Analysis of price incentives for lentils in Ethiopia for the time period 2005–2012

February 2015

Analysis of price incentives for lentils in Ethiopia for the time period 2005–2012

February 2015

CONTENTS

SUMMARY OF THE NOTE

Product: Lentils
Period analyzed: 2005-2012
Trade status: import 2005, 2006 and 2012; Export 2007-2011

COMMODITY CONTEXT

- Total lentil production amounted to only 151,000 tonnes in 2012/13.
- In terms of total pulses production, the average share of lentils was only 5 percent during the same period but this is increasing.
- Over the 2005-2012 period, productivity of lentils doubled to 12.2 quintal/ha.
- On average, nearly 41 percent of the lentils produced are consumed by producing households and 39 percent of the production, a relatively larger share compared to cereals, is marketed.
- The area harvested has varied widely between 84,000 and 123,000 hectares.
- Ethiopia was a net exporter of dry and shelled lentils in most of the years from 2005 to 2012. The volume of lentils exported declined during the period; the highest volumes of export was in 2010 (about 17,640 tonnes). The lowest levels of both export and import of lentils were recorded in 2012 (0.22 tonnes) and 2011 (0.08 tonnes), respectively.
- The lentil value chain is long with little processing and involves a number of small operators providing transport and storage services.

Figure 1. Observed and Adjusted Nominal Rate of Protection at Farm gate for Lentils in Ethiopia, 2005−2012
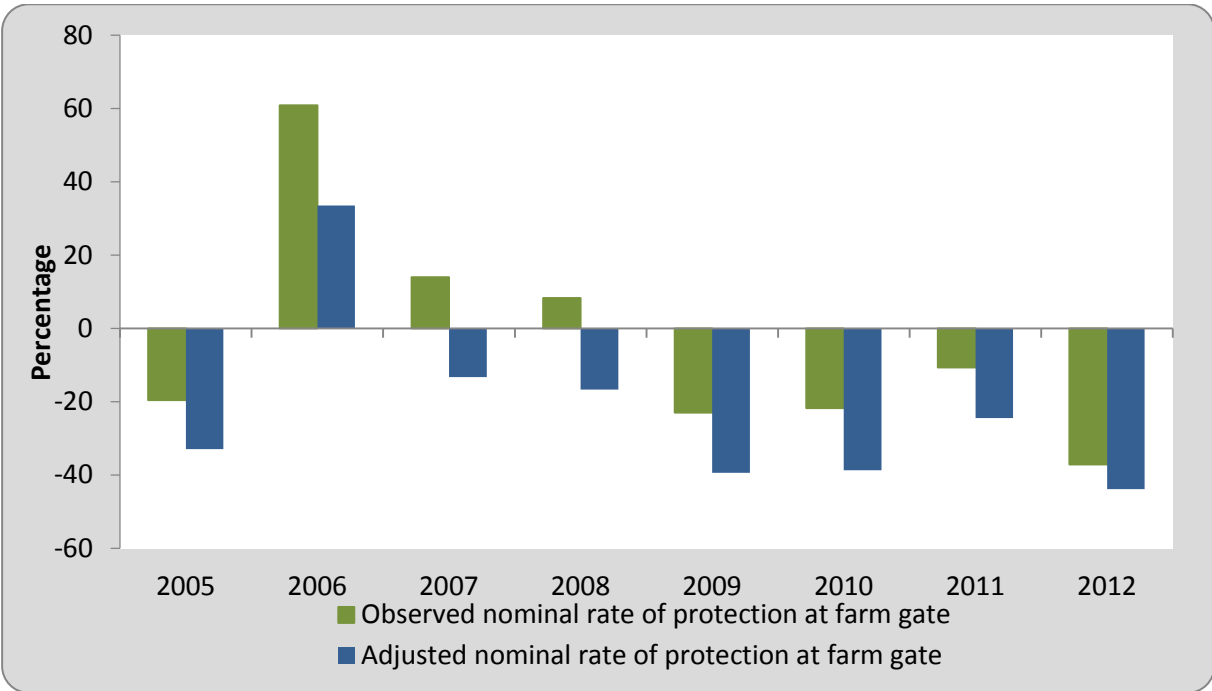
Source: MAFAP, 2014

The observed Nominal Rate of Protection (NRP, green bar) in the graph above measures the effect of policy distortions and overall market performance on price incentives for producers. The adjusted NRP (blue bar) captures the same elements as the observed NRP, in addition to any market distortions resulting from inefficiencies in the commodity's value chain and exchange rate misalignment.

DRIVING FACTORS

- Restrictive trade policy: for instance, an export ban on lentils in 2012, led to higher disincentives than any other year.
- High international prices (during 2012), in relation to the domestic price, also contributed to the price gap.
- High transport costs (access costs) from farm gate to the point of competition
- The high weight loss of lentils after harvest contributes to a significant share of costs at farm gate. Weight losses vary with seed varieties, i.e. improved seed varieties lose less weight than traditional lentil seed varieties.
- Processing and handling costs are also substantial because of the increasing cost of labour over time and lack of modern equipment.
- An overvalued exchange rate created additional obstacles for price transmission
- High broker fees per quintal of lentils due to the lack of information at the producer and trader level.

RECOMMENDATIONS

- There is high demand for lentils in domestic and international markets; it is therefore worthwhile to encourage producers. However, incentives to producers are currently not sustainable and measures should be taken to address this;
- Restrictive trade policy, primarily banning exports, must be reconsidered. During the years of low domestic prices, the export market was an alternative market for decreasing the negative effects of falling domestic prices;
- Carefully reconsider the exchange rate policy. The devaluation of the exchange rate without increasing production could result in increasing imported inputs such as fertilizer. In addition, the effect of devaluation on the revenue from other export commodities has to be assessed because the exchange rate serves the entire economy, not agricultural commodities alone;
- The nominal rate of assistance to lentil producers is fluctuating. To enhance production and bring radical change to agricultural productivity, in order to increase production for domestic and export markets, sustainable support is required;
- Improve rural road infrastructure, road maintenance, and encourage bulk transportation;
- Modernize the market information system on prices (of pulses and cereals) for both producers and traders, similar to the case of the Ethiopia Commodity Exchange service;
- Improve the quality of lentils in order to decrease weight loss and processing costs. There is a substantial difference between lentils of improved seed varieties and traditional seed varieties and the multiplication and distribution of seeds to producers during sowing season could improve the quality of harvested lentils;
- Encourage investors in the areas of storage, bulk transport, and distribution;
- Loading and unloading at various levels has to be modernized, requiring capital goods to ease the increasing cost of labor;
- Increasing the yield and quality of lentils at farm gate would increase the competitiveness of exportable lentils and stabilizes prices for consumers;
- Address the high price fluctuations that could have harmed the trade of lentils.

1. PURPOSE OF THE NOTE

This technical note is an attempt to measure, analyze and interpret price incentives for lentils in Ethiopia over the period 2005 – 2012.

For this purpose, yearly averages of domestic farm gate and wholesale prices are compared with reference prices calculated on the basis of the price of the commodity in the international market. The price gaps between reference prices and domestic prices along the commodity's value chain indicate the extent to which incentives (positive gaps) or disincentives (negative gaps) were present at the farm gate and wholesale level. The price gaps are expressed in relative terms as a percentage of the reference price, referred to as the Nominal Rate of Protection (NRP). These key indicators are used by MAFAP to assess the effects of policy and market performance on prices.

This technical note begins with a review of the commodity's production, consumption/utilization, marketing and trade, value chain and policy context (Chapter 2). It also provides a detailed description of how key data elements were obtained and indicators were calculated (Chapter 3). The indicators were then interpreted in light of existing policies and market characteristics (Chapter 4), and key policy recommendations were formulated on the basis of this interpretation (Chapter 5). Finally, the note concludes with a few main messages, limitations of the analysis and areas identified for further research to improve the analysis (Chapter 6).

The results and recommendations presented in this analysis of price incentives can be used by stakeholders involved in policy-making for the food and agriculture sector. They can also serve as input for evidence-based policy dialogue at the national, regional or international level.

This technical note should not be interpreted as an in-depth value chain analysis or detailed description of the commodity's production, consumption/utilization, marketing and trade or policy context. All information related to these areas is presented merely to provide background on the commodity under review, help understand major trends and facilitate the interpretation of the indicators.

All information in this technical note is subject to review and validation.

2. COMMODITY CONTEXT

Ethiopia ranks first in Africa for the volume of lentils produced, even though its share in world production in 2012 was only 3.3 percent. Furthermore, the total production of lentils in the country was only 151,500 tonnes in 2012/13, a relatively small volume in comparison with India or Canada.

Cereals and pulses account for more than 70 percent of agricultural output in Ethiopia, e.g., the average share of the two in total crop production was nearly 76 percent during the period 2005-2012 (CountryStat data, 2014). In this category, the share of pulses remained between 10 and 12 percent over the same period, though the quantity of output doubled from 12,895,403 tonnes in 2005 to 22,402,183 tonnes in 2012. In terms of total pulse production, the average share of lentils was only 5 percent during the same period, but is increasing over time. Though the share of lentils in total pulse production and area is low, lentils are a relatively high-value crop compared to other pulses, such as beans and cowpeas, and smallholder farmers earn a more substantial income per hectare.

Lentils often grow in relatively low moisture conditions, require minimal labor and have a short growing period (average of 76 days) in the Ethiopian highlands, making them a less risky crop than most. Lentils are consumed in urban and rural areas, meaning they provide a valuable source of both food and income for smallholder farmers. As a cash crop, the export value of lentils has also increased from 5,133 in 2005 to 17,640 tonnes in 2010, an increase of approximately 240 percent.

As discussed thus far, lentils are a crop of growing importance in Ethiopia, and have been selected for MAFAP analysis based on current and potential economic importance in terms of food security and trade (both domestic and international) as well as opportunities for increasing yields, and therefore income. The increase in production, consumption, and export demand, together with its high value and low risk characteristics as a crop for smallholder farmers, and its potential to increase rural incomes, denotes the importance of lentils at the national level, making it a target for MAFAP analysis.

PRODUCTION

Asia remains the biggest producer of lentils worldwide; from 2002 to 2006, more than 60 percent of global production was in India, Turkey and Nepal (ECEA, 2009). Canada is now the largest producer globally, and the primary contributor to North America's 32 percent share of global production. Africa is not a significant global producer, with only 2.4 percent produced in Ethiopia and Morocco.

Figure 2. Production of lentils per country in 2011 (metric tonnes)
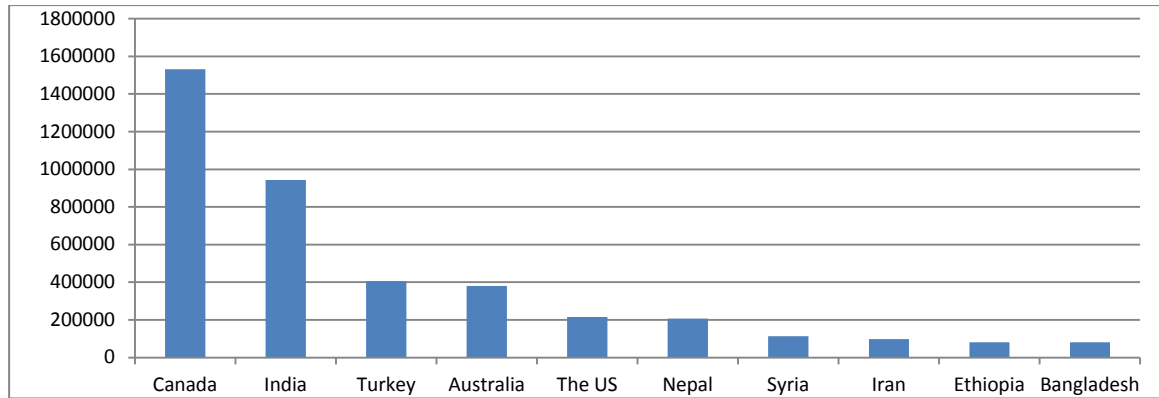
Although Ethiopia is the 9th largest producer of lentils globally (Figure 2), in terms of national production, lentils occupy a small share in comparison to cereals (Figure 3). In 2012, the share of lentils in total production reached 0.76%, the second highest since 2001 (CountrySTAT, 2014).

Figure 3. Main commodities produced in Ethiopia and share in total volume of production (in tonnes)

Lentil production is growing steadily in Ethiopia. Over the period analyzed, it has increased threefold from 84,900 tonnes in 2005 to 123,720 tonnes in 2012 (Figure 4).

