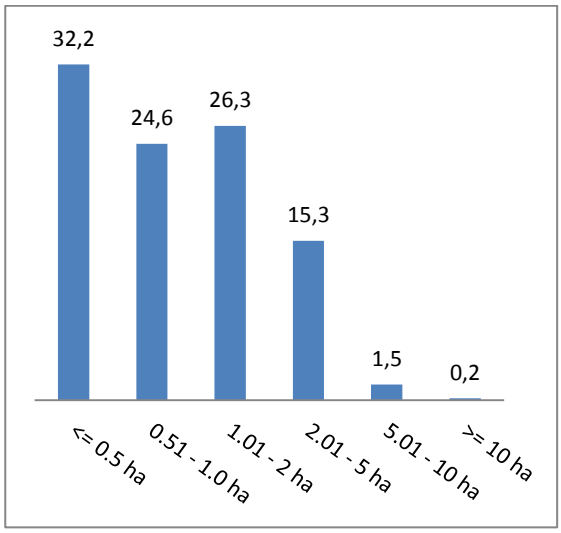
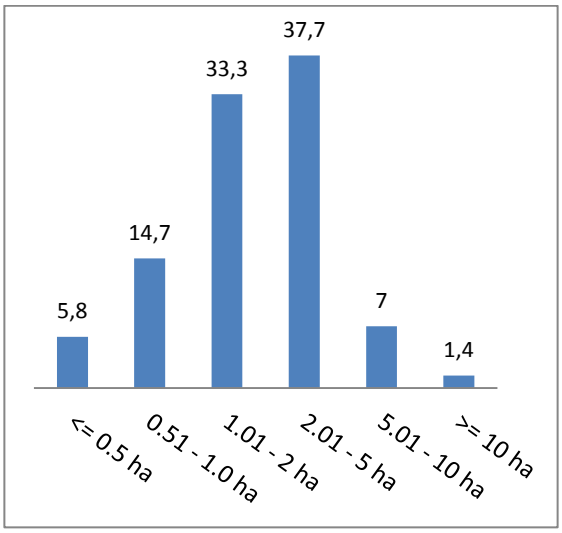


Figure 3: The Structure of Ethiopian farms by farm size (percent of all farms)



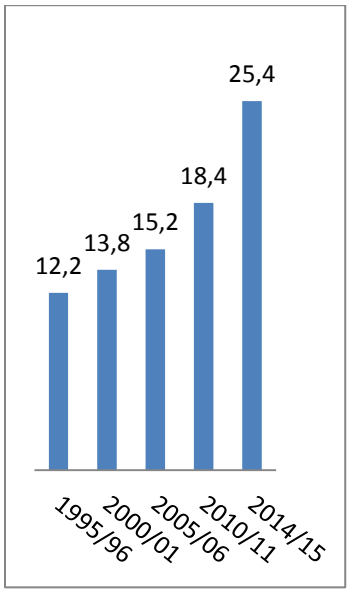
Source: computed based on CSA (2014b)

Wheat yield has increased over the past decade. Recent estimates show that wheat farmers in Ethiopia produce on average 2.5t/ha[5], which is well below the experimental yield of above 5 t/ha. There is, however, consistent progress in terms of narrowing this yield gap between field and experimental levels. As indicated by official statistics, wheat yield has doubled over the past two decades (Fig. 4). In comparison to the global trend the recent growth in wheat yield in Ethiopia is also encouraging. Considering wheat, Ethiopia has managed to more than double its land productivity over the past one and half decades. The second best performer in the category is Malawi, a country that hugely subsidizes its fertilizer market. Ethiopia is among the top wheat producer countries in Africa, following South Africa and Egypt. Yet, wheat yield in Ethiopia is only 70 percent of the level in South Africa, and only 39 percent of the highly irrigated wheat production system of Egypt. Compared to China, wheat yield in Ethiopia (in 2014) is about half of that of China.

In general wheat yield in Ethiopia needs to improve further to level-up with Africa's and world average wheat yields, which were 13 and 32 percent higher than the average wheat yield in Ethiopia, respectively (MoA, 2012; FAO, 2015a). A study by FAO, however, shows that Ethiopia (in 2012) ranks 80th in wheat yield globally. As shown in Fig. 5, wheat yield in Ethiopia in 2012 was only 25 percent of that of New Zealand, which leads the global performance with 8.92 tonnes per hectare. Compared to the best performing African countries such as Namibia and Zambia, wheat yield in Ethiopia was only about one-third of these countries (Fig. 6). Beyond agro-climatic and political factors contributing to lower yields, technology could play a more dominant role in productivity, enabling Ethiopia to enhance its yields and achieve at least a sufficient yield to feed and change the living standard of its growing population (FA0, 2014).

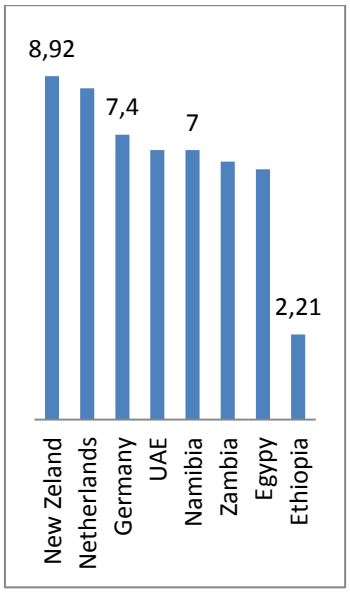
[5] There is considerable variation in average wheat yields across regions and zones. For instance, the average wheat yields in some zones of Oromia and SNPP, where farm sizes are relatively large, were between 2.5 and 2.8t/ha, whereas, average yields are reportedly lower than the national average in most of parts of Amhara and Tigray, ranging between 1.7 and 1.9 t/ha (CSA, 2013).

Figure 4: Wheat yield in Ethiopia (100k.g./ha)



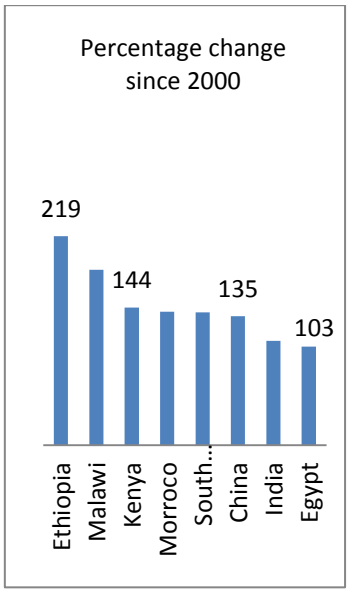
Source: CSA annual reports (Fig. 5).

Figure 5: Global Comparison of Wheat Yield, 2012 (tonns/ha)



Source: Adapted from FAO (2014)

Figure 6: Growth in wheat yield in Ethiopia viz-a-viz best performing developing and other selected African countries



Source: Computed based on data from FAO database

2.2.1 *Use of modern farm inputs among wheat producers*

Low agricultural productivity can be attributed to smallholders' limited access to agricultural inputs, financial services, improved production technologies, irrigation and agricultural markets—and, importantly, to poor land management practices that have led to severe land degradation. The use of fertilizer and other yield augmenting practices and inputs like improved seeds has also increased over time as availability or access to suitable farmland has increasingly become scarce due to population pressure and also other factors like land degradation and unsustainable land management practices. Between 2002 and 2011, fertilizers sale and consumption in Ethiopia, for instance, grew by more than 100 percent, implying an average growth rate of 6 per year (IFDC, 2012).

Table 1: Extent and intensity of modern input use in wheat production

Inputs	**Extent and intensity of use (2014 crop year)**
Fertiliser	• 73.4% of wheat acreage • 67.6% of wheat growers • 137.8 Kg/ha • 48.1 Kg/farmer
Improved seeds	• 5.6% of cultivated land • 7.4% of wheat growers
Irrigation	• 0.39% of cultivated land • 0.88% of wheat growers
Pesticide use	• 47.2% of cultivated land • 35% of wheat growers

Source: CSA (2014d)

Following *Teff*, wheat is the most common crop on which fertilisers like DAP and Urea were applied. In 2015, about 68 percent of wheat growers applied fertilisers on 1.68 million hectares or 73.4 percent of wheat acreage but often with suboptimal amount (Table 1). Despite this relatively high use of fertilisers, only a small portion of wheat growers had sown their farm with improved seeds in 2014/15 crop year. CSA report indicates that only 5.6 percent area planted with wheat in 2014 crop year used improved seeds varieties (CSA, 2014d). If one assumes that this 5.6 percent of wheat area planted with improved seeds also fertilised, the area cultivated using improved seed-fertilizers packages is still less than 6 percent of total cultivated land[6], which is unfortunate given the high production response for combined use of improved seeds and fertilizers in Ethiopia (Dercon et al., 2009; Byerlee et al., 2007).

2.2.2 Research and Extension as institutional players

In addition to wheat farmers, addressing the complex issue that hindered the country from becoming self-sufficient in wheat requires an active and complete participation of other important value chain actors at the pre-production stage of the wheat value chain. Among them are public and private institutions that have been engaged in the development and supply of agricultural inputs and technologies. These include formal agricultural research and extension systems that have long been engaged in the generation, promotion and adoption of improved seeds and other farm technologies and management practices that potentially enhance wheat production and productivity.

Agricultural research and technology generation has been an important aspect of government efforts for the development of Ethiopian agriculture for the last several decades. It is now over five decades since agricultural research activities were institutionalized. Currently, there are many agricultural research institutions at various levels that engage in agricultural research and technology generation and dissemination activities. But the Ethiopian Institute of Agricultural Research (EIAR) remains the primary agricultural research agency. The EIAR is a federal institution mandated to design research policy and strategies, assist in capacity building, coordinates national research activities and undertakes researches with its own research centres and in collaboration with other regional research institutes. The institutional structure of Ethiopia's agricultural R&D system has undergone numerous rounds of restructuring over recent periods.

While the Ethiopian research system has supported wheat producers across the country, it is difficult to say that the wheat value-chain at the pre-production stage in general and the research and extension systems in particular provide demand-driven support to wheat producers. National capacity in terms of facilitating identification, sourcing, import, and multiplication and dissemination of new and proven agricultural technologies should be strengthened. Limited participation and integration of the private sector in wheat value added activities undermined the whole value chain system. The sustainability and efficiency of the wheat value chain at the upstream stage needs strong but well regulated participation of the private sector. Previous studies, for instance Byerlee et al. (2007) and Yu et al. (2011), argued that increased private sector participation would strengthen the Ethiopian seed system.

2.2.3 Wheat producers and the Ethiopian seed system

Despite the on-going small program of direct marketing of certified seed by seed producers to farmers across 31 woredas (districts), currently improved certified seed is supplied to Ethiopian smallholders primarily through regional, state-run extension, and input supply systems that operate with a degree of guidance from the federal Ministry of Agriculture and Forestry. This regional system is made up of regional bureaus of agriculture, their woreda (district) offices, and extension agents

[6] Gashaw et al. (2014), however, indicate that only about 1 percent of the wheat area was cultivated using improved seed-fertilizers packages.

(termed "development agents") working at the kebele (peasant association) level. These organizations collaborate closely with farmer cooperatives and regional credit and savings institutions in both supplying inputs and disbursing credit (Spielman et al., 2011). The pricing and marketing policy in the Ethiopian seed system is highly centralized.

For farmers in Ethiopia, buying improved seeds through the formal system has not always been reliable. Sometimes seeds are delivered too late for the planting season or the wrong type of seed is delivered; often there are seed shortages, and the seed quality can be low. "Farmers have limited options to access improved seed beyond their primary cooperative in their villages, especially when seed is unavailable or not at the appropriate level of quality (McMullan, 2014).

The other major problem in the Ethiopian seed marketing system is related to demand for and supply of improved seeds. Estimates of market demand for improved seed in Ethiopia are based entirely on official projections. The responsibility of responding to these demand estimates lies primarily with the state-owned Ethiopian Seed Enterprise (ESE) (AGRA, 2014). Seed distribution is usually managed by farmer cooperative unions which usually pick the seed up in the regional/Zonal warehouses and bring it to the woredas and kebeles. Unions charge for transport, loading and unloading but they make only small profits for seed distribution, as these profit margins are determined by the regional governments (Husmann, 2014). An important implication of this seed system is the lack of agro-dealers as the seed distribution is organized via government-controlled large distribution channel. Seed demand has consistently exceeded supply. In addition, shortcomings in seed quality and timeliness of delivery have been longstanding issues in Ethiopia (AGRA, 2014).The process of government policy to estimate demand and supply of seed aggregates from "demand estimates" produced by woreda and regional bureaus likely masks the growing demand for improved or certified seed and for quality maize seed throughout Ethiopia. So supply of certified/improved seed may be consistently falling short of demand. Lack of "unbiased estimates" of quantities demanded and supplied is the core reason for shortcomings in seed quality and timeliness of delivery in the country (AGRA, 2014)[7].

Private sector involvement in wheat seed markets in general is very low, and growth in the private seed sector is inhibited by several factors. One is the provision of large government subsidies to the public ESE. Another cited reason is the expansion of the ESE into hybrid seed production despite an existing private seed company with experience in the hybrid maize seed sector. Additionally, most farmers use retained seed for planting, making it difficult to accurately predict demand for seeds (Bergh et al., 2012).

Though the public provision of inputs, credit, and information is still necessary, many of Ethiopia's state-led policies put in place to promote cereal intensification and smallholder commercialization have outlived their usefulness. A rethinking of approaches is needed, one that reallocates the roles of the public and private sectors in the country's agricultural input, extension, and education systems. This rethinking requires a nuanced understanding of the complex issues involved, evidence-based analysis and policy recommendations, and continuous debate on the pros and cons of alternatives and options (Spielman, 2008). The development of a more dynamic and competitive agricultural sector in Ethiopia requires the introduction of rural institutions and organizations that respond effectively to rapidly changing market and technological conditions. This suggests the need for policies and programs designed to create more space for both public and private input and service providers in the rural economy.

[7] Byerlee et al. (2007) and Yu et al. (2011) argue that increased private sector participation would strengthen the Ethiopian seed system, which is currently failing to meet the needs of many farmers. The ESE is not able to provide a sufficient seed supply. In 2005, for instance, the quantity of wheat seed supplied by the ESE was only 20 percent of the quantity demanded according to regional bureau predictions. Farmers have also reported problems with ESE-supplied seed quality, including poor cleaning, low germination rates, seed mixtures, and delayed supply.

The recent addition of the Agricultural Transformation Agency (ATA)[8] into the Ethiopian agricultural system is expected to reshape the imbalance in the role of the private and public sectors in the country's agricultural input and service provision system and in making it more effective and demand-driven for small wheat producers. The ATA is expected to work with implementation partners mainly the ministry of agriculture and forest development to identify solutions to address systemic bottlenecks in the agricultural technology, input and finance systems around a prioritized set of commodities, such as wheat, throughout the country. The ATA launched the Ethiopian wheat productivity initiative in 2013 which aims to increase the productivity of one million smallholder wheat farmers by 50 percent by 2015 (Biruk, 2014). In doing so, it also aims to replace all current wheat imports to save the annual foreign exchange spending on wheat imports and to protect local producers.

ATA, in collaboration with MoA and other stakeholders, has been working to develop a comprehensive rural financial services (RFS) strategy, which has a potential to at least partly solve smallholders' limited access to credit. This initiative is also expected to enhance the existing low capacity in rural finance institutions and nonexistence of risk mitigation mechanisms, hampers productivity of wheat farmers at the pre-production and production stages.