Figure 4. Lentil production in Ethiopia from 2003 to 2012 (in tonnes)
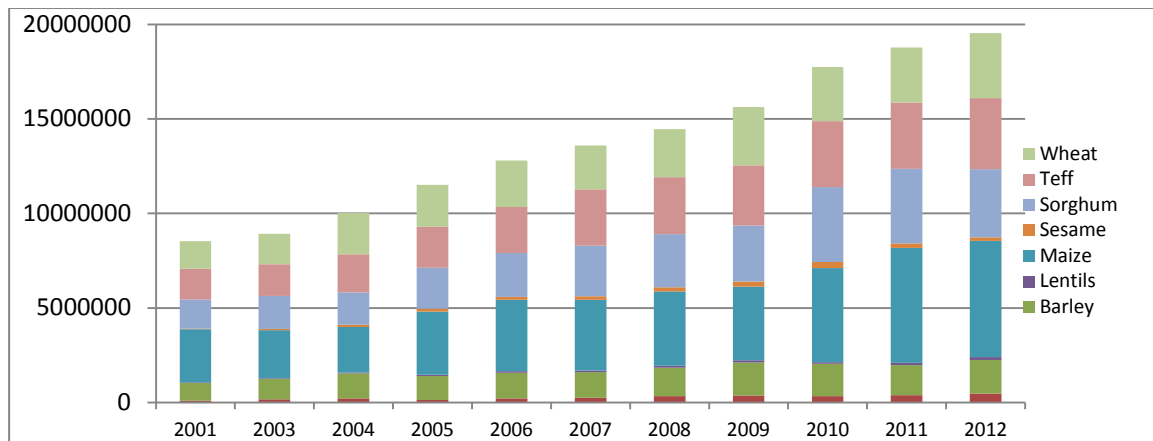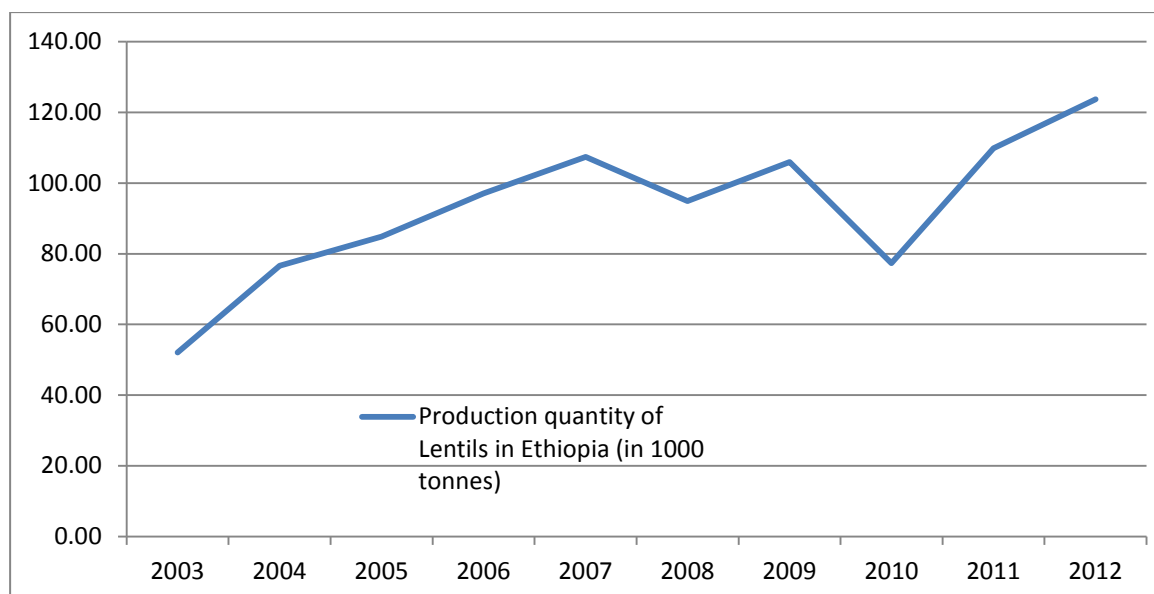
Source: CountrySTAT, 2014

Lentils are mainly grown in the highlands of Ethiopia, as altitude and high rainfall are needed for good lentil production. Smallholder farmers who follow traditional knowledge are the primary producers of lentils; minimal mechanization is used on small farming plots (ECEA, 2009).

Table 1. Lentils production 2005-2011 per region in Ethiopia (in tonnes)

Value	2005	2006	2007	2008	2009	2010	2011
Addis Ab.	234.2	337.37	358.4	0	0	0	[..]
Amhara	36,948.3	33,246.5	39,686.3	51,985.8	55,417.4	62,062.6	41,358.0
Benishan. Gumuz	15.6	23.75	[..]	[..]	[..]	[..]	[*]
Oromia	12,764.4	20,720.8	32,992.1	31,461.5	30,545.2	51,469.6	33,155.8
SNNP	513.8	343.14	890.05	368.7	600.74	656.47	364.1
Somali	53.8	2.47	[..]	[..]	[..]	[..]	[-]
Tigray	4,012.20	2,929.08	7,116.98	10,229.41	8,169.52	9,561.70	6,036.10

Source: CountrySTAT website, consulted on 01/04/2014

During 2011/12 and 2012/13, lentil production in Amhara was still high, accounting for more than 60 percent of national production in 2012/13, followed by Oromia and Tigray. The Amhaara region remains the largest producer in the country (Figure 5).

Figure 5. Share of regional production in the lentils sector in 2012/13
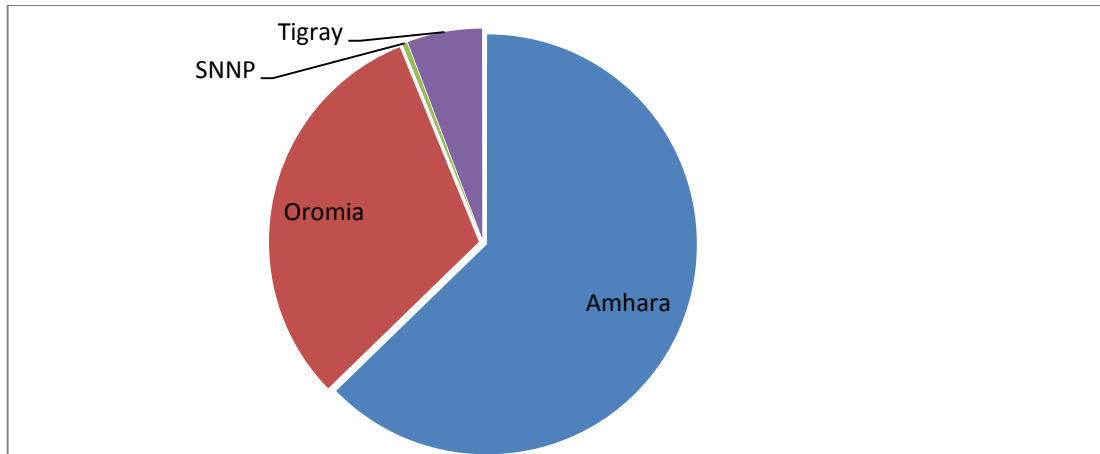
Source: Central Statistical Agency of Ethiopia, Reports Area and Production of Major Crops

YIELD

Over the period, the productivity of lentils has gone up to 12.24 qt/ha, doubling since 2005 (Table 2). Looking deeper, figures show that the area harvested ranged chaotically between 84,000 and 123,000 hectares.

Table 2. Lentils production, area and yield from 2005-2012 in Ethiopia

	2005	2006	2007	2008	2009	2010	2011	2012
Production (tonnes)	57,603	81,049	94,103	94,773	123,777	80,952	128,009	151,500
Area (ha)	84,895	97,110	107,428	94,946	105,956	77,334	109,895	123,718
Yield (qt/ha)	6.42	5.93	7.54	9.90	8.94	10.5	11.64	12.24

Source: CountrySTAT (2014), CSA

However, lentil production still faces numerous constraints due to pests, diseases and agro-climatic stresses, the lack of improved inputs, mechanization and proper agro-management (ECEA, 2009). In order to partially address this, the Ethiopian Agricultural Research Organization has been producing and distributing several improved seed varieties, enhancing lentil productivity in the country (ECEA, 2009).

Figure 6. Yield of lentils (Qt/ha) in Ethiopia, 2005-2012
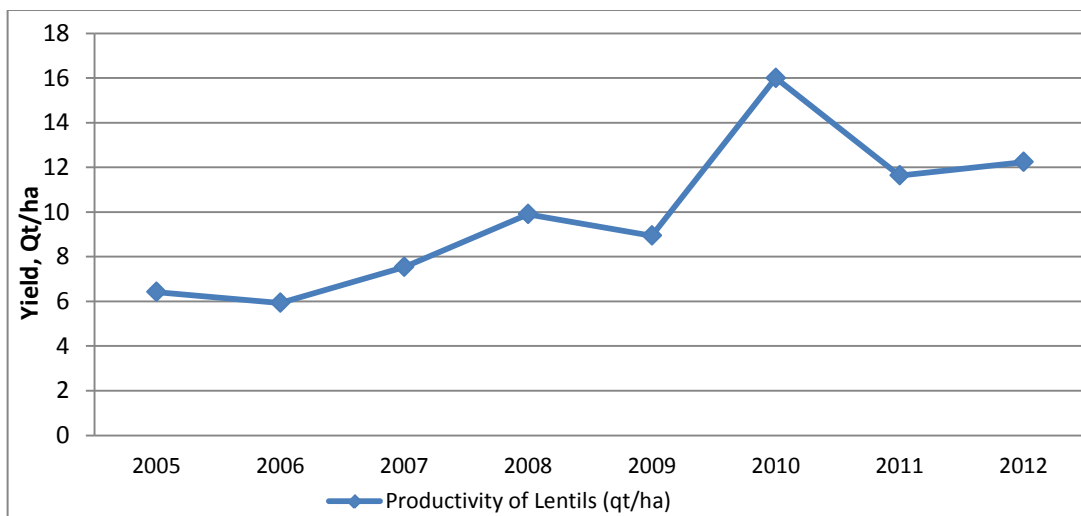
Source CountryStat, 2014

The trend in the yield of lentils increased over the 2005-2012 period (Figure 6). Within this period, 2010 was a year of decline for both output and cropped areas by nearly 35 and 27 percent. This means that the total output declined from 123,777 tonnes in 2009 to 80,952 tonnes in 2010, and similarly, the total area covered by lentils declined from 105,956 in 2009 to 77,334 in 2010. A reason for the decline could be that when the domestic market price increases substantially, exports decline. Lentils command a high price and enjoy a strong demand in the national market, leading to their low export share compared to other pulses (Schneider and Anderson, 2010). In 2011, both output and area recovered to almost the same level as in 2009, and in 2012, they increased by nearly 18 and 13 percent. The rise in the level of productivity from 2011 to 2012 is similar to the rise in output and area, from 11.6Q/ha in 2011 to 12.2Q/ha in 2012. Overall, lentil yields increased continuously over the period, possibly due to an increased use of fertilizer and pesticides, and suitable weather.

CONSUMPTION/UTILIZATION

At the national level, pulses contribute about 7% in total calorie intake of the Ethiopian population, and in 2004/05, the average contribution of pulses to the calorie intake was 129 and 161 calories in urban and rural areas, respectively (Guush et al. 2007). Among the pulse categories, lentils are mainly consumed in Ethiopia as a traditional main-dish to accompany *injera*. By and large, lentils could be one of the major sources of protein in the Ethiopian diet, and are consumed during fasting and non-fasting days. Lentils are a widely consumed pulse (Frehiwot, 2009),. They have a number of nutritional benefits and are usually eaten fried, roasted and whole boiled, or split in the form of stews, vegetable soups mixed with other beans, or sometimes prepared as 'shiro,' 'Azifa,' or 'Hilbet.' Geographically, lentils are used mainly in urban areas, depending on the culture and food habits and are available anywhere from local petty markets to the supermarkets of big cities, such as Addis Ababa. Literature indicates that lentils are high in dietary fiber, low in fats and free of cholesterol. They are also high in proteins, low in sodium, are a wonderful source of complex carbohydrates and vegetable proteins, and are high in vitamins and minerals, such as vitamin B6, manganese, magnesium, phosphorus, copper, and potassium, among others.

The country data analyses, based on the 2007/08 crop utilization agricultural sample survey conducted by CSA, indicates that on average, nearly 41% of lentils produced (about 941,027 tonnes) are consumed by producer households, while 39% are used for sale (Figure 7).

Figure 7. Proportion of lentil used for various uses at national level in 2007/08 in Ethiopia
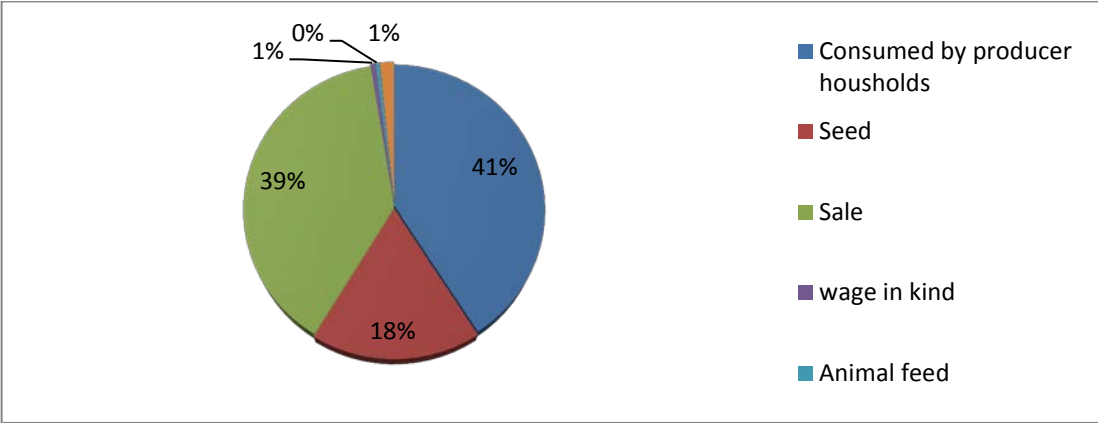
Source: Based on Crop utilization agricultural sample survey 2007/08 (CSA data)

6

The data also indicates that the proportion of lentils consumed within the sample regions varies. In 2007/08, the total quantity consumed in Amhara and Oromia was equivalent, but in Oromia, households consumed more than half of the production (about 50.2 percent) (Frehiwot, 2009). A large proportion of the national lentil output is produced in Amhara (55 percent), but households consume only 29 percent of the lentils produced in the region, with nearly 48 percent used sold on the market. In Oromia and SNPPR, where other cash crops are largely produced, nearly half of the lentils produced are consumed rather than sold (Figure 8).

Figure 8. Quantity of Lentils consumed in four major regions of Ethiopia as a percentage of quantity of lentils produced in a region, 2007/08
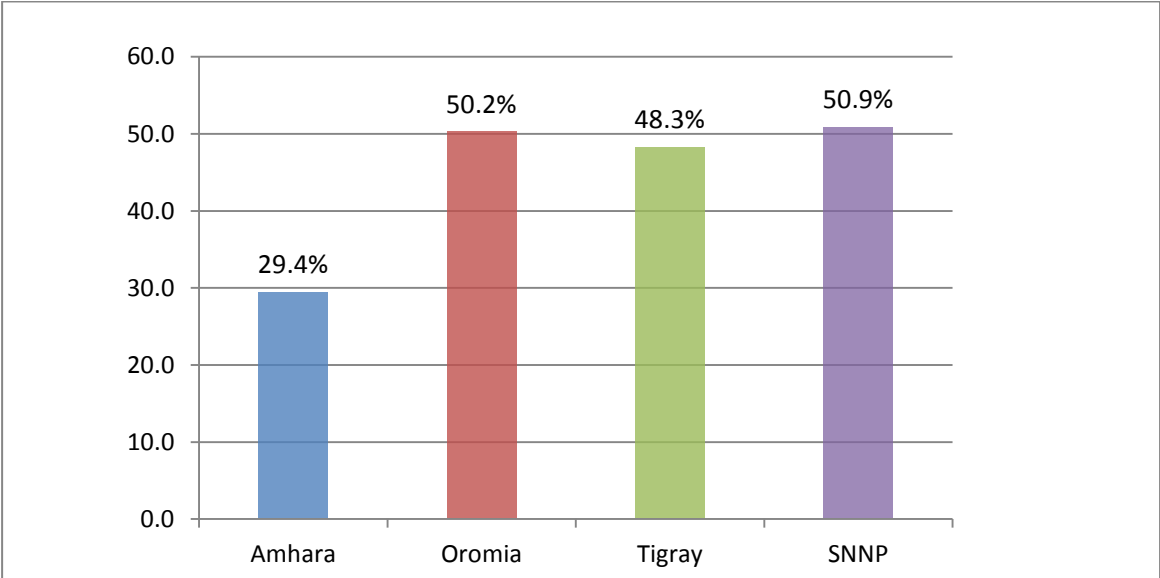
Source: Based on Crop utilization agricultural sample survey 2007/08 (CSA data)

The dynamics of lentil consumption is interesting to examine. After 2007, lentils became a substitute for meat in the main Ethiopian dishes[1] due to the exceptionally high prices of beef and mutton; households could have shifted to the consumption of lentils. Pulses are often consumed by the low-income groups because they cannot afford meat products (Frehiwot, 2009). It helps to examine the price co-movement to investigate any correlation between the price of meat and lentils. In fact, a preliminary analysis of the pair-wise correlation of the inflation rates of meat and pulses (using CSA data) indicates that the movement has a positive and statistically significant correlation, with a 1 percent level of significance [0.51 (p-value=0.00)]. In addition, the average inflation rate of the two categories of commodities from 2000 to 2012 shows a co-movement of the two prices (CSA, 2013). However, the general inflationary environment in the country could have also led to a positive correlation between the two prices.