2.3 Wheat production and marketing in Ethiopia

Wheat production grew by 37 percent between 2010/11 and 2013/14, and reached at 3.93 million metric tons in 2013/14 (CSA, 2015c). Wheat production, however, concentrates in two regions. This contributes to the geographical dispersion of wheat-surplus and deficit areas in the country. The major surplus areas of wheat are zones (provinces) in Oromia and SNNPR, namely Bale, East Arsi, West Arsi, Western and Eastern Shoa, Central SNNPR (Hadiya and Kembata) and Central and Southern Amhara (East Gojam, North Shoa) (see Figure 12) (FAO, 2014). Two-thirds of the zone-level surpluses come from just four zones: Bale, Arsi, West Arsi, and East Gojam (Minot et al., 2015). Trade flows from these surplus areas in all directions to Addis Ababa. Other major flows are from North Western areas to Dessie and then to Mekele, and from Addis Ababa to other deficit areas, including Dire Dawa, Harar, Jijiga and peripheral regions of Oromia, Somalia and Benshangul. As shown in Figure 7 the major route of wheat trade is from Addis Ababa to East Ethiopia, and from Dessie to northern part of the country, whereas the minor routes are to western and southern peripheries (FAO, 2014).

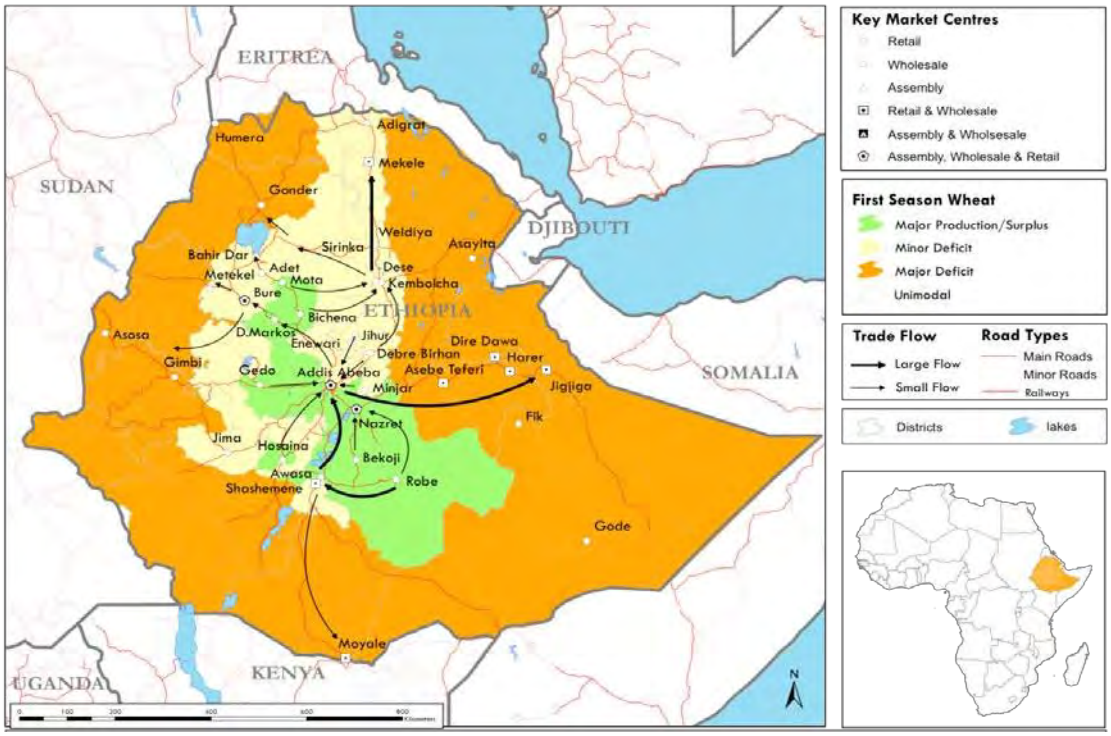
Table 2: Wheat production, import and self-sufficiency in Ethiopia

	Wheat Production (million tons)	Wheat Import (million tons)	Estimated marketable surplus*	Share of imported wheat	
				as total domestic production (%)	as domestic surplus/marketable production (%)
2010/11	2.86	1.70	0.572	59.4	237.8
2011/12	2.92	1.65	0.584	56.5	226.0
2012/13	3.43	1.64	0.686	47.8	191.3
2013/14	3.93	1.62	0.786	41.2	164.9

Source: Computed based CSA (2015c) and FAOSTAT (for data on wheat import).
Note: Based on CSA's 2014/15 crop utilization survey, the share of marketable surplus is considered as 20 percent of the production.

[8] The ATA was created in 2010 to help Ethiopia to replicate the agricultural transformation seen in many Asian countries during their first phase of development. In particular, the agency is reported to strive to (i) introduce new technologies and approaches that can address systemic bottlenecks & catalyse transformation of the sector, and play a catalytic role to support partners to effectively execute agreed upon solutions (many of which may not be new) in a coordinated manner.

Figure 7: Production and market flow maps, Ethiopia first season wheat

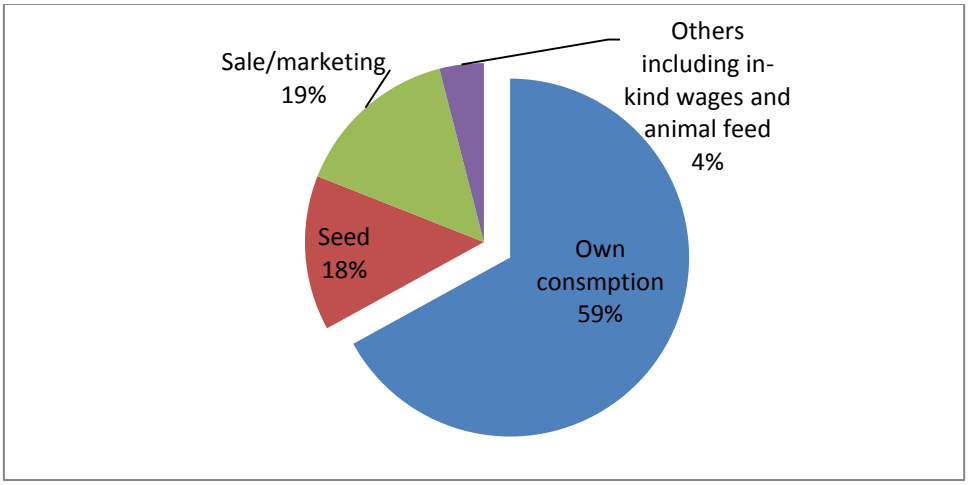


Source: FEWSNET (in FAO, 2014).

Despite the high growth in wheat production, the market surplus of wheat farmers, however, remains very low, indicating the subsistence nature of wheat production in the country. Most wheat in Ethiopia is not marketed; instead it is retained by the farmer and used for their own consumption, seed, and possibly other uses. According to the 2013/14 Agricultural Sample Survey, just 19 percent of wheat output was sold. The proportion was somewhat higher (25 percent) in the 2012 IFPRI-ATA Baseline Survey (Minot et al., 2015). Official statistics also indicate that in 2014/15 production year, the average wheat producer produce 751 kg of wheat and sell 189 kg (CSA, 2014c), so that the average marketable surplus was 25 percent. The share of wheat production that is sold, however, varies widely across households.

Over half of the estimated 4.7 million wheat growers, for example, produced only for own domestic consumption. Based on a national representative data, a study by Minot et al. (2015) indicates that about 54 percent of wheat producers do not sell any of their wheat output, which implies that few producers supply the bulk of wheat marketed in the country. In other words, the domestic wheat market is dominated by a few and relatively large producers. The top 20 percent of wheat sellers account for 60 percent of wheat sales. Just 10 percent of them sell more than 40 percent of the wheat supplied to the domestic market. This difference in output market participation among wheat growers is partly explained by the disparity in the size of farm operated by these farm households (Figures 9 and 10).

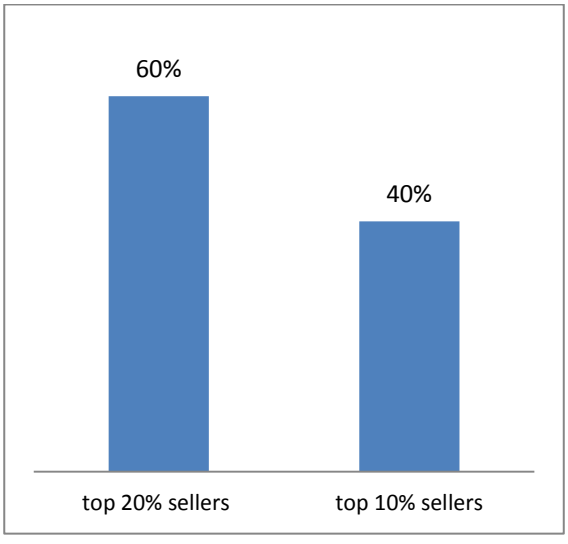
Figure 8: Utilization of wheat among wheat producers (percent of all production)



Source: CSA, 2014/15

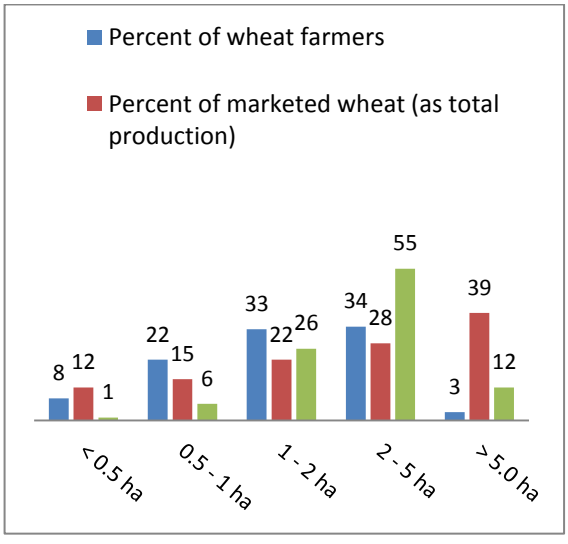
Market participation of wheat producers is affected by a range of factors including the volume of wheat production/wheat acreage and wealth status of producers. A study by Minot et al. (2015), for instance, found that farmers with smallest farms (those with less than 0.5 hectares) sell just 9 percent of their harvest, on average, while those with more than 5 hectares sell an average of 39 percent of their wheat output. Only 3 percent of farmers fall into this category; however, so they contribute just 12 percent of the total marketed surplus of wheat. On the other hand, farmers with 2-5 hectares of land sell a smaller share (28 percent) but account for more than half (55 percent) of wheat marketed in Ethiopia because they are more numerous (accounted about 34 percent of the wheat producing farms) (Minot et al., 2015).

Figure 9: Market share of best wheat sellers (percent of all wheat marketed)



Source: Minot et al. (2015)

Figure 10: Patterns of marketed surplus of wheat among farmers operate different farm sizes



Source: Minot et al. (2015)

On the other hand, wheat production per farm is also found to be smallest among the poorest households and rises steadily across expenditure quintiles. Not surprisingly, the quantity of wheat sold per farm also rises with expenditure category. The marketed share is just 9 percent for the poorest quintile of farmers, but it rises to 37 percent among the richest farmers. As a result, 40

percent of the marketed surplus of wheat is produced by the richest 20 percent of farmers. Though they didn't study the underlying cause of the findings, Minot et al. (2015) also indicate that male-headed households produce more wheat on average but sell a somewhat smaller share of the total compared to female-headed households[9].

2.4 Efficiency and volatility of wheat markets

Market participation among wheat producers is very low, though growing overtime following recent expansion of roads and urban centres in the country. Along with increase in production, good and efficient markets that are expected to transfer a fair proportion of consumers' price to producers are important to enhance and sustain market participation of wheat producers, thereby create conducive environment for the process agricultural intensification to deepen further with a positive impact on poverty reduction.

Market efficiency could be measured in terms of a range of indicators. In this report, however, two measures are selected: the degree of spread between consumers and producers price measured as the share of farmers /producers from consumers' price) and volatility of producers' price measured as temporal differences in seasonality of output prices[10].

The above graphs on wheat price trend reveal two points. First, the spread between wheat producers' price (in Bale region) and consumers' price (in Addis) remains high. Second, the gap in producers' and consumers price went in par as prices paid by consumers increased over time. As shown in Fig. 9, the average share of wheat producers in consumers' price paid over the past fifteen years (between 2000 and 2015) is 63 percent, and varies between 60 percent in 2012 and 73 percent in 2008[11]. This indicates that over 38 percent of the price paid by wheat consumers in Addis (which is located on average about 400 Km from producing areas) accounted for transport costs, loading and unloading costs, and profit margin and processing expense, if any. Reducing these costs improves market efficiency. On the other hand, the gap between producers' and consumers' prices remains similar even if consumer prices increased significantly over time. The low competitiveness level in wheat market could play the role in preventing wheat producers to increase their share from the growing consumers' price. All these indicate the need to enhance the competitiveness of smallholder producers in their engagement in agricultural output markets.

The temporal difference in wheat seasonal prices is high. As indicated in Fig. 14, over the past 14 years, price at post-harvest period decline on average by 70 percent when compared to the price at pre-harvest season when prices reach at their peak. This difference in price gap declines to 24 percent if we consider the mean annual price instead of the lowest seasonal price. This seasonal fluctuation in grain price reflects difference in seasonal grain supply. The grain market is generally flooded with crops just after the meher harvest when demand is relatively the lowest[12]. As smallholders have no financial capacity or/and improved storage condition to delay their post-harvest sale, output prices (both producers' and consumers' prices) drop substantially just after harvest season.

[9] This may be a result of the fact that female headed households have fewer members, so their consumption needs are smaller, or they might be poorer and forced to sell wheat to buy less expensive food crops.

[10] Developments in real farm prices which measure the relative growth in farm/output prices to non-farm prices (i.e. price of commodities and services consumed by farmers) could be more important in terms of indicating resource transfers between the two sectors; but this was not computed for lack of time series data on these variables.

[11] It is important to note that this figure will shrink further if one considers markets like in Dire Dawa or Mekele which are located very far from Addis market which could also serve as distribution centres for these markets.

[12] In fact, it is estimated that during the post-meher harvest period between January and March, 79 percent of annual crop sales of farmers and 51 percent of annual purchases of traders take place (Gabre-Madhin 2001).

Figure 11: Trends in wheat producers share of prices paid by consumers (percent of retail/consumers price in Addis Ababa reached at farm-gate)

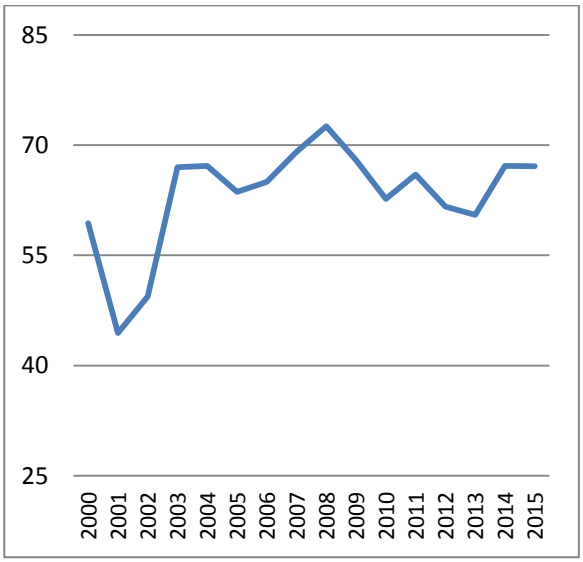
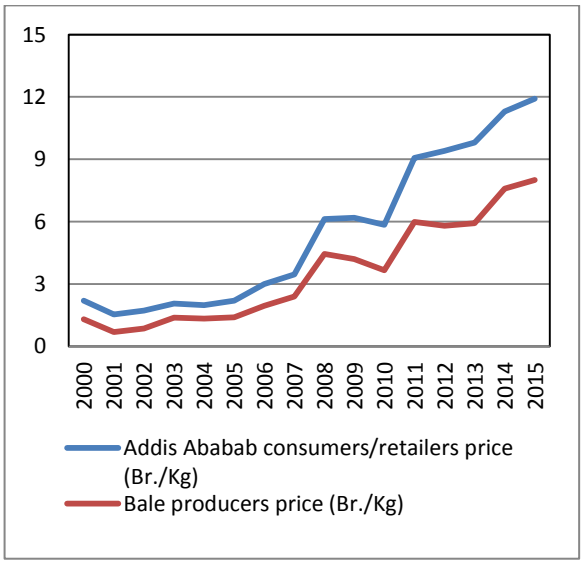


Figure 12: Price trend of wheat at producers and consumers' markets - (Br./Kg)



Source: Computed based on CSA annual price statistics.