---

[1] The substitution between meat and lentils is in two cases. The first is during the fasting season where the consumption of dairy products is completely replaced by non-dairy fasting dishes. In these dishes lentils is the main variety served with *injera*. The second one is when the beef and mutton is not affordable by low income group the main dish served with *injera* is often made of lentils.

MARKETING AND TRADE

In 2007/08, about 40 percent of the lentils produced in Ethiopia were sold. In terms of price, similar to other cereals, the geometrical mean of the national wholesale price of lentils steadily increased over the period from 2005-2012 (Figure 9).

Figure 9. Lentil wholesale price (national mean) in Ethiopia (Birr/qt), 2005-2012
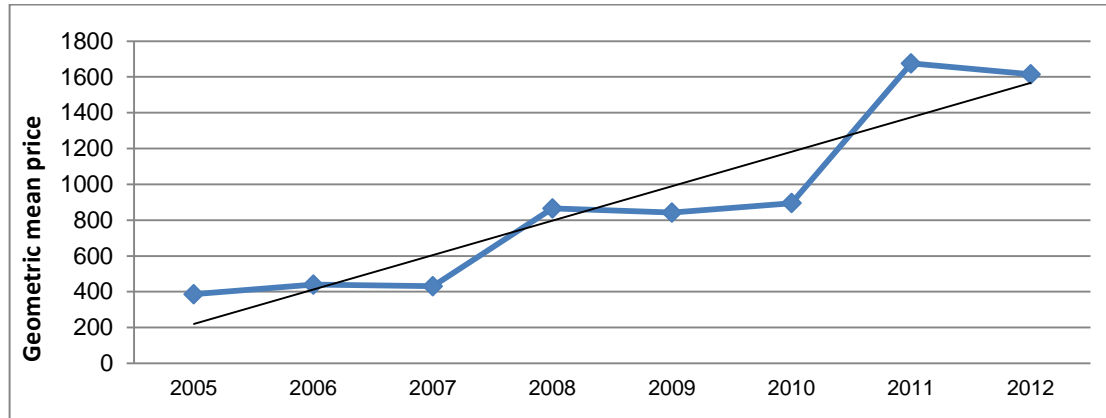
Source: EGTE, 2013

The price of lentils doubled twice during the period 2005–2012 (Figure 8). The first time was during 2007/08, observed for most of the cereal crops as well, whereas the second time was between 2010 and 2011, after a stable price period from 2008-2010. Over a period of four years, the price escalated, almost tripling from 430 to 1675 Birr per quintal, which is exceptionally high. Two reasons can be suggested from the demand side. First, lentils could have become a substitute for meat in Ethiopian main dishes in low and middle-income families. Second, export demand might have increased. ERCA (Figure 10) indicates that the quantity of lentils exported increased from 6,906 to 17,640 tonnes between 2007 and 2010 (about 155 percent change).

In 2011, the domestic wholesale price of lentils was the highest and this matches with a sharp decline in lentil exports. In fact, 2011 was a year of high inflation rates in Ethiopia (CSA, 2013), which suggests that the relatively high domestic prices may have affected lentil exports (Schneider and Anderson, 2010). On the other hand, even though domestic supply increased in 2011, there was little importing, which could have increased the price.

Figure 10. Quantity of lentils exported in tonnes, Ethiopia (2005-2012)
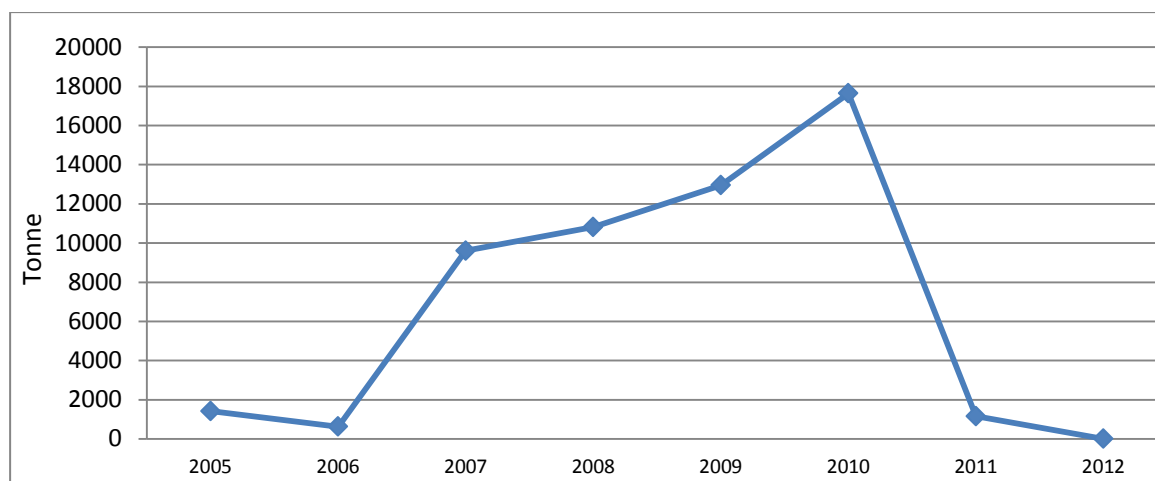
Source: Authors, based on ERCA data, 2013

Unlike the exportation of lentils, the importation of lentils to Ethiopia is fluctuating, and the overall trend of imported quantity is in a declining trend (Table 3). In 2012, the importation of lentils declined from 42,000 tonnes to 771 tonnes.

Ethiopia was in a surplus situation for most of the period, and was a net exporter of lentils (Table 3). It is important to note that in 2005 and 2006, Ethiopia had high deficits in lentils, and therefore had to import a substantial amount.

Table 3. Exports and Imports and trade status over the period (tonnes)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Imports Volume (ton)	42,002.13	20,013.03	1,613.44	2,207.62	7,398.82	4,852.64	0.08	771.20
Exports Volume (ton)	1414.85	627.96	9606.09	10813.23	12947.16	17,640.2	1152.20	0.22
Trade status	Deficit	Deficit	Surplus	Surplus	Surplus	Surplus	Surplus	Deficit

Source: Ethiopian Customs Authority, 2013

During the entire period except 2006, 99 percent of lentil imports to Ethiopia from the United States. In 2006, the share fell to 79 percent because the government imported 4,000 tonnes from Italy that year, only importing 15,000 tonnes from the US.

Table 4. Main countries of lentils exports and level of trade (2005-2012)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Main country destination & percentage share	Turkey	Djibouti	Pakistan	Pakistan	UAE	Sudan	Sudan	USA
Volume of exports (tons)	688.00	560.18	3,215.61	2,473.78	3,917.08	6,318.10	480.50	802.07
Share of total Exports (%)	48.63	89.21	33.47	33.47	33.47	33.47	41.70	0.00

Source: Authors' compilation from Customs Authority data, 2013

Trade intensity evaluates the relative share of trade over apparent domestic consumption. This calculation gives an idea of the openness of the national market for a commodity, and can be

found in the MAFAP methodology guidelines (Barreiro et al., 2013). In the case of lentils, it is clear that the intensity has decreased (Table 5).

Table 5. Lentils trade intensity in Ethiopia over the period 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Trade intensity (%)	44.2	20.6	13.0	15.1	17.2	33.0	0.9	0.5

Source: MAFAP calculations from Customs Authority, CountrySTAT and CSA data, 2013

DESCRIPTION OF THE VALUE CHAIN

A value chain is the range of activities involving agents in the production and marketing of a product. The anlaysis refers to this process in order to understand several aspects related to, for example, share of stakeholders, performance and constraints (Gereffi and Memedovic, 2003). So far, the value chain analysis carried out for lentils in Ethiopia is scant. For instance, the number of rural assemblers at local markets, wholesalers, retailers and exporters are not estimated by any of those studies; this study could not find any figures about the number of actors at each level. Some of the value chain studies suggest that compared to cereals, the pulse market structure is less organized, market chains are less visible, and the market has a seasonal nature that changes from time to time, depending on the production level in the area (Frehiwot, 2009). Recent CSA data indicates that nearly 40 percent of the national lentil output was traded in 2007/08, which differs greatly from the 26 percent indicated in Girma (2003), showing the traded volume has increased recently.

Overall, the lentil value chain in Ethiopia involves input suppliers, small-scale producers, assemblers, rural based wholesalers, urban wholesalers, rural and urban retailers, processors, consumers and exporters (see Figure 11). Small farmers dominate the supply market, and sell their lentils either to small-urban and rural consumers, or to local assemblers or wholesalers. Assemblers then sell to local consumers or wholesalers, who in turn transport the product to markets in big cities such as Addis Ababa, Bekie, Debrebirhan, or Nazareth. Bekie is a processing center where a large proportion of the lentils received from several parts of the country are processed, graded, packed and sold, either to domestic or export markets. In addition to the processing in Bekie, private processors (cleaning, splitting, sorting and sometimes washing) sell in retail markets, or deliver the product to wholesalers and retailers, either for the domestic market or export. In both rural and urban areas, lentil consumption is high, and the role of retailers (small shops, supermarkets) is substantial. In general, the role of the cooperative in the value chain of pulses is very limited. The low volumes traded by cooperative unions make them barely competitive when compared to the rural assemblers, especially with a shortage of supplies in the market (USAID, 2010). The role of cooperatives in other export commodities, such as coffee, are substantial, and their bargaining power for the benefit of coffee farmers is substantial. Figure 11 shows that assemblers, wholesalers, processors, retailers and exporters make up the lentil value chain.

Assemblers: involve rural traders who buy lentils from farmers and petty traders. They play a substantial role in the value chain by collecting from remote areas, where the transport cost is high, and linking the lentils produced by smallholders to central markets. Assemblers sell and deliver to wholesalers and processors, e.g., wholesalers from the Amhara and Oromia regions buy from assemblers and then channel the product to Bekie processors. Assemblers close to the

Bekie area would sell directly to Bekie processors. The average number of assemblers at a small market is unknown, and there has been no study to estimate such a figure.

Wholesalers: the ECXA study indicates two groups of wholesalers. Rural wholesalers found at the sub-district (woreda) level, and wholesalers at big city (urban wholesalers) marketing terminals. Rural wholesalers are supplied with lentils from rural assemblers, whereas big city wholesalers are supplied with lentils from rural wholesalers through transports. Big city wholesalers include those at Debrebirhan, Adama, Gondar, Dessie, Bahirdar, etc.

Processers: the purpose of processing lentils is to split, clean and separate the mixtures into domestic and export grades. Two kinds of processers operate in the lentil market; retailers process lentils by themselves to add value, so that they can sell at higher prices. Bulk processors, such as Bekie processers, are about 50-75 in number and are located about 15 km from Bekie town in North Shoa, Oromia regional state. Lentils are transported from different parts of the country to Bekie for processing, grading, packing and sale for the domestic and international markets. According to the interviewed lentil processors in Bekie, local varieties of lentils that are transported to Bekie lose up to 20kg per 100kg, whereas improved lentils lose up to 10 kg, due to the processing and milling for the removal of the chaff from the seed. After processing, the different grades are sold at different prices, and the decorated and graded lentils are sold to wholesalers in Addis Ababa. From wholesalers in Addis, exporters buy and export them, or retailers (also from deficit areas) buy the processed lentils from the wholesalers and then sell them. However, exporters often buy from rural assemblers and wholesalers, who clean and export lentils.

The Quality and Standards Authority of Ethiopia (QSAE) has set four standards to facilitate the transaction of lentils exported to the international market and in the grain; the lowest grade for an export is a grade of 3 (Frehiwot, 2009).

Retailers: retailers purchase lentils from urban and rural wholesalers and then sell to consumers. Small shops and supermarkets are the major retailers in cities, whereas small shops are the major retailers in urban centers.