Such intra-year variability in the domestic price at times exceeds price volatility at international levels. A study by Assefa and Rashid (2006) indicates that the domestic price variability (measured at Addis Ababa markets), has exceeded world market price variability 8-times over the past 20 years, irrespective of how variability is measured. As Ethiopia imports wheat significantly, world price volatility has also impacted domestic wheat price. A study by FAO (2014), for instance, shows that over the period between 2005 and 2012, wheat price on average increased by 23 percent annually, but the prices surged in 2008 and 2011 were 79 percent and 51 percent, respectively, as these price increase correspond to the global food price crisis of 2008 and the lesser food price hike of 2011 (FAO, 2014).

Figure 13: Seasonal price volatility in wheat producers' market (Bale region)

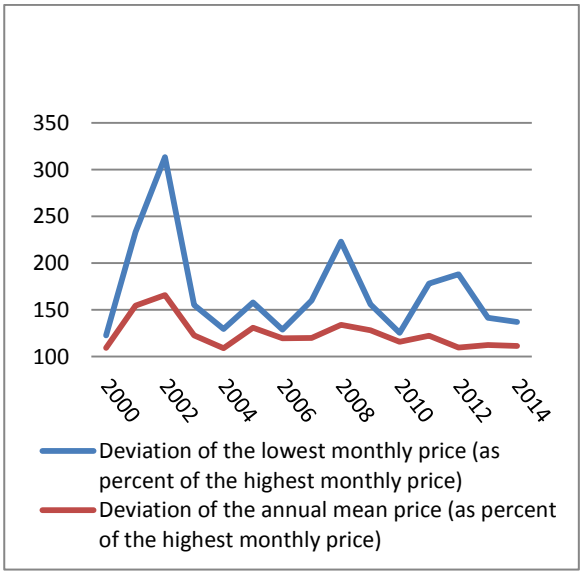
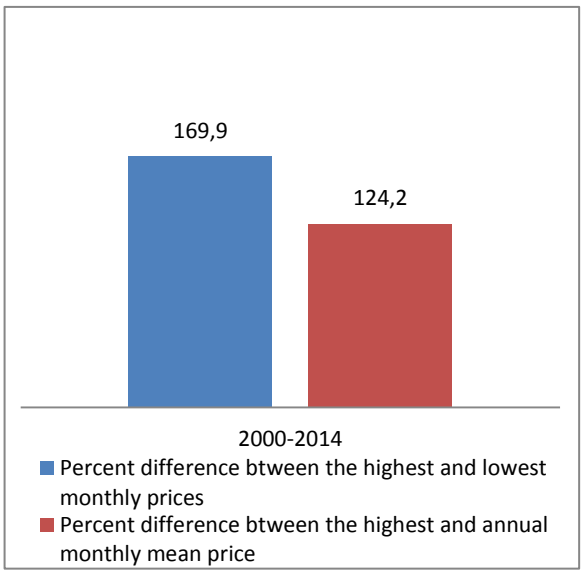


Figure 14: Seasonal price volatility in wheat producers' markets (average of the past 14 years)



Source: Computed based on CSA reports on monthly agricultural prices

3 The Ethiopian wheat market structure and integration

3.1 The wheat marketing channel

Wheat markets in Ethiopia have two supply sources –domestic production and import. Unlike other staple grains, wheat is imported in large volumes. Over the past four years (2010-2014), Ethiopia imported on average 1.65 million metric tons of wheat commercially, which accounted about 50 percent of the domestic production during these periods (see Table 2 above). As imported wheat exclusively imported by the government with primary objectives of food price stabilisation, the government has made effort to insulate the marketing channel of this administratively operated imported wheat from domestically produced and freely marketed wheat. Results from key informant interview indicate that supply chain for imported wheat is relatively very short and largely dominated by few actors.

The distribution of imported wheat is also seasonal, with most of the wheat delivered between May and October, the six months prior to the beginning of the major wheat harvest. This aims to smooth out the supply of wheat in the domestic market, dampens the seasonality of wheat prices and reduces the cost of subsidies to wheat import (Minot et al., 2015). The overall goal of this arrangement is to maintain the competitiveness of the wheat market in general and to decouple the subsidy to wheat import from domestic wheat producers in particular. In this way, the domestic wheat market is presumed to remain competitive and may not affect supply responsiveness of producers to price changes coming from imported wheat.

The government/EGTE controls the import as well as the supply chain of imported wheat that is sold at subsidized price primarily to large-scale millers and bakeries. In doing so, the government aims to eventually subsidize the poor consumers and to stabilize wheat and other substitutable grain prices (Minot et al., 2015). This, however, might affect the two most important wheat value chain actors, wheat producers and consumers, differently[13].

Wheat marketing in general is still traditional. Farmers bring different wheat to the traders at market places where they mix wheat. More important to the trader and the farmer is the physical parameters such as weight, grain filling and the admixtures to negotiate for price. Wheat marketing in general, with the exception of few cases, does not target the final product (biscuit, pasta, bread). The knowledge of trader in terms of quality mainly limited to purity and level of grain filling, as these are required by most of the buyer. However, classifying wheat into hard and soft is becoming common recently among the traders, mainly because some factories are demanding wheat by these categories. In such cases there is price difference paid for wheat and such initiative need to be strengthen to improve the quality of the final product. Yet, hard and soft are relative terms and the analysis if at all done only indicates the average value of the sample and does not indicate the level of variability within the sample (Mohammed, 2009).

3.2 Market integration and price transmission in the wheat market

Several studies have addressed the speed and extent of wheat price transmission in the post-reform period in Ethiopia. The various working papers and market analysis notes produced by the grain market research project of the former Ministry of Economic Development and Cooperation (MEDaC)

[13] Some studies indicate that domestic wheat prices in 2014 would have been 22 percent higher had the government not subsidized wheat import. While this benefits consumers, it serves as a disincentive for local producers. In fact, it is estimated that the costs of this subsidy to the government and to the farmers can be eight times greater than the benefits that accrue to consumers (Minot et al., 2015). In 2014, the government subsidy to wheat import was equivalent to 32 percent of the import parity price in Addis Ababa. The cost of imported wheat delivered to Addis was US$413/ton, whereas the price at which EGTE sold wheat to millers was US$280/ton (Minot et al., 2015).

could be considered as pioneer work that led the way for subsequent researches in the area. Many unpublished reports from this project (such as those by Negassa and Jayne, 1998 and Desalegn et al., 1998) indicated the existence of weak spatial and vertical integration of grain markets in Ethiopia. A study by Gabre-Madhin (2001), however, challenges this finding and concludes that grain markets were spatially efficient. This study attributed the lack of price efficiency to the then collusive pricing conduct of grain markets especially in urban areas. Neither of these studies, however, estimated long-run market integration to compare the difference between short-run and long-run integration measures, and to conclude about the extent of spatial efficiency in the grain markets.