Figure 11. Lentil marketing chain and processing in Ethiopia
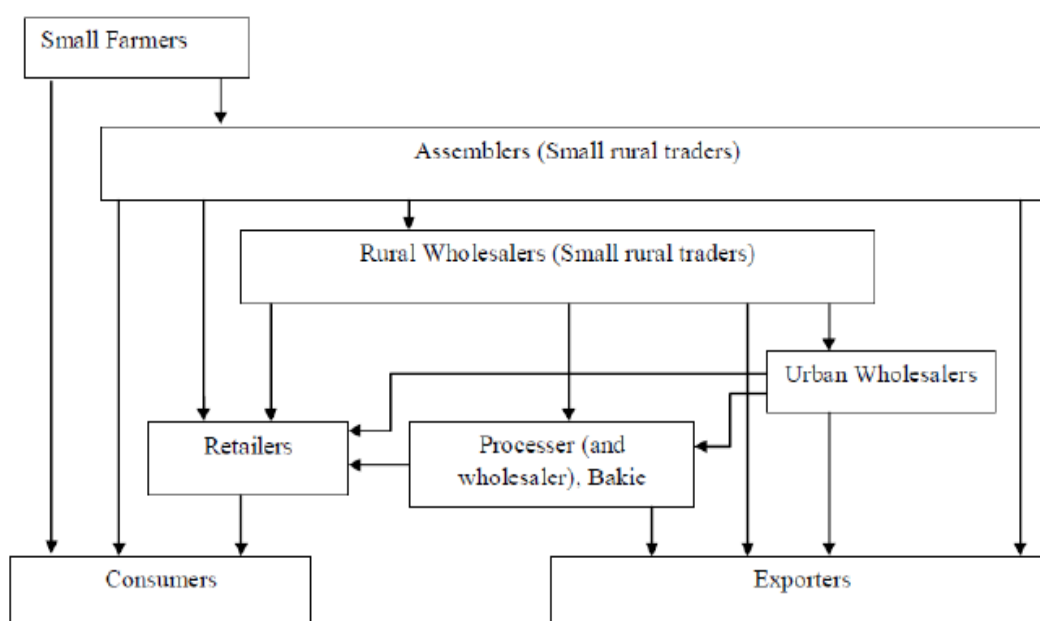
Source: Adapted and modified from Frehiwot -Economic Analysis Department of ECXA (2009)

Exporters: there are a number of privately owned lentil exporting companies. The data was obtained from the Ethiopian Pulses, Oilseeds, and Spices Processors Exporters Association, and about 80 export enterprises of various pulses, oilseeds, and spices are active. Among them, ACOS/Ethiopia, Amal Trading, EGTE, Antypas & Brothers, Ambassel, Guna, Soreti International Trading, etc. are well organized in terms of storage and cleaning facilities, organization and modernization, and experience in the business, whereas others are small and weakly organized. Exporters get their products from assemblers and urban and rural wholesalers, and then sell to the international market (USAID, 2010). The USAID study (2010) and the interview on a member from one of the exporting companies indicated that exporters, who are mainly concentrated in the terminal markets of Addis Ababa, Nazret and Dire Dawa, usually specialize in the foreign market, and many of them own cleaning plants. Those who do not have their own cleaning facilities obtain cleaning services from the big exporters. The exporters of pulses and oilseeds have their own associations, which provide them with various services, including access to market information, advocacy and capacity building, training, facilitation of participation in trade fairs, etc.

POLICY DECISIONS AND MEASURES

Before the change to the Government in 1991, farmers and traders were forced to sell their grain to the Agricultural Marketing Corporation (AMC) at fixed low prices in order to make food cheap and feed urban consumers (Gabre-Madhin, 2001). After 1991, the new Government introduced policy reforms that restored private trade and the AMC was transformed and renamed as the Ethiopian Grain Trade Enterprise (EGTE). Afterwards, the EGTE began to operate in competition with the private sector, with the following objectives: (i) stabilizing prices; (ii) earning foreign exchange through exporting grain; and (iii) facilitating the purchase and distribution of Emergency Food Security Reserve. Over the years, it has moved away from its

price stabilization role towards exporting cereals, pulses and oilseeds (Rashid and Negassa, 2011). In addition to EGTE, the number of private traders at primary, secondary or central market levels have increased considerably, with many operating without licenses, undercutting formally registered traders (Demeke, 2012).

The establishment of the Ethiopian Commodity Exchange (ECX) is a recent step towards market development, with a vision to revolutionize agricultural trade through creating a new marketplace that serves farmers, traders, processors, consumers and other actors. The ECX commenced its trading operations in April 2008. Its members include cooperative unions, industrial processors, commercial farmers, exporters, and domestic trading firms engaged in the agricultural commodity business. ECX operates warehouses in major market centers. It is important to note that lentils are not among the commodities traded at ECX; trade is limited to coffee, sesame, and recently pea-beans and mung-beans.

Other trade related policies emerged as a result of the 2008 price surge phenomena, and these include the (i) official imposition of the export ban on cereals (teff, wheat, millet, maize, sorghum, oats and rice) and pulses (peas, chick peas, lentils, etc.) in December 2006 and 2008 (USAID, 2010), which has continued until now; (ii) re-introduction of urban food rationing of imported food (mainly wheat and edible oil) at a subsidized prices in 2008 and 2009; (iii) informal suspension of local procurement by WFP and others; and (iv) direct Government imports for open market sales and price stabilization. The seasonal and temporary bans on exports were imposed in February 2008. Ethiopia lifted a two-year ban on the export of cereals, such as maize and sorghum, in July 2010. In March 2011, a decision was made to re-impose the restriction on exports due to the toll rising food prices began to take on general inflation which continued until 2013. Neighboring countries however were exempt after ensuring domestic supply (USAID, 2013).

Additionally, the government took other policy measures to stabilize domestic prices. One such policy measure indirectly restricted the importation of certain cereals and food items. For example; in 2008, the private sector was not officially banned from importing but access to foreign exchange was restricted (US$AID, 2013). The EGTE is assigned to importing grains, and selling them at subsidized prices. Also, the Government officially banned again the exportation of grains in 2011 (after a short lift in 2010), with the exception of maize to neighboring countries, after ensuring sufficient supply for domestic consumption. Moreover, in response to the increasing inflation of wheat and other grains, the government lifted value-added & turnover taxes on imported foodstuffs (US$A, 2013).

Ethiopia has high potential for lentil production due to suitable weather and in the 1970s, ranked fifth in the world among producing countries. However, the country could not sustain this position because there was no incentive due to the controlled market and lack of innovative technology. After the early 1990s, the production and yield of lentils continuously increased. There have been strategies in place to lift low agricultural production overall, and the production of lentils in particular. In addition to market liberalization measures, there has been the implementation of an extension package with emphasis on the propagation of improved seeds, fertilizer and other chemical inputs, and the involvement of development agents in each peasant association. The Government initiated a 100 percent credit guarantee scheme on fertilizer

purchases in 1994, allowing farmers to purchase fertilizer at below-market interest rates. However, the program has been gradually scaled down and farmers are being encouraged to buy on cash or credit provided through cooperatives at low-interest rate subsidies.

Research and development centers have paid high attention to lentils, with the same objective of enhancing output. Since the early 1980s, research and development activities have involved the collaboration of the Ethiopian Agricultural Research Organization (EARO) with the International Center for Agricultural Research in the Dry Areas (ICARDA) in a program to improve lentils. The program has released seven lentil varieties, five of which were derived from ICARDA-supplied material, and the varieties have a yield potential of up to 2.6 tonnes/ha (Frehiwot, 2009).

The successive poverty reduction strategies (as the Poverty Reduction Strategy Program/PRSP and the SDPRS rural development) were particularly significant during those periods and the attention paid towards the agricultural sector to increase rural income, improve crop growing and animal husbandry was substantial.

Recently, in the Growth and Transformation Plan, crop production was given attention through the intensive extension program and the promotion of agricultural technologies. The GTP aims to double grain output by 2015 (MOFED, 2010). Accordingly, the Ministry of Agriculture and Rural Development (MoARD) formulated a master plan to enhance the market-oriented production for priority crops (wheat, barley, teff, lentil, chickpea, haricot beans, cotton, sesame, coffee and spices) and livestock commodities (dairy, meat, poultry, apiculture, sericulture, fisheries, skins and hides (USAID, 2010). This strategic plan was designed to introduce and develop technologies leading to sustainable productivity, including sound crop management practices, integrating modern technologies such as chemical/organic fertilizers, improved and high yielding varieties, proper cultural practices and the use of crop rotation. With this objective, potential woredas are identified for selected export commodities. A total of 173 sub-districts/woredas have been identified with the potential for specialization in eight main food crops, while 38 woredas have been considered for cotton production. Of the 173 sub-districts, in 2 regions and 7 sub-districts, a total area of 172,219 was identified for lentils. The strategy also focused on encouraging production during both short and long rainy seasons and producing two to three times a year using irrigation (water harvesting technologies).

The technologies identified for this purpose mainly include: alleviating the determining factors (e.g., use of appropriate varieties), and minimizing the effects of limiting factors (e.g., moisture stress) and reducing factors (e.g., diseases and pests, etc.) (IPMS Ethiopian Farmers Project, information from website). In addition to these technologies, activities that improve the enabling environment by allowing farmers to be more effective and productive, include: generation of research and technology; training of MoARD staff and revitalizing the extension system; developing infrastructure; strengthening service cooperatives, market information systems, and links between investors and producers or cooperatives (to improve market outlets through various forms of arrangements, such as contract farming); improving the credit systems to farmers and cooperatives; enhancing the use of traditional institutions; examining the potential use of locally available materials; and ensuring the proper and efficient multiplication of proven technologies (IPMS Ethiopian Farmers Project website).

3. METHODOLOGY

MAFAP methodology seeks to measure price incentives for producers and other marketing agents in key agricultural value chains. The analysis is based on the comparison between observed domestic prices and constructed reference prices. Reference prices are calculated from the international price of the product at the country's border, where the product enters the country (if imported) or exits the country (if exported). This price is considered the benchmark price free of influence from domestic policies and markets. MAFAP estimates two types of reference prices – observed and adjusted. *Observed reference prices* are those that producers and other marketing agents could receive if the effects of distortions from domestic market and trade policies, as well as overall market performance, were removed. *Adjusted reference prices* are the same as observed reference prices, but also exclude the effects of any additional distortions from domestic exchange rate policies, structural inefficiencies in the commodity's value chain, and imperfect functioning and non-competitive pricing in international markets.

MAFAP's price incentives analysis is based on the law of one price, which is the economic theory that there is only one prevailing price for each product in a perfectly competitive market. This law only applies in the case of homogeneous goods, if information is correct and free, and if transaction costs are zero. Thus, this analysis was conducted for goods that are either perfectly homogeneous or perfect substitutes in the local market in terms of quality, or, failing that, are simply comparable goods. Indicators calculated from reference and domestic prices will, therefore, reveal whether domestic prices represent support (incentives) or a tax (disincentives) to various agents in the value chain.

Domestic prices are compared to reference prices at two specific locations along commodity value chains– the farm gate (usually the main production area for the product) and the point of competition (usually the main wholesale market where the domestic product competes with the internationally traded product). The approach for comparing prices at each location is summarized below, using an imported commodity as an example. In this situation, the country is importing a commodity that arrives in the port at the benchmark price (usually the unit value CIF price at the port of entry). In the domestic market, we observe the price of the same commodity at the point of competition, which is in this case the wholesale market, and at the farm gate. We also have information on observed access costs, which are all the costs associated with bringing the commodity to market, such as costs for processing, storage, handling, transport and the different margins applied by marketing agents in the value chain. These include access costs between the border and wholesale, as well as between the farm gate and wholesale.

The benchmark price is made comparable to the domestic price at wholesale by adding the access costs between the border and wholesale, resulting in the observed reference price at wholesale. This takes into account all the costs incurred by importers and other agents to bring the commodity to market, which in effect, raises the price of the commodity. The reference price at wholesale is further made comparable to the domestic price at the farm gate by deducting the access costs between the farm gate and wholesale, resulting in the observed reference price at farm gate. This takes into account all the costs incurred by farmers and other agents to bring the commodity from the farm to the wholesale market. Mathematically, the equations for calculating the observed

reference prices at wholesale(RP_{owh}) and farm gate $\left(RP_{ofg}\right)$ for an imported commodity are as follows:

$$RP_{owh} = P_b + AC_{owh}$$

$$RP_{ofg} = RP_{owh} - AC_{ofg}$$

where AC_{owh} are the observed access costs from the border to wholesale, including handling costs at the border, transport costs from the border to the wholesale market, profit margins and all observed taxes and levies, except tariffs, and P_b is the benchmark price. AC_{ofg} are the observed access costs from the farm gate to wholesale, including handling costs at the farm, transport costs from farm to wholesale market, processing, profit margins and all observed taxes and levies.

The same steps described above can be taken a second time using benchmark prices and access costs that have been adjusted to eliminate market distortions due to exchange rate misalignments, structural inefficiencies in the commodity's value chain[2] and imperfect functioning and non-competitive pricing in international markets, where possible and relevant. The adjusted benchmark prices and access costs are then used to generate a second set of *adjusted* reference prices, in addition to the first set of *observed* reference prices calculated.

For exported commodities, a slightly different approach is used. In this case, the border is generally considered the point of competition (wholesale), and the unit value FOB price for the commodity is normally taken as the benchmark price. Furthermore, observed and adjusted reference prices at wholesale are obtained by subtracting, rather than adding, the access costs between the border and wholesale. Mathematically, the equations for calculating the observed reference prices at wholesale(RP_{owh}) and farm gate $\left(RP_{ofg}\right)$ for an exported commodity are as follows:

$$RP_{owh} = P_b - AC_{owh}$$

$$RP_{ofg} = RP_{owh} - AC_{ofg}$$

After observed and adjusted reference prices are calculated for the commodity, they are subtracted from the domestic prices at each point in the value chain to obtain the observed and adjusted price gaps at wholesale and farm gate. *Observed price gaps* capture the effect of distortions from trade and market policies directly influencing the price of the commodity in domestic markets (e.g. price ceilings and tariffs), as well as overall market performance. *Adjusted price gaps* capture the same as the observed, in addition to the effect of any distortions from domestic exchange rate policies, structural inefficiencies in the commodity's value chain, and imperfect functioning and non-competitive pricing in international markets. Mathematically, the equations for calculating the observed price gaps at wholesale(PG_{owh}) and farm gate $\left(PG_{ofg}\right)$ are as follows:

$$PG_{owh} = P_{wh} - RP_{owh}$$

$$PG_{ofg} = P_{fg} - RP_{ofg}$$

---

[2] Structural inefficiencies in commodity value chains may include government taxes and fees (excluding fees for services), high transportation and processing costs, high profit margins captured by various marketing agents, bribes and other non-tariff barriers.

where P_{fg} is the domestic price at farm gate, RP_{ofg} is the observed reference price at farm gate, P_{wh} is the domestic price at wholesale, and RP_{owh} is the observed reference price at wholesale.

A positive price gap, resulting when the domestic price exceeds the reference price, means that the policy environment and market functioning as a whole generate incentives (support) to producers or wholesalers. For an imported commodity this could be due to distortions such as the existence of an import tariff. On the other hand, if the reference price exceeds the domestic price, resulting in a negative price gap, this means that the policy environment and market functioning as a whole generate disincentives (taxes) to producers or wholesalers. For an imported commodity this could be due to distortions such as a price ceiling established by the government to keep domestic prices low.

In general, price gaps provide an absolute measure of the market price incentives (or disincentives) that producers and wholesalers face. Therefore, price gaps at wholesale and farm gate are divided by their corresponding reference price and expressed as a ratio, referred to as the **Nominal Rate of Protection (NRP)**, which can be compared between years, commodities, and countries.

The *Observed Nominal Rates of Protection* at the farm gate (NRP_{ofg}) and wholesale (NRP_{owh}) are defined by the following equations:

$$NRP_{ofg} = \frac{PG_{ofg}}{RP_{ofg}} \; ; \; NRP_{owh} = \frac{PG_{owh}}{RP_{owh}}$$

Where PG_{ofg} is the observed price gap at farm gate, RP_{ofg} is the observed reference price at the farm gate, PG_{owh} is the observed price gap at wholesale and RP_{owh} is the observed reference price at wholesale.

Similarly, the *Adjusted Nominal Rates of Protection* at the farm gate (NRP_{afg}) and wholesale (NRP_{awh}) are defined by the following equations:

$$NRP_{afg} = \frac{PG_{afg}}{RP_{afg}} \; ; \; NRP_{awh} = \frac{PG_{awh}}{RP_{awh}}$$

where PG_{afg} is the adjusted price gap at farm gate, RP_{afg} is the adjusted reference price at the farm gate, PG_{awh} is the adjusted price gap at wholesale and RP_{awh} is the adjusted reference price at wholesale.

If public expenditure allocated to the commodity is added to the price gap at farm gate when calculating the ratios, the **Nominal Rate of Assistance (NRA)** is generated. This indicator summarizes the incentives (or disincentives) due to policies, market performance and public expenditure.[3] Mathematically, the Nominal Rate of Assistance is defined by the following equation:

$$NRA = \frac{PG_{afg} + PE_{csp}}{RF_{afg}}$$

---

[3] The NRA indicator was not calculated for any of the commodities analyzed because of insufficient data on public expenditure. However, it will be developed in the forthcoming reports, as the public expenditure analysis is improved and better data is made available.

4. DATA REQUIREMENTS AND CALCULATION OF INDICATORS

To calculate MAFAP's price incentives indicators, several types of data are needed. This section presents the data that was obtained and methodological decisions that were taken in this analysis.

TRADE STATUS OF THE PRODUCT

As shown in Table 6, all sources of data indicate that Ethiopia was a net importer of lentils during 2005, 2006 and 2012, but a net exporter during all other years. The figures obtained from FAO and UN Comtrade data are similar, but differ slightly from that of ERCA's.

Table 6. Trade status of Ethiopia in lentils trade based on volume of trade (2005-12)

		2005	2006	2007	2008	2009	2010	2011	2012
Ethiopian Revenue and Customs Authority	*Imports*	42,002.13	20,013.0	1,613.44	2,207.6	7,398.8	4,852.6	0.08	8,902.9
	Exports	1414.85	627.96	9606.09	10813.2	12947.2	17640.0	1152.20	0.23
	Trade status	net importer	net importer	net exporter	net exporter	net exporter	net exporter	net exporter	net importer
UN COMTRADE	*Imports*	41833	20014	1613	2679	7399	5021	3	4145
	Exports	5133	423	9606	10799	12947	17640	1252	0
	Trade status	net importer	net importer	net exporter	net exporter	net exporter	net exporter	net exporter	net importer
FAO	*Imports*	41833	20014	1613	5794	12196	9207	3	-
	Exports	5133	423	9606	10799	12947	17640	1252	
	Trade status	net importer	net importer	net exporter	net exporter	net exporter	net exporter	net exporter	net importer

Source: Authors, based on ERCA, UNComtrade and FAOSTAT data, 2014

MARKET PATHWAY ANALYSED

A market pathway geographically shows where production takes place and is traded. The trade flow often goes from surplus to deficit areas. In 2007/08, 99.6 percent of lentils were produced the three regions Amhara, Oromia and Tigray (CSA, 2007/08). On average, 26 percent of the lentils produced were for the market (Girma, 2003), but regional variations in marketable surplus were high. For instance, the respective shares of marketed lentils in 2007/08 in Amhara, Oromia, Tigray and SNNPR were 47.7, 31.27, 33.86 and 30.47 percent, respectively. The data also shows, on average, about 38.7 percent of the production in the four major regions was marketed.

Figure 12. Market pathway analyzed for lentils trade in Ethiopia, 2005 - 2012
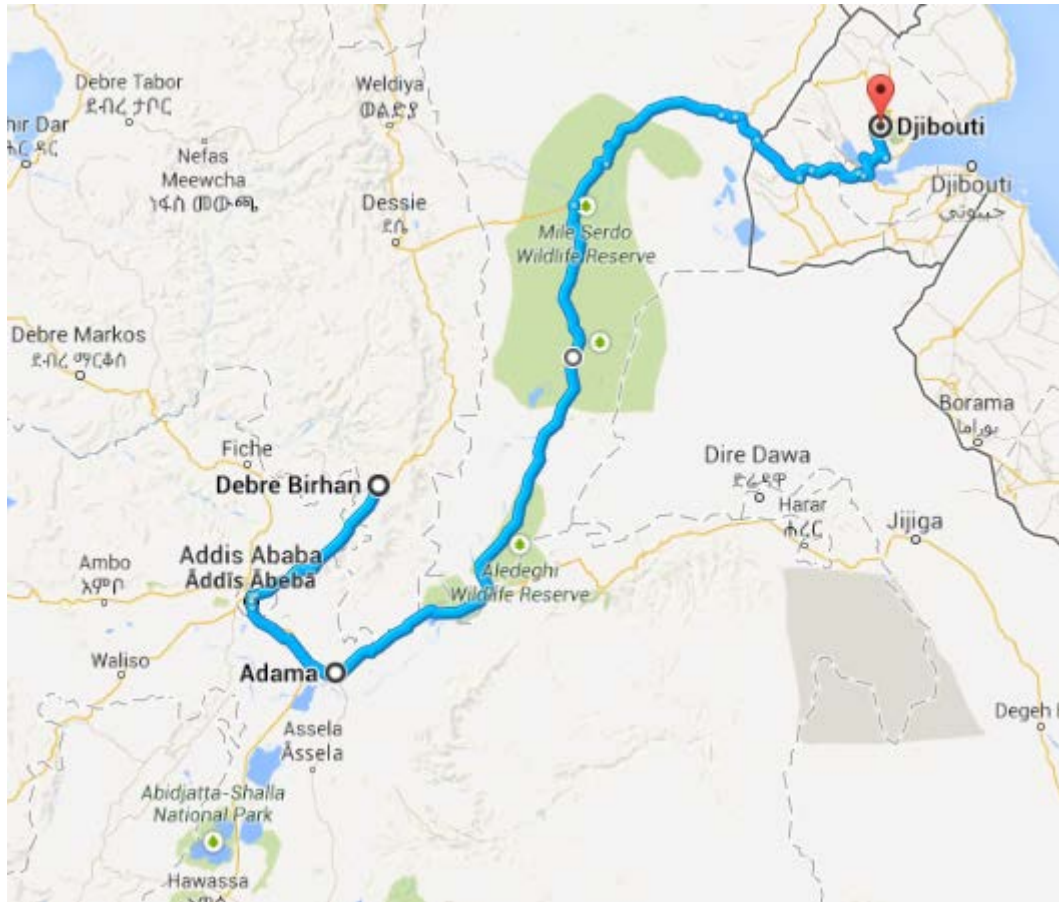
Source: Authors, from Google maps

In order to highlight the market pathway, the share of production for each zone is ranked. In 2007/08, the East Shoa Zone of Oromia (Nazareth) had the highest share of lentil production (23.3 percent), followed by North Shoa (21.4 percent), South Wollo (11.9 percent), North Wollo (9.6 percent) and North Gonder (9.1 percent). Together, these six zones make up 82 percent of the total production.

Debrebirhan (see Figure 11) is used as a source for farm gate prices because it is the second highest surplus production area and it is close to Bekie lentils processing. Therefore, the market incentives/disincentives in lentil production was analyzed from Debrebirhan to Addis Ababa due to its high share of production in Debrebirhan's zone and relatively better information on access costs in the lentils market.

Domestic consumption and export demand is concentrated in Addis Ababa and other capital cities, while export processing is carried out in Addis Ababa, Nazareth and Dire Dawa (USAID, 2010). This means that the major trade flow for lentils begins in the six zones and other surplus areas, traveling to Addis Ababa, Nazareth and Dire Dawa (Figure 12). Minor lentil pathways are trade flows to the peripheral regional states, such as Somali, Afar, Benishangul-gumz, and relatively remote parts of the four major regional states. Among the major trading centers for lentils, Addis Ababa is the chosen point of competition due to the high volumes of trade and large number of traders concentrated in the city. It is important to note that exporters are located in Addis Ababa, which is close to Bekie where lentils are processed, and then delivered to wholesalers in order to distribute them to retailers

20

and exporters. Additionally, Addis Ababa attracts large urban consumers; has a relatively better availability of storage facilities compared to other lentil processing and exporting centers, such as Adama; is the location for lentil value chain actors and institutions (importers and exporter associations, etc); and is a center for loading and unloading lentil exports and imports, along with other agricultural commodities.

BENCHMARK PRICES
Observed

The basis for calculating a reference price to determine whether lentil producers receive either market incentives or disincentives is to establish a benchmark price that represents the price for lentils free from domestic policy and market distortions. Since Ethiopia was a net importer and exporter of lentils during 2005-2012, the benchmark prices considered for lentils were CIF and FOB (Table 7).

Table 7. Comparison of Benchmark prices for imported and exported Lentils, 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status	net importer	net importer	net exporter	net exporter	net exporter	net exporter	net exporter	net importer
Benchmark price	CIF	CIF	FOB	FOB	FOB	FOB	FOB	CIF
ERCA data (US$/tonne)	580	331	598	780	895	874	932	1134
UN Comtrade data (US$/tonne)	585	335	606	797	914	903	901	1134
International price (US$/ton)	580.0	331.0	598.4	779.6	894.6	874.1	931.6	1134
International price (ETB/ton)	5,028.60	2,892.94	5,511.26	7,639.6	10,825.1	11,267	15,743.2	19,958.4

Source: computed by Author from ERCA and UNComtrade data

The Ethiopian Customs Authority and UN Comtrade data sources indicate very close figures, showing a difference of less than 4 percent; the graph of the two almost coincide (Figure 13). Both ECA and UN Comtrade data are based on the exportation and importation of dried, shelled lentils (HS code: 071340). The direction of movement of the ERCA and UN Comtrade benchmark prices coincide with that of the international price for lentils, except in the years 2007 and 2012.

Figure 13. Comparison of Benchmark prices for Imported and Exported Lentils in Ethiopia (US$/tonnes), 2005-2012
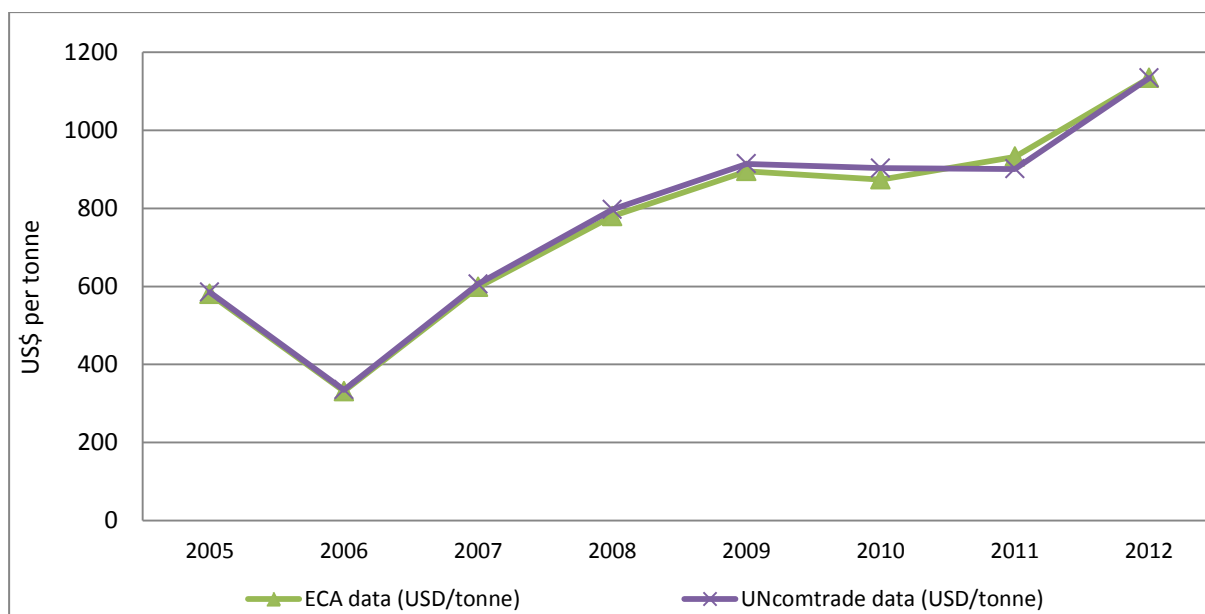
Source: Authors computation based on ERCA, UN Comtrade data

Adjusted

No adjustments have been made on the observed benchmark price due to lack of information on distortions, information that would be required for such an adjustment.

DOMESTIC PRICES

Observed prices at point of competition

The Ethiopian Grain Trade Enterprise (EGTE) collects price data in Addis Ababa and several major markets in the country, including monthly wholesale prices for lentils. The average annual wholesale price of lentils in Addis Ababa is considered the price at the point of competition. Between 2005 and 2012, the wholesale price of lentils increased by 318 percent at the point of competition (Addis Ababa), with an annual average rate of 30.5 percent. During this period, 2008 and 2011 had the highest price increases (Table 8 and Figure 14). From 2007 to 2008, the average wholesale price of lentils in Addis Ababa increased by 118 percent, from 4,275 to 9,325 birr. Similarly, in 2010 and 2011, the wholesale price increased by 95 percent, almost doubling.