On the other hand, Negassa, Myers, and Gabre-Madhin (2004) reported high spatial inefficiency within the Ethiopian wheat markets, which affects wheat transportation from regions of surpluses production to regions where demand outpaces production. One possible explanation for this failure is poor capacity of the marketing system to provide timely and accurate price signals, which present special challenges given the price instability observed over the past few years. As discussed below, the riskiness of the wheat market may also reduce private sector participation, particularly in rural areas where distribution costs may be higher.

Since 2005, more empirical studies were conducted on grain markets in general and wheat markets in particular. Getnet et al. (2006) analyzed the dynamics of six white wheat markets using a vector autoregressive model. Similarly, Getnet (2007) studied the spatial equilibrium of wheat markets by employing an autoregressive distributed-lag model and a cointegration analysis on wheat prices during the post-liberalization period for the central wholesale market and for a local market in Ambo. Furthermore, Goshu et al. (2010) evaluated the level of spatial wheat market integration, the pricing conduct of traders, and the structural determinants of spatial market integration.

While Getnet et al. (2006) identifies the absence of exclusive price leadership of wheat markets in the country, Getnet (2007) provides evidence of wheat market integration. Since intervention in local wheat markets is generally costly and less effective, the author suggests the possibility of targeting intervention at the central wholesale market level with the objective of influencing price dynamics in the local markets. On the other hand, the findings by Goshu et al. (2010) question the underlying basic assumption of a well-integrated wheat marketing system in Ethiopia as inter-market price transmission was found to be sluggish. The result, however, indicates that the central market in Addis Ababa has a dominant role in fixing wheat prices discriminatively and controlling the price transmission to other supply markets. Information gathered from key informants/wheat traders in Addis Ababa and Shashmene[14] indicate that traders in Addis Ababa respond to price shocks in supply markets slowly while protecting the price changes within them from transmitting back to the supply markets. This implies that wheat traders in the Addis Ababa market operate to widen the spatial price differential without sharing it to producers and retailers in the supply markets which are geographically close to the few major producing areas but far from major consumers' markets that are scattered across the country. A transportation infrastructure is particularly important for wheat due to the concentration of wheat production in the Amhara and Oromia regions.

[14] Shashemene is the major wheat wholesale market area close for major wheat producing areas of Oromia region.

4 Major findings from key informant interviews

The study has also conducted key informant interview with a range of actors in the wheat value chain. The selection of key informants was made either based on individuals' personal knowledge or knowledge through friends so that it would help build confidence of interviewees to supply information without fear or bias. As the study aims to generate information from willing wheat and/ bread value chain actors, purposive sampling method was employed. The survey includes 32 key informants that include 12 wholesalers from Addis Ababa and other two major markets, processors/millers, bakeries, governmental institution (EGTE), millers' association; village millers, and brokers.

The objectives of the key informants interview slightly differ across the various sample groups, but in general it aims: (i) to generate ideas on how they do their transactions (from/to whom they buy/sell, when do they buy/sell, type of risks, and risks transmission mechanisms or risks aversion/minimization mechanisms, price mark-ups, cost-structures/types and build-up (both transfer costs, handling costs etc), and (ii) to learn on the trends and the factors that are shaping the value chain environment and operating conditions and effectiveness/efficiency.

The study covered the Addis Ababa Ehil-berenda, Adama and Shashemene wholesale grain markets for wholesale and retail. These three markets were selected because they are big markets where many of largest wheat wholesalers are located. They serve as major hub for distribution of wheat to major deficit regions of the country. They are also close to major wheat producing areas of the country.

In general, this section provides general conclusions about the Ethiopian wheat market based on the perspective of interviewed wheat value chain actors – mainly wheat traders and processors.

4.1 Wheat value chain actors

4.1.1 Wheat traders

Wheat trade especially at producer and sub-regional levels involves a large number of transactions of small value and quantity. The size of transactions of wheat is governed by the subsistence production and traditional transport system that constrains the quantity of each transaction. Small traders and brokers are expected to play a significant role in the wheat supply chain at this stage of the market.

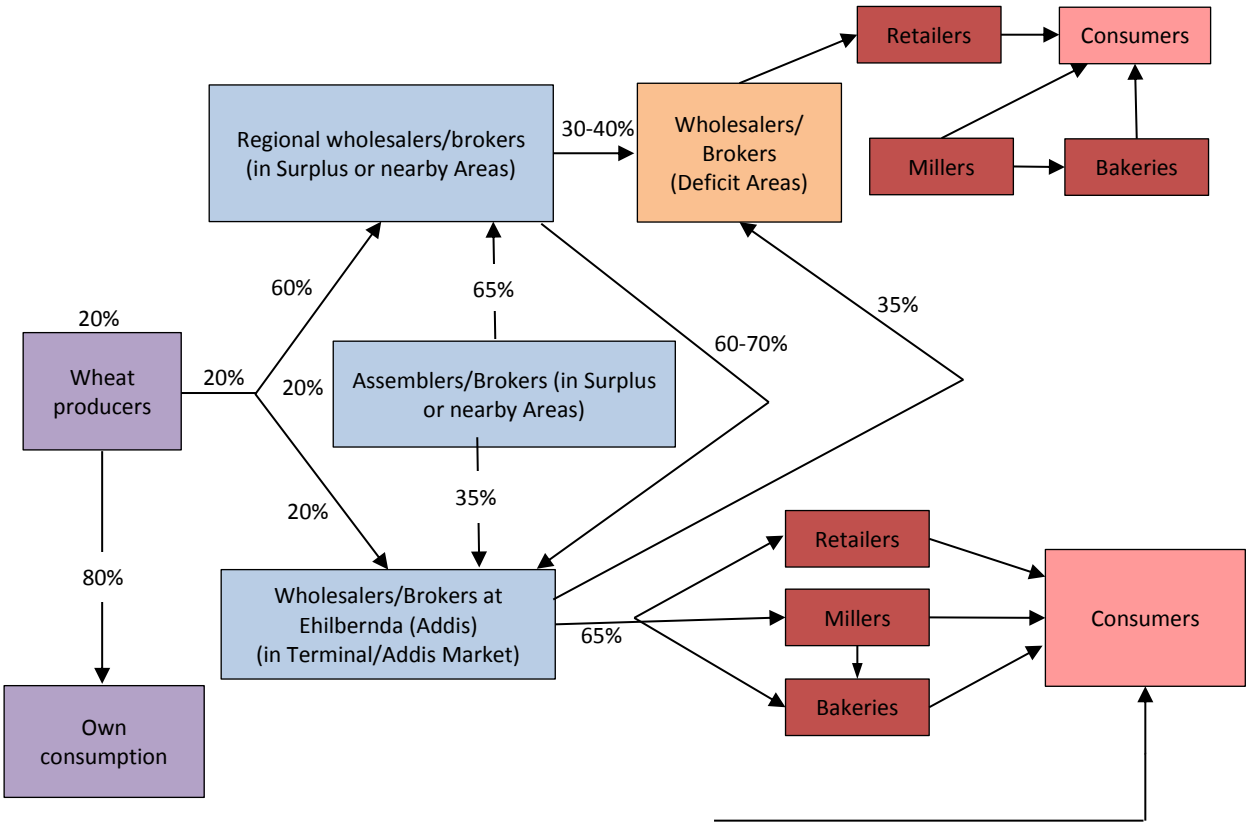
Similarly, results from key informant interview at major wholesale markets indicate that the wheat wholesale market is not only characterised by domination of small number of traders but also by relatively small transaction. Based on data collected from our interview of wholesalers, annual transaction of the large wholesalers seldom exceeds 600 tons. Wholesalers interviewed at Ehil-berenda, Adama, and Shashemene reported that they bought and sold 300-600, 170-300, and 200-300 tons of wheat in 2014, respectively. The wheat value chain at the surveyed markets consists of multiple actors and channels (Fig. 14). A range of actors that include farmers, wholesalers, retailers, part-time farmer-traders, brokers, processors (millers and bakeries), and private consumers take part at one or more stages of the value chain of the surveyed markets. Most grain/wheat wholesalers, however, lack specialization and often engaged in retail and other types of trade.