Table 8. Observed wholesale prices at Addis Ababa and DebreBihran for (unprocessed) Lentils in Ethiopia, 2005-2012

	Unit	2005	2006	2007	2008	2009	2010	2011	2012
Wholesale purchase price observed at the market of A.A.	ETB/tonne	3861	4483	4275	9325	8337	8585	16758	16143
Debrebirhan wholesale observed price	ETB/tonne	3968	4439	4298	7267	6496	9632	11690	15000

Source: Ethiopian Grain Trade Enterprise (EGTE) for Addis Ababa and Debrebirhan wholesale prices

Figure 14. Comparison of domestic prices at Addis Ababa and Debrebirhan for lentils 2005-2012
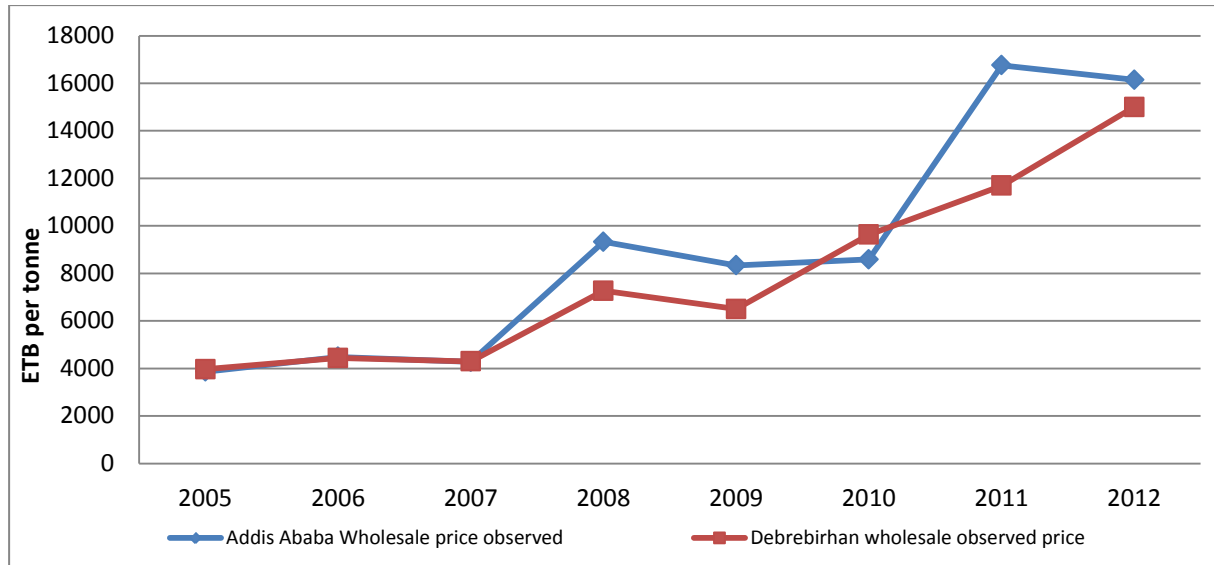
Source: EGTE, 2013

Observed prices at farm gate

Located some 130 km North East of Addis, Debrebirhan represents a major lentil-producing zone. Lentil traders in Debrebirhan and surrounding towns buy from farmers and assemblers, in order to either sell at the central market in Addis or deliver to Bekie processors. Exporters also buy from the area and then transport them to Addis Ababa for processing. In Debrebirhan, the wholesale price of lentils is higher than the farm gate price because of the expected transport costs and the margins of assemblers and wholesalers. Debrebirhan traders offer a lower price to farmers and assemblers with the aim of either selling at a wholesale price in Bekie or transporting to Addis Ababa.

The trend in Debrebirhan for wholesale prices is similar to that of Addis Ababa, but the price increase from 2005 to 2012 was 278 percent, with an average annual increase of 23.6 percent, ranging between from 69 percent rise in 2008 to a 10 percent decline in 2009. This indicates that the rate of price change was lower than the wholesale price at the Addis Ababa market.

The observed farm gate price of lentils around Debrebirhan from 2005 to 2007 was obtained from EGTE but this price was not available after 2007. We used the inflation rate of pulses (CSA data) to estimate the farm gate prices from 2008-2012. The estimated farm gate price had a similar trend with the above two prices but with a lower average (20 percent) annual increase; the highest rise being 60 percent in 2011, with a fall of 3 percent in 2007.

We compared the estimated farm gate price based on the three-year EGTE price data with the farm gate price obtained from CSA (Figure 15). The price trends are very similar, except that the CSA price is higher than of the one from EGTE. As the wholesale price at the point of competition is from EGTE, the EGTE based producer price was used.

Figure 15. Lentils producers prices comparisons: CSA vs EGTE data, 2005-2012
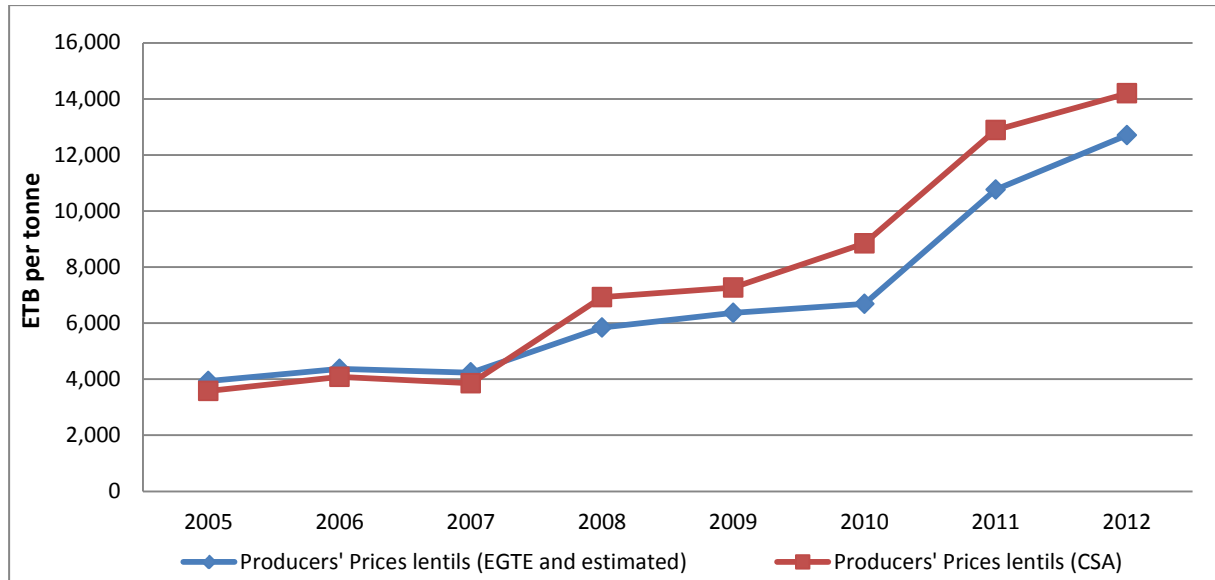
Source: Authors' compilation from EGTE and CSA data

In comparing the price trends at wholesale and farm gate, it is apparent that the two prices were very similar during the first three years. In fact, the difference between the two did not exceed 119 ETB/tonne (see Figure 16), while the corresponding access costs averaged 804 birr/tonne during these three years. The rather low level of wholesale prices might be due to the pathways for lentils involved in Ethiopia. The analysis takes into consideration (i) the main market pathway and (ii) the processing costs from raw to cleaned lentils in Bekie. Thus, it is assumed that the lentils traded in Addis Ababa are the processed ones. However, due to lentils' numerous pathways, the price for lentils in Addis, received from the EGTE, might reflect the price for processed and unprocessed lentils (Figure 15).

Figure 16. Comparison between farm gate and wholesale prices (ETB/ton), access costs between farm gate and Addis Ababa (ETB/ton), 2005-2012

Source: Authors

24
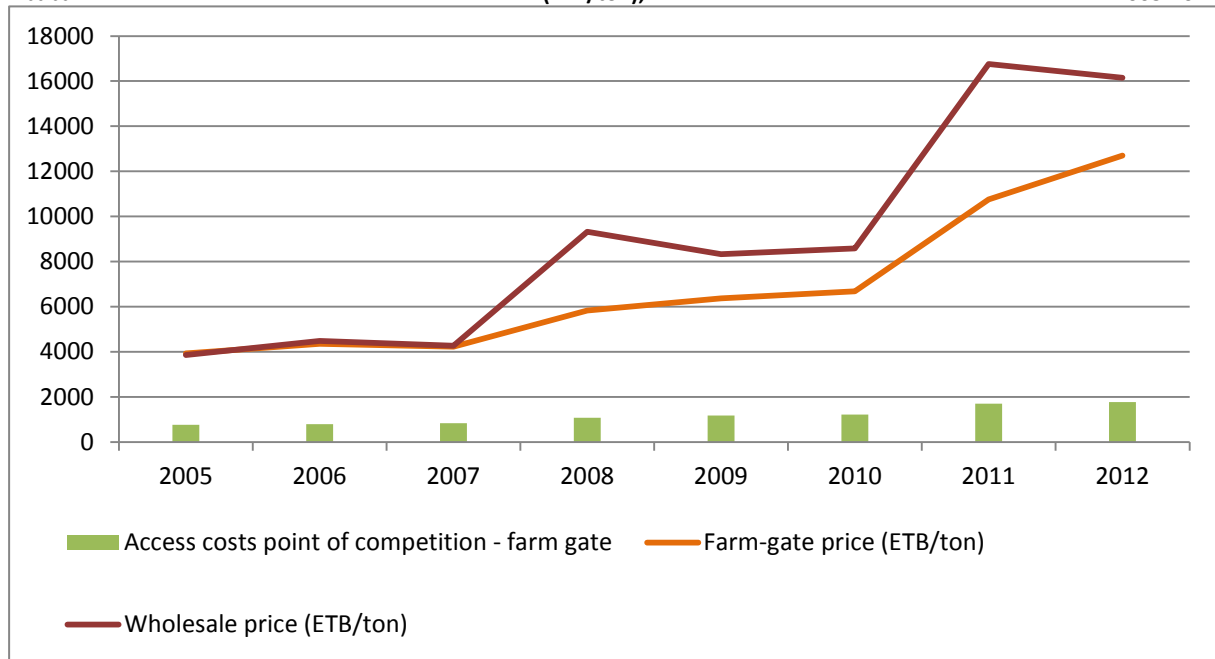
EXCHANGE RATES

Observed

The observed exchange rate increased from an average of Birr 8.67 to US$1 in 2005 to 9.80 in 2008. In 2009, the rate increased to Birr 12.10 and in 2010, to Birr 12.89. It further increased to an average of 16.90 in 2011, and 17.60 in 2012. The jump from 12.89 to 16.90 is a result of the devaluation in September 2011 (Table 9). It is documented that the stability of the exchange rate in Ethiopia is due to the policy of managed floating with strong Government control. The National Bank of Ethiopia is the sole provider of foreign exchange and only authorizes banks and investors who are able to bid at least US$ 0.5 million are allowed to participate in the weekly foreign exchange auction. The marginal rate of each auction (once a week) serves as the official rate, until a new rate is established in the next round (a week later). It is believed that the domestic currency (Birr) was overvalued, especially in 2008, 2009 and 2010 (Demeke, 2012), with the extent of overvaluation estimated at 40 percent, and thus the Government was forced to devalue the Birr by 25 percent in September 2011 (Rashid, 2010). The high rate of inflation (relative to the low inflation rate among its trading partners) and increasing pressure on the foreign exchange reserve are among the major causes of currency appreciation in Ethiopia. Between 2005 and 2008, inflation rates hit double digits, declining to 8.5 and 7 percent in 2009 and 2010, and then increasing to 35 and 21 percent in 2011 and 2012. In 2007 and 2008, the foreign currency reserve fell short of the critical requirement of 12 weeks worth of imports, and as a result, the Government implemented a foreign exchange rationing (Rashid, 2010). In March 2008, access to foreign exchange for imports was rationed to curb the excessive drawdown of the foreign exchange reserve. The devaluation of September 2011 decreased the overvalued exchange rate.

Table 9. Observed and adjusted exchange rate Birr to US$ (annual average), 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Observed (Birr per US$1)	8.67	8.74	9.21	9.80	12.10	12.89	16.90	17.60
Adjusted (Birr per US$1)	10.40	10.49	11.05	11.76	14.52	15.47	19.10	19.70

Source: National Bank of Ethiopia; IMF and World Bank for 2011 and 2012

Adjusted

During the 2005-2010 period, it is assumed that the local currency was overvalued by roughly 20 percent, and the exchange rate has been adjusted accordingly in our calculation of adjusted reference prices (Rashid, 2010). According to the IMF and the World Bank, a respective adjustment rate of 13 and 12 percent was taken in 2011 and 2012. The adjustment factor approximates the depreciation of the local currency, had a more liberal policy been pursued. The adjusted exchange rate has thus increased from Birr 10.40 in 2005 per US$1 to Birr 15.47 in 2010 (Table 9), and to Birr 19.10 per US$ 1 to Birr 19.70 per US$ 1 in 2012.

ACCESS COSTS

Observed

From port to point of competition

Addis Ababa is the wholesale market for lentils and other agricultural commodities, and Ehil Berenda has a network of brokers who sell the lentils they receive from client traders in surplus production areas such as Bekie, Debrebirhan, Dessie and Gondar. Access costs from the port of Djibouti to the point of competition (Addis Ababa) include surtax, withholding tax, processing, port handling, transportation, loading and unloading, license fees, margin and miscellaneous costs. The estimated costs for loading/unloading, surtax and withholding taxes are based on a USAID Bellmon study (USAID, 2011) that is used in Demeke (2012).

Margins of importers are estimated based on the selling price at the point of competition minus the costs from the border such as loading, unloading, storage and marketing. According to importers, exporters and the EGTE, importers do not exact a consistent margin but this is estimated to be about 3 percent of the CIF price. The margin for exporters is higher, estimated to be 5 percent of the FOB price. Expenses for exporting at the port of Djibouti, such as loading and unloading, port handling, paper work, etc., are estimated to total US$25/tonne. For 2007 and 2011, the loading/unloading and port handling costs were deducted from the ETB equivalent of US$25; the remaining miscellaneous costs were estimated as a residual cost. However, the initial margins may be underreported and it is difficult to adjust given the information constraint.

Transportation of lentils from Addis Ababa to the port of Djibouti is carried out by private transport companies. The transport cost for exports is lower than imports for private companies. The data collected from the EGTE and ESLSE indicates that to transport imports from Djibouti's port to Addis, transporters charged ETB 80-90 per quintal in 2012, whereas for exports they charged 60 birr. This difference exists because transport companies have the opportunity to load product from Djibouti's port to Addis, maximizing on profits from round trip transport service, whereas import-loading firms leaving from Addis Ababa may go empty at the time of dispatch. Between 2010 and 2012, transport costs doubled (Table 10) because of the increased fuel price and high inflation rate in 2011 and 2012. The rise in transport costs, estimated from Addis Ababa to Djibouti, was consistent with the rise in transport costs of grain from local markets to Addis Ababa. In this study, the transport costs were estimated with the inflation rate provided from CSA for the years of export that was not available.

Finally, the export preparation process for lentils includes cleaning, baggage and labour costs, and of these three, the baggage cost is the highest. In 2013, the cost (baggage and labour) to prepare a bag of lentils to be exported was 22 Birr per quintal, which increased from 14 birr per quintal in 2011. The cleaning cost was about 5 birr per quintal and it did not change from year to year.