Key informants at the three major wheat wholesale markets were also asked estimate their market transactions and other actors with whom they have been working along the value chain, to estimate their market shares and transactions. As indicated in Fig. 14, the wheat value chain involves many actors that operate in complex ways. Key informants at Ehil-Berenda indicate that they have three sources for their wheat purchases. They obtain about a fifth of their wheat grain directly from producers, less than 10 percent from urban and village assemblers in producing areas, and close to 60 percent from regional wholesalers (Fig. 14).

Regional wholesalers in Shashmene and Adama that run their trade close to the major surplus wheat producing areas are reported to purchase close to 60 percent of their wheat directly from wheat producers or part-time farmer traders. They purchase the remaining 40 percent from wholesalers in Addis Ababa and from independently operating urban assemblers and farmer-traders. A study by Bergh et al. (2012), however, reported a little higher role of retailers and farmers' traders, indicating better market linkage between wheat producers and retail traders. Based on a survey conducted in 2005, they indicated that about 51 percent of wheat producers sell their wheat grain to wholesalers, whereas 43 percent of them sell to retailers and the remaining 6 percent directly to consumers.

Information gathered from key informants at the three major wheat wholesale markets indicates that above half of the domestic marketable wheat destine outside Addis Ababa. Key informants in *Ehil-Berenda* also indicate that close to one third of their purchased wheat is sold back to markets outside Addis Ababa, especially to traders from wheat deficit regional towns. Estimates from wholesalers and brokers interviewed for this study also indicate that close to 70 percent of the domestic marketable wheat passes through markets in Addis Ababa, including *Ehil-Berenda*. The survey also asked key informants about transparency and networking during their market transactions which affect the efficiency of the markets and distributional gains and losses associated with their transactions. Most of wholesalers in *Ehil-berenda* market conduct their wheat trade either with partners they know well or they engage brokers who act as agents on their behalf to perform a range of exchange, physical and facilitating functions that affect the performance of markets.

Figure 15: Wheat supply chain for domestically produced wheat and estimated market share[15]



Source: Sketched based on information from key informants at the three surveyed markets

[15] This diagram is sketched based on information collected from wholesalers and brokers from Ehil-Berenda, Adama, and Shsamene markets. This, especially data on producer market surplus and market share of other actors, is supplemented by information obtained from previous studies (Minot et al., 2015; Demeke and Di Marcantonia, 2013; Bergeh et al., 2012 and Woldehanna et al., 2010).

Brokers at Ehil-berenda are reported to engage in a range of activities like checking the quality of wheat, price setting and then selling it to other traders, mills and other buyers. In addition to brokers, the dominant participants in Ehil-berenda are regional wholesalers from surplus and deficit areas, but also institutional buyers, retailers and consumers and the local traders. Regional traders from surplus areas are reported to use their own transportation to bring wheat to Ehil-Berenda and they typically sell it via brokers to wholesalers at Ehil-Berenda. A study by Gabre-Madhin (2004) also indicates that 85 percent of wholesalers regularly use brokers. Wheat wholesalers at Ehil-berenda reported that they don't have contractual buying and selling arrangements, whereas about 60 percent of wheat transaction in Adama and Shashemene is conducted through contractual selling and buying arrangement.

4.1.2 Wheat millers

There are more 200 flour mills in Ethiopia, with a total production capacity of 3.2 million tons of flour a year. About a third of the mills are located in Addis Ababa and nearby areas, including most of the large ones[16]. Millers can purchase either domestically produced wheat from the local market or imported wheat from the government grain trade agency (EGTE). The EGTE offers millers to buy imported wheat at a subsidized price, but caps the price of the resultant wheat flour. Millers that want to buy wheat grain from the EGTE should register with the ministry of trade, which decides the amount of wheat they can purchase based on their production capacity. About a third of the wheat flour millers in the country, mostly located near Addis Ababa, are registered to purchase EGTE wheat.

Wheat millers interviewed for this study are not only engaged in wheat processing for flour production but also in production of pasta, macaroni, and biscuits. Millers indicate shortage of wheat. They indicate that the amount of wheat supply both from the EGTE and from the local market has been decreasing over the past five years. Bergh et al. (2012) indicate that most of the millers have been operating at half-capacity due to shortage of local wheat supply. Table 3 reports the storage and processing capacities of three major wheat processing factories in Ethiopia.

Table 3: Storages and processing capacity of selected large millers

Factories	Wheat storage capacity (in thousand MT)	Flour storage capacity (in thousand MT)	Processing capacity (in thousand MT/day)
DH Geda	5	4	60
Ethiopian Spice Extraction and Flour Factory	10	15	62
Ada Food Complex	58	7	100

Source: Key informant interview, 2015

4.2 Seasonality and price volatility in wheat market

The domestic wheat market exhibits large seasonal variability. Trading activities of wholesalers reach at peak level during the harvesting season, which is between late October and end of December. Not only does the volume of wheat supply increase and prices decrease at this period, the quality of wheat is reported to show large variation during this period. This is also the major purchase and stocking period for traders with sufficient storage capacity and capital.

Survey respondents indicate that December and June are the best months to stock and release wheat grain, respectively. They, however, indicate that limited storage capacity is their biggest problem. Wholesalers at Ehil-Berenda, Adama, and Shashemene wheat markets mostly reported that

[16] This data is obtained from Ethiopian Wheat Millers Association.

they could not store because of lack of storage facility. They typically sell their purchases as soon as possible. Most wholesalers rent warehouses as they don't have their own. This sometimes pushed them to sell before unloading the truck to wheat millers, which usually have relatively better storage capacity[17].

Interviewed wholesalers indicate that they only store their wheat for about two to three months. Besides the seasonality of wheat production/supply, interviewed wholesalers indicate that storage capacity and working capital as critical factors in their decision on their grain purchasing and selling times (table 2). There is high interest among wholesalers to store wheat for longer period. Government policy, however, appears to discourage traders from holding stocks while it supports on-farm storage in various ways. If the objective is to reduce the seasonality in grain prices, a more balanced approach to promoting grain storage by all actors would be more effective (Minot et al., 2015).

Similar to wholesalers, nearly all of the interviewed wheat milling companies purchase over 50 percent of their annual purchase during harvesting season. Unlike wheat wholesalers, however, most wheat processing factories indicate that they have regular and contractual wheat purchase arrangements with ranger of suppliers that include the EGTE, commercial farms, wholesalers, farmer cooperatives, and traders.

Table 4: Seasonality of wheat marketing (percent of volume marketed wheat)

Seasons	Purchase (%)	Sell (%)
December – February	55	35
March – May	30	30
June – November	25	35

Source: Key informant interview, 2015

Wheat traders in all the three surveyed regional wheat markets indicate that wheat price has increased significantly over the past two years. They also indicate the key role of brokers in setting both purchasing and selling prices. According to key informants at Ehil-Berenda and Shashemene, the role of brokers is far higher than marketing factors like demand, supply, and quality in setting their purchasing price of wheat. Brokers, for instance, fix purchasing price of wheat in about a third of the transactions of key informants at Ehil-Berenda and Shashemene. Market factors – such as demand, supply, and quality – are reported as main factors that affect traders purchasing price in at least two thirds of wheat transactions. The role of brokers is reported to be even larger when they offer their wheat grain for sale.

Table 5: Factors affecting wheat purchase and sell time – (percent of interviewed wholesalers)

Factors	Purchase (%)	Sell (%)
Supply/price	45	--
Demand/price	--	40
Storage capacity	25	20
Working capital	30	40

Source: Key informant interview, 2015

[17] However, a single wholesaler at Adama replied that he has exceptionally been provided with land and bank loan. As a result, he is in the process of shifting his area of business from wholesaler upgraded to factory which implies the positive impact of appropriate institutional support to wholesalers.