Table 10. Access costs (observed & adjusted) from Djibouti to Addis Ababa– price/tonne or price/km (nominal prices), 2005-2012

			2005	2006	2007	2008	2009	2010	2011	2012
a	Surtax & withholding tax	ETB/quintal	5.14	6.20	0.00	0.00	0.00	0.00	0.00	10.60
b	Processing (including packing)	ETB/quintal	0	0	13.5	17.3	16.3	15.5	19.0	0
c	Port Handling	ETB/quintal	26.11	29.76	35.12	50.57	54.62	58.99	78.58	97.53
d	Transport costs	ETB/quintal	24.1	26.1	30.5	34.3	36.3	44.2	57.7	85.0
e	Loading and Unloading	ETB/quintal	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
f	Taxes and fees	ETB/quintal	0.48	0.55	0.65	0.93	1.01	1.09	1.45	1.80
g	Margins	ETB/quintal	15.1	8.7	27.6	38.2	54.1	56.3	78.7	59.9
h= (25US$x Ex rate) − c − e*	Others (miscellaneous costs)	ETB/quintal	121	138	163	162	215	231	311	310
i	License fee (2% of margin)	ETB/quintal	0.30	0.17	0.33	0.46	0.65	0.68	0.95	1.20
J=a+b+c+d+ e+f+g+h+i	Total costs	ETB/quintal	63.0	61.7	95.6	115.7	138.7	150.0	200.0	202.5
*J*10*	**Total costs : observed**	**ETB/ ton**	**630**	**617**	**956**	**1157**	**1387**	**1500**	**2000**	**2025**
	Total costs: adjusted (less tax and fees, surtax and withholding tax)	**ETB/ ton**	**574**	**549**	**949**	**1147**	**1376**	**1489**	**1986**	**1901**

*The cost of 25 US$ is coming from EGTE for port-related costs for exports of lentils.

Source: Adopted from Demeke (2012) USAID, Office of Food For Peace Ethiopia, Bellmon Estimation, Annex 1 Economic Data and Trends, Sept.2011

From farm to point of competition

Marketing costs from Debrebirhan to Addis were obtained from a discussion with traders/brokers and processors at Bekie and trade associations at the Addis Ababa central grain market. These costs include loading, transportation, storage and processing (water charge for washing lentils, labour and cleaning), fees for brokers selling lentils in Addis, and margins for traders (Table 11). To compare and cross check the information from Bekie, information was also collected from grain traders, transporters and brokers in Addis Ababa.

Transport costs, the major component of the total access cost, have nearly tripled between 2005 and 2012 in nominal terms, mainly because of the high fuel cost and high rate of inflation in the country. In terms of US$/km/tonne, the price of transport has increased from 0.075 (7.5 cents) in 2005 to 0.10 (9.6 cents) in 2012. The observed transport cost is well above the cost reported along the Djibouti-Addis Ababa road and the international rates[4]. The transport cost for lentils from the Debrebirhan area to Addis Ababa is rather good because the highway is asphalt and the possibility to get vehicle access is easier near Addis Ababa. Overall, the high cost is because smaller trucks are used (often 6 tonne capacity Isuzu cars), rather than bigger trucks with lower costs per unit.

According to traders, the estimated margins were relatively high but tended to decline between 2005 and 2012. Trader margins were calculated as the residual that regional traders received after they had paid farm gate prices, incurred access costs (common practice) and sold the lentils in Addis

---

[4] See for instance, The Reporter (newspaper), 11 February, 2012
http://www.thereporterethiopia.com/News/govt-to-tighten-grip-on-trade-logistics.html

Ababa at wholesale prices. For lentils, the margins are not declining because they have high domestic demand.

Table 11. Access costs (observed) from Debrebirhan to Addis Ababa (nominal prices), 2005-2012

	Unit	2005	2006	2007	2008	2009	2010	2011	2012
Loading	ETB/tonne	32	37	43	62	67	73	97	120
Transportation costs	ETB/tonne	84	96	107	121	128	156	211	220
Broker fees for accessing truck (load)- per tonne	ETB/tonne	7	8	9	13	14	15	20	25
Broker fees for selling grain in Addis	ETB/tonne	20	23	27	39	42	45	60	75
Estimated margins for traders	ETB/tonne	233	205	174	250	231	214	285	230
Cleaning and sorting	ETB/tonne	100	100	100	100	150	150	150	150
Weight loss	ETB/tonne	294	327	317	438	478	501	807	952
Other costs	ETB/tonne	2.68	3.05	3.60	5.18	5.60	6.05	8.06	10.00
Total costs	ETB/tonne	773	797	841	1088	1175	1220	1699	1782

Source: Compiled based on information collected from traders and trader association at the central grain market (Ehil Berenda) Addis Ababa

In 2011 and 2012, high inflation rates and increased fuel-prices influenced transport costs, as well as other costs from farm gate to the point of competition. During this period, the average annual general inflation rates were 35 and 24 percent, and similarly, in 2010 and 2011, the average transport inflation rates were 21 and 35 percent. As a result, the loading cost doubled between 2010 and 2011; transport costs increased by 27 percent; and the brokers' fees for selling grain and for truck usage increased by 33 and 60 percent between 2011 and 2012, respectively.

The rate of weight loss for lentils is substantial. The information obtained from Bekie processors indicates that the loss varies from 10 to 20 percent depending on the seed variety (improved or traditional). For dried and shelled lentils, 7.5 percent is estimated because it is not split (uncovered grain); the loss is greater for traditional seed variety lentils.

Adjusted

Border to point of competition

In this analysis, the observed transport costs vary between US$2.8 cents and 5.0 cents, which are less than the costs suggested by the USAID study (USAID, 2011) and no adjustment is made for transport costs. Some costs at the port are unavoidable and cannot be ignored, such as port handling and loading/unloading costs, so they are not adjusted. The margins of importers and exporters are not adjusted due to a lack of precise information, which they fail to provide because costs vary from day to day, and thus, a precise estimate of the margin and its adjustment is difficult to make. The only costs adjusted for the border to point of competition are the taxes, fees along the segment, and the surtax and withholding tax. Adjusting the access costs from the border to the point of competition by lifting this cost decreases the observed access cost by an average of 8.4 percent (see Table 10).

Farm gate to point of competition

Between 2005 and 2012, transport costs from Debrebirhan to Addis Ababa were adjusted by reducing the observed transport costs from 12 to 73 percent. This adjustment was intended to reflect a more efficient transport system, thus reducing transport costs to an average of US$ 6.75

cents/km/tonne (between 6.1 and 7.4 US$ cents/km/tonne), which is only slightly higher than the rates charged along the Djibouti-Addis Ababa road.

The brokers' fee for selling lentils on the other hand, could also be improved with the establishment of farmers' cooperatives, the expansion of mobile networks, and measures to allow farmers' access to Market Information. We can assume that this kind of measure decreases the brokers' fee for selling grain by half, and that the broker fee for truck usage is reduced to zero (Table 12). The adjusted brokers' fee is assumed to increase the efficiency in grain marketing.

Finally, the weight losses incurred at farm gate were adjusted downward by half. In fact, according to processors, 7.5 percent of the losses were due primarily to inefficient processing in the rural areas and based on this discussion, it was estimated that these losses could potentially be 50 percent lower.

Table 12. Adjusted access costs for lentils in Ethiopia, from farm gate to point of competition, 2005-2012 (ETB/tonne)

		2005	2006	2007	2008	2009	2010	2011	2012
Transportation costs	ETB/ton	84.06	95.06	107.42	120.9	127.85	155.7	211.5	220
Adjustment factor (to reduce transport cost to 6.75 US cents/km/tonne	%	12%	33%	49%	69%	26%	60%	74%	74%
Transport cost adjusted	ETB/tonne	75.24	72	7206	71.78	101.7	97.05	121.4	126.6
Difference between adjusted & observed brokers' fee for truck and for selling grain	ETB/tonne	17	19	23	32	35	38	50	63
Weight losses (3.75% of the farm gate price)	ETB/tonne	147	163	158	219	238	250	403	476
Adjusted total cost	ETB/tonne	600	591	624	787	875	873	1155	1150

Sources: Authors' compilation

BUDGET AND OTHER TRANSFERS

In this study, no specific budget transfer for lentils is documented between 2005 and 2012. This could be addressed in the country report for the incentive/disincentive analysis.

QUALITY AND QUANTITY ADJUSTMENTS

There is no adjustment factor used for the quality of lentils during 2005 and 2012. The lentils considered in this study are dried and shelled, rather than split.

DATA OVERVIEW

Following the discussions above, Table 13 summarizes the main data sources used and the methodological decisions taken for the analysis.

Table 13. Data sources and methodological decisions

	Description		
Concept	**Observed**		**Adjusted**
Benchmark price	The data from the Ethiopian Customs Authority (ECA) and UN Comtrade are similar, but the former country data is chosen as benchmark prices. The geometric mean of the CIF and FOB at the port of Djibouti is computed based on the CIF and FOB of the tradable item, *i.e. lentils dried and shelled,* which is obtained from the ECA data*.*		*No adjustment.*

Domestic price at point of competition		The wholesale price data from the EGTE is used for analysis.	*N.A.*
Domestic price at farm gate		The 2005-2007 farm gate prices are obtained from the EGTE. The farm gate price for the 2008-2012 period was obtained by using 2007 as a base year and estimated using the general inflation rate of pulses.	*N.A.*
Exchange rate		National Bank of Ethiopia is the source of data for the average observed exchange rate (from 2005- 12).	Rashid (2010), IMF
Access cost from the point of competition to the border		The cost of transportation in 2012 is deflated using the CPI, to arrive at an estimated transport cost for imports for the previous years. A similar method is applied to compute the export transport costs. The sources of data are mainly exporters and importers, including the EGTE; Ethiopian Shipping and Logistics Service Enterprise (ESLSE); the Pulses and Oilseed Exporters Association; and individual importers and exporters. Margins are estimated based on the information from importers and exporters, including the EGTE, and 3% of CIF price is taken as the margin of importers and 5% of exporters. From the estimated margins, a 2% license fee is estimated. Processing cost of export is obtained from EGTE with a breakdown of cleaning, baggage and labor costs. In exports, a total cost of about 25US$tonne is estimated to pay loading, port handling and other costs based on EGTE and ESLSE. Other cost is computed as a residue for most of the years. Surtaxes and withholding taxes on imports are estimated at 2-3% of the CIF and this is obtained from Demeke (2012). Surtax and withholding tax on exports is zero.	Surtax and withholding tax are dropped from the observed costs.
Access costs from the point of competition to farm gate		Transport cost from Debrebirhan to Addis Ababa is deflated interview data from Ehil Berenda grain traders association and processors at Bekie. The interview and discussion data from Ehil Berenda also include brokers' fee for grain selling, car brokers' fee, loading and unloading costs, and margins.	Transport cost is equated to an average 6.75US$/ tonne/km. Adjustment to brokers' fee is assumed. Weight losses halved.
QT adjustment	Bor-PoC	*N.A.*	*N.A.*
	PoC-FG	*N.A.*	*N.A.*
QL adjustment	Bor-PoC	*N.A.*	*N.A.*
	PoC-FG	*N.A.*	*N.A.*

The data used for this analysis is summarized below.

Table 14. Data used for MAFAP analysis

	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012
		Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
		trade status	*m*	*m*	*x*	*X*	*x*	*X*	*x*	*m*
DATA	*Unit*	*Symbol*								
Benchmark Price										
Observed	US$/ton	$P_{b(int\$)}$	580.00	331.00	598.40	779.6	894.6	874.1	931.6	1134
Adjusted		P_{ba}								
Exchange Rate										
Observed	ETB/US$	ER_o	8.67	8.74	9.21	9.80	12.10	12.89	16.90	17.60
Adjusted	ETB/US$	ER_a	10.40	10.49	11.05	11.76	14.52	15.47	19.10	19.70
Access costs border - wholesale										
Observed	ETB/ton	AC_{owh}	630.39	616.95	955.53	1,156.70	1,386.62	1,500.24	2,000.47	2,024.80
Adjusted	ETB/ton	AC_{awh}	574.15	549.43	949.03	1,147.33	1,376.49	1,489.31	1,985.91	1,900.73
Domestic price at wholesale	ETB/ton	P_{dwh}	3861.0	4483.0	4275.0	9325.0	8337.0	8585.0	16758.0	16143.0
Access costs wholesale – farm gate										
Observed	ETB/ton	AC_{ofg}	773.08	797.62	841.26	1,088.24	1,175.59	1,220.50	1,699.50	1,782.00
Adjusted	ETB/ton	AC_{afg}	601	591	625	788	876	873	1155	1150
Farm gate price	ETB/ton	P_{dfg}	3,930.00	4,364.00	4,233.00	5841.5	6367.3	6685.6	10763.9	12701.4
Externalities associated with production		E	-	-	-	-	-	-	-	-
Budget and other product related transfers		BOT	-	-	-	-	-	-	-	-
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}	-	-	-	-	-	-	-	-
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}	-	-	-	-	-	-	-	-
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}	-	-	-	-	-	-	-	-
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}	-	-	-	-	-	-	-	-

Table 15. MAFAP Price Gaps for Lentils in Ethiopia, (ETB/tonne), 2005-2013

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status for the year	m	m	x	x	X	X	x	m
Observed price gap at point of competition	(1,798)	973	(281)	2,842	(1,101)	(1,182)	3,015	(5,840)
adjusted price gap at point of competition	(2,745)	461	(1,388)	1,305	(3,277)	(3,449)	951	(8,098)
Observed price gap at farm gate	(956)	1,652	519	447	(1,896)	(1,861)	(1,279)	(7,500)
Adjusted price gap at farm gate	(2,076)	934	(806)	(1,391)	(4,371)	(4,475)	(3,887)	(10,389)

Source: Author's own calculations using data as described above.

Table 16. MAFAP Nominal Rates of Protection and Assistance Lentils in Ethiopia, (%), 2005-2013

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status for the year	m	m	x	X	x	x	x	m
Observed NRP at point of competition	-31.77%	27.72%	-6.16%	43.84%	-11.67%	-12.11%	21.94%	-26.57%
Adjusted NRP at point of competition	-41.55%	11.47%	-24.51%	16.27%	-28.21%	-28.66%	6.02%	-33.40%
Observed NRP at farm gate	-19.56%	60.90%	13.96%	8.28%	-22.94%	-21.78%	-10.62%	-37.13%
Adjusted NRP at farm gate	-35%	27%	-16%	-19%	-41%	-40%	-27%	-45%
Observed NRA at farm gate	-19.56%	60.90%	13.96%	8.28%	-22.94%	-21.78%	-10.62%	-37.13%
Adjusted NRA at farm gate	-35%	27%	-16%	-19%	-41%	-40%	-27%	-45%

Source: Author's own calculations using data as described above.