The Ethiopian wheat market exhibits high price variability. Prices generally follow the annual pattern of relatively low post-harvest prices in January followed by a period of rising prices that peak during the *lean* season (June to August), but are marked by significant intra-and inter-annual price variability. Most of the wheat traders and brokers interviewed for this study also indicate that wheat price has been highly volatile over the past few years. While above half of the respondents report that wheat price varies on a weekly or monthly bases, the remaining key informants indicate that wheat prices exhibit inter-annual fluctuations (Table 6).

Table 6: Volatility of wheat prices: perception of market actors

Percent of respondents agree that wheat price vary on …… basis	
Weekly or less	30%
Monthly	25%
Annually	45%

Source: Key informant interview, 2015

Wheat millers could source their wheat either from the EGTE (subsidized imported wheat) or from the open domestic market. Following this differences, prices of wheat flour vary significantly. The unsubsidized market wheat flour price is obviously higher and is reported to have increased by about 35 percent over the past three years. On the other hand, the wheat flour supplied to bakeries at the subsidized price (by the EGTE) has only increased by about 4 percent during the same period (Table 7). The difference between these wheat flour prices indicates the impact of government subsidy on imported wheat.

Table 7: Price and price change of wheat and wheat products over the past three years

Year	Non-EGTE wheat flour (Birr/100Kg)	EGTE wheat flour (Birr/100Kg)	EGTE wheat bread price Birr/100 gm
2012/13	890	769	1.20
2013/14	964	796	1.20
2014/15	1229	796	1.30

Source: Key informant interview, 2015[18]

Table 7 shows that the nominal bread price has increased only once during the last three years (an increase of above 8 percent), whereas the price of wheat flour, which is processed from an ETGE wheat grain, remains the same. The gap between ETGE-wheat flour and non-ETGE wheat flour prices has increased from 16 percent to 54 percent over the course of the three years, indicating the large increase in the domestic wheat price during this period.

4.3 Challenges along the wheat value chain

Interviewed key informants indicate a range of problems in the wheat value chain. A range of problems that include poor product quality, contract default, lack of market information and shortage of working capital and price instability were reported as major problems. According to key informants the supply market and price, especially in Ehil-Berenda and Adma markets, is unreliable and suffers by excessive and unreasonable broker interference. Price is reported to be set by brokers

[18] Key informants also reported the following wheat conversion rate: Wheat to wheat flour: 100 Kg wheat to 74 Kg wheat flour. Wheat flour to bread: 100 Kg wheat flour to 111 – 133.3 Kg bread, depending on quality of wheat flour and other factors. Millers also reported that on average 66 percent of their cost is attributed to purchase wheat; while the remaining 34 percent is constituted by various operating costs.

but not by factories (millers) and traders. Brokers are also reported to impair or block direct contact between regional suppliers and wholesalers in the Addis Ababa, Adama, and Shashemene markets. Most of the wholesalers that we interviewed considered brokers as illegal traders who negatively affect the wheat supply chain. This opinion, however, seem to undermine brokers' roles in minimizing the transaction costs of search and information.

Poor and unreliable grading and standard system creates loopholes for excessive intervention of brokers. Lack of a transparent system of grades and standards in the wheat market is also reported to expose wheat wholesalers to high degree of risk and uncertainty, especially when they trade with wheat millers and bakeries. Wholesalers supply wheat to factories on conditional basis: the quality of wheat is required to be tested in laboratory before any payment is made. If the quality is found to be below the miller's standard, the wheat is rejected and the loaded truck will be returned. Among other problems, wheat in a given truck could be of different quality as it is typically collected from a number of small farmers. This affects the operation of markets is reported to lead to bankruptcy and even force some wholesalers who especially work with millers to exit their wheat trade altogether. Some key informants indicate that the government as the regulatory of the system has not intervened to tackle that problem so far.

One problem is that the system largely works on social-trust basis. The wheat market still operates with well-established social trust, in which trusted local traders and brokers play an important role in the value chain of the products (Woldehanna et al., 2010). But it is not without its cost. The wheat supply market is reported to be affected by financial settlement problems related to verbal purchase and sale agreements. Because of such problems and other contract defaults the wheat market is characterized by frequent intervention of courts to settle such disputes. Furthermore, key informant wholesalers indicate that wheat trade is affected by a range of other operational constraints related to storage capacity and working capital. Others also reported poor access to public market information, in particular, especially on imported wheat (which solely administered by the government), and lack of transparency on the operation of government wheat stocks as problem.

Most interviewed wheat millers and bakeries indicate shortage of wheat as their primary problem. Poor quality of local wheat and lack of grade and standardization of traded wheat are the other frequently reported problems. Moreover, unreliable power supply is reported to affect their businesses and operations along the value chain.

5 Conclusions

Over the past two decades, both wheat production and consumption have shown increasing trends in Ethiopia. Wheat import has also grown significantly over the past decade. Yet, this substantial increase in domestic production and import of wheat has not reversed the increasing trend in wheat and wheat product prices, implying an even faster growth of wheat demand. Despite a huge investment by the Ethiopian government in agricultural extension programs, studies indicate growing wheat supply deficit in the coming decades. This suggests the need for increased but efficient investment not only in wheat production but also in wheat processing and marketing.

Although Ethiopian wheat producers are generally small, our qualitative survey and a review of relevant literature show that relatively larger farmers and large-scale producers supply most of the marketed local wheat in the country. For instance, only 10 percent of wheat producers sell more than 40 percent of their wheat harvest while only 5 percent sell more than half of their wheat production. The top 20 percent of the wheat sellers account for 60 percent of the domestic wheat sale. On the other hand, above half of the wheat farmers do not sell any of their wheat production. These facts are important in terms of informing policies and institutions on the need to expand wheat production in general and marketable wheat in particular. In this regard, institutional and policy reforms to improve the supply value chain, expansion of irrigation and mechanized farming as well as further investment in research and development can be viable policy interventions to enhance wheat supply in the country.

Wheat is extensively imported by the government. But the effect of international market on the domestic wheat market is expected to be limited as the government crafted supply and market value chain for such imported wheat carefully. Yet, imported wheat is expected to influence wheat demand on the domestic market of those who receive subsidized wheat – which are millers and few institutional consumers. Therefore, flour prices should exhibit the largest response to international wheat market fluctuations, followed by wholesale wheat (grain) prices. Producer and consumer prices as well as the bread market are expected to respond only little to international wheat prices. This observation, however, need to be tested using further empirical research.

The findings indicate that the EGTE had a substantial role in the domestic market, especially at the wholesale level. Disincentives were greater at the wholesale level than at farm gate. The restricted export of wheat and high level of cheap wheat imports, which are sold at subsidized prices by the EGTE, do likely depress the domestic wheat market. Additionally, during periods of low expected domestic prices (for instance, at periods of bumper harvest), the EGTE bought wheat from the domestic market, thus supporting producer prices but overtook wholesalers (FAO, 2014). Some studies have evaluated the government's decision to focus on wheat import for its price stabilization policy, by assessing the rationales and cost-effectiveness of public wheat imports vis-à-vis local procurement. Rashid and Lemma (2014), for instance, indicate that except in 2008 and 2009, local procurement of wheat would have been justified and provided better incentives for farmers to grow wheat at a higher price, which is still below import parity. This could encourage wheat producers to adopt new technologies and boost wheat production.

Our qualitative survey indicates important institutional and operational reforms for improving efficiency in the wheat-bread value chain. Important among them are the need for easily verifiable standards and norms for assessing wheat quality, better regulation of brokers specially to control their excessive interference, better dispute settlement mechanisms, and increased financial access to enhance operational constraints such as storage capacity. Some also reported for enhanced access to public market information, in particular on imported wheat market, and transparency on the operation of government wheat stocks.

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Authors: Samuel Gebreselassie, Mekbib G. Haile, Matthias Kalkuhl

Contacts: sgebreselassie@eeaecon.org, mekhaile@uni-bonn.de, kalkuhl@mcc-berlin.net

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