Table 17. MAFAP Market Development Gaps for lentils in Ethiopia, (%), 2005-2013

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status for the year	m	m	x	x	x	x	x	m
Access costs gap to competition point (ACGwh)	56.24	67.52	(6.51)	(9.37)	(10.12)	(10.93)	(14.56)	124.08
Access costs gap to farm gate (ACGfg)	(173)	(206)	(217)	(301)	(300)	(347)	(544)	(632)
Exchange rate policy gap (EXRP)	(1,003.40)	(579.25)	(1,101.06)	(1,527.9)	(2,165.02)	(2,255.29)	(2,049.41)	(2,381.40)
International markets gap (IMG)								

Source: Author's own calculations using data as described above.

5. RESULTS AND INTERPRETATION

MAFAP analysis is based on the comparison of domestic prices, both at farm gate and wholesale levels, with reference prices. Reference prices reflect the prices that producers could get in the absence of policy and market distortions. Indicators of the price difference between domestic and references prices are calculated at wholesale and farm gate levels (see Chapter 3: Methodology).

The overall trends of the price gaps, both at wholesale and farm gate, show a highly unstable environment, alternating between positive and negative throughout the period (Figure 17). Higher reference prices at the point of competition imply that domestic lentils are cheaper compared to the equivalent international price. Cheaper domestic prices mean that there is room for producers and agents to benefit from higher prices on the international market if trade policies were removed and overall market performance enhanced. Lower domestic prices benefit consumers and discourage producers. The years of lower domestic wholesale prices were 2005, 2007, 2009, 2010 and 2012, and resulted in an unstable economic environment.

The price gaps between domestic and reference prices at the point of competition are negative (Figure 17), except in 2006, 2008 and 2011. In all other years, the domestic prices at wholesale in Addis Ababa were below the equivalent international prices. The fluctuating domestic price trend indicates the instability of the market, which highlights the risks attached to the production and marketing of lentils.

In absolute terms, the observed price gaps at wholesale were relatively low, except in 2008, 2011 and 2012. In 2008, the food crisis hit the country and although there were policy decisions to counter it, such as government imports and seasonal bans on grain trade, food prices increased. After several years of increasing inflation, the government gradually devalued the birr in 2010 and 2011, which contributed to the peak, in birr, of the benchmark price of lentils. Furthermore, the fall in production in 2011 emphasized this upward price trend at wholesale level. In 2012 however, the country became a net importer (with almost no exports) and production increased by 18 percent, leading to an over-supply of lentils and subsequent depression of domestic prices. The additional surtaxes levied between Addis and Djibouti for imports but not exports, raised the overall costs along the value chain, and increased the gap between domestic and equivalent import prices at wholesale.

The adjusted price gaps at wholesale were greater than the observed in all years except 2006, 2008 and 2011. The predominantly negative price gaps confirm that wholesalers would have benefited more from the trade of lentils if the value chain had been more efficient (taxes and levies on imports).

On the other hand, lentil producers received a lower price overall compared to the equivalent international price.[5] Observed price gaps (PGofg) were negative in all years except 2006, when the gap was positive as well as 2007 and 2008 when the situation was neutral. In the adjusted domain; additional costs incurred by farmers, such as excessive weight loss of harvested lentils and high margins of brokers, contributed to increasingly negative price gaps.

---

[5] Low producer price is observed not in the case of Ethiopia alone. Producers in the majority of East and West African countries face a similar problem (See Technical notes series, MAFAP, 2014).

In 2012, the price gaps for farmers were exceptionally great (Figure 17) due to the export ban on lentils in 2011. The government imposed a strict ban on private sector exports, inadvertently preventing agents from benefitting from the high international prices that had risen by 21 percent since 2011. The adjusted price gaps at farm gate become increasingly negative from 2007 onwards, indicating that years of net exports create a better situation at both farm gate and wholesale than net importing years such as 2012 (Figure 17).

Figure 17. Price gap between domestic and reference prices – observed and adjusted at point of competition and farm gate level for lentils in Ethiopia, 2005-2012 (ETB/tonne)
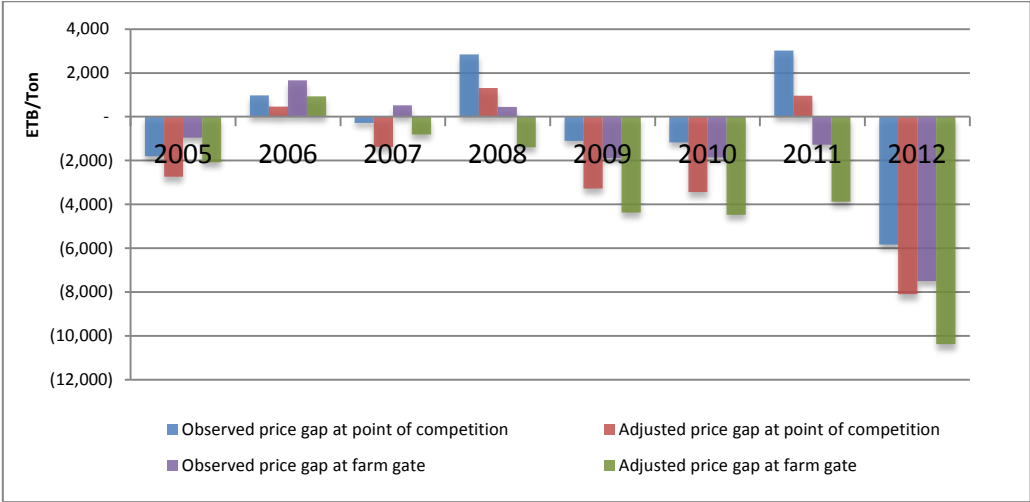
Source: Authors elaboration based on the quantitative information in Annex I

The nominal rate of protection (NRP) at the wholesale level (NRPowh) was negative in all years except 2006, 2008 and 2011, ranging from -31 percent in 2005 to 44 percent in 2008. At the farm gate level, the observed NRP was negative except for the years 2006, 2007 and 2008 (Figure 18).

From 2005 to 2006, the international price of lentils decreased by 42 percent. During this time, domestic prices at the point of competition and farm gate increased by 16 and 11 percent, respectively. These contrasting trends resulted in a substantial increase in the incentives for agents along the value chain. Farmers benefitted more from this situation than wholesalers (Figure 18), which might be due to a fall in production during these years in most of the production areas, including the most important one, the Amahra Region. Moreover, imports fell by half, emphasizing the low price of lentils in the country.

In 2008, incentives increased dramatically (see Figure 18); although more so for wholesalers than producers. This could be the result of the substantial growth in the domestic price, which increased by 118 percent. In March 2008, the Government began to control the amount of foreign currency used in the country, which likely hindered the private sector from importing food products. Thus, the reduced availability might have placed more stress on domestic prices than on international prices. However, the price at farm gate level did not increase much; farmers received weaker incentives to produce, which could have been due to the stable production in the country, and the lack of an efficient information system to make them aware of the market trend.

Again, in 2011, farmers and wholesalers did not have same trade encouragement from the economic environment. One explanation could be the implementation of an export ban directed towards the private sector, making the EGTE the sole legal exporter of lentils. This governmental decision was

likely taken to control the amount of domestic supplies and to earn foreign currencies. Wholesalers might have benefitted from this situation without transmitting the benchmark price increase to the producers.

The adjusted nominal rates of protection at wholesale and farm gate were more negative than observed NRPs. On average, the adjusted incentives were greater along the farm gate and wholesale segments than between wholesale and Djibouti, which could indicate that more inefficiencies should be targeted in this segment; as weight losses and high margins (from brokers and traders).

Figure 18. Observed and adjusted nominal rate of protection at point of competition and farm gate for lentils in Ethiopia, 2005-2012 (%)
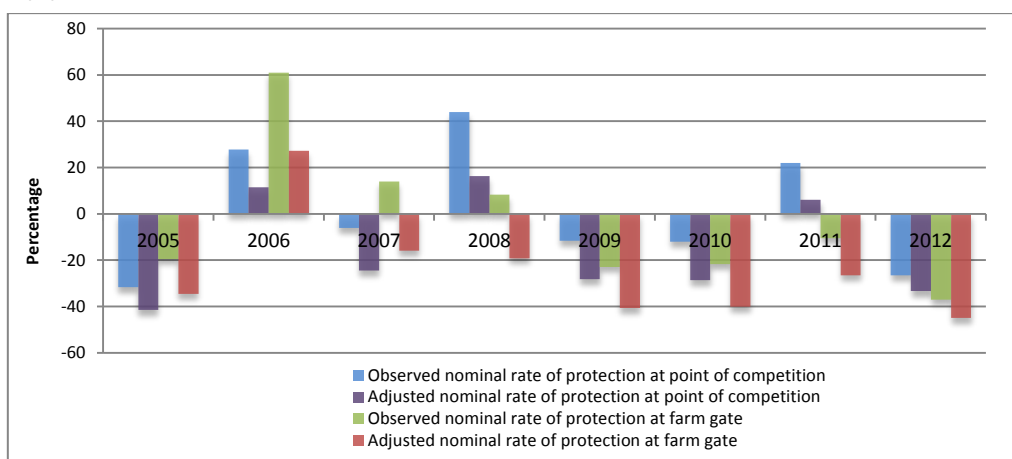
Source: Authors elaboration based on the quantitative information in Annex I

The Market Development Gaps indicate the portion of the price gap that can be attributed to "excessive" access costs within a given value chain, exchange rate misalignments and an imperfect functioning of international markets. Excessive access costs are separated between the two segments of the value chain that are taken into account in this analysis. The sum of these components is divided by the adjusted price gap at farm gate, in order to reach the relative market development gap (Table 18).

Table 18. Market Development Gap for lentils in Ethiopia, 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Market Development Gap (Per tonne)	(973)	(554)	(1,165)	(1,619)	(2,236)	(2,363)	(2,204)	(2,413)
Market Development Gap (%)	(0.17)	(0.17)	(0.24)	(0.23)	(0.21)	(0.22)	(0.15)	(0.11)

Source: Author's computation from the quantitative information in Annex I

Table 18 and Figure 19 indicate that the MDG increased over the 2005–2012 period, from an average -1,078 (2005-2008) to -2,304 (2009-2012), which shows that in the case of lentils, the successive devaluations of the currency have not improved the overall economic environment for value chain .

Before 2008, the exchange rate misalignment was relatively low but the market development gap was increasing (Figure 19). In 2008, despite a devaluation of the local currency, the exchange rate misalignment was still higher than 2007. Additionally, the relative market development gap that increased to -0.24, has remained stable until 2011 mainly due to the weight of the access cost gaps. After 2011, the MDG declined from 0.13 in 2011 to 0.11 in 2012 (Table 19), mainly due to declining access costs and the exchange rate policy.

Table 19. Components of market Development Gap for lentils (ETB/tonne), 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Exchange policy gap	(1,003)	(579)	(1,101)	(1,528)	(2,165)	(2,255)	(2,049)	(2,381)
Access costs gap to point of competition	56	68	(7)	(9)	(10)	(11)	(15)	124
Access costs gap to farm gate	26.0	42.7	(57.9)	(81.6)	(61.1)	(96.5)	(140.5)	(155.9)

Source: Author's computation from the quantitative information in Annex I

Figure 19. Components of the MDGs for lentils in Ethiopia (ETB/tonne), 2005-2012
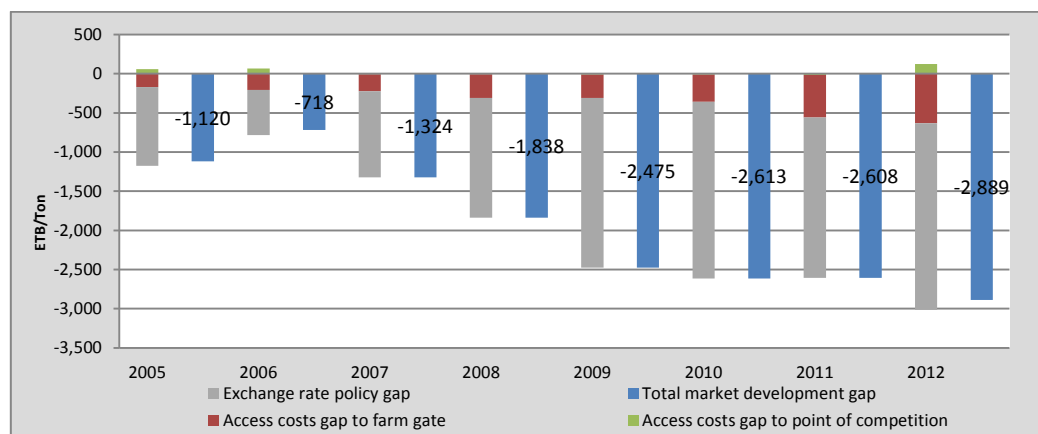
Source: author's elaboration based on the information in Annex 1

6. RECOMMENDATIONS

MAFAP price incentive and disincentive analysis on lentils concludes with solid findings, leading to recommendations that could improve the situation of lentil producers, consumers and exporters. Export bans and the overvalued exchange rate must be carefully addressed in order to encourage lentil producers and avoid implicit taxation on consumers and exporters. The findings demonstrate that lentil producers faced disincentives to production in five of the eight years under consideration. In order to reduce disincentives for lentil producers, the following actions should be considered:

1)   Carefully consider the overvaluation of the currency. The findings of this study indicate that currency overvaluation plays the biggest role in the adjusted price gap at farm gate. A number of issues related to currency overvaluation can be raised; Firstly, currency overvaluation plays a big role in the incentive and disincentive environment depending on the trade status of lentils in Ethiopia. However, currency devaluation may not always help in addressing the disincentives of producers if export bans continue. Second, since the exchange rate policy is affected by the international economic environment, looking at the international price distortion could allow the authorities to make informed decisions. Third, theoretical literature underlines the expected effect of the devaluation of a currency, which is lower in a developing country (j-curve effect) because they cannot address their supply constraints in the short run, even if the currency is devaluated to lower the price of their tradable commodities. Therefore, the question is whether or not the country produces and supplies enough to counter balance the devalued exchange rate.

2)   Adopt less restrictive trade policies. Given the relatively high yields realized and the increasing world demand for lentils, Ethiopia stands to benefit substantially from export, were trade restrictions removed. The findings strongly suggest that during the years that Ethiopia was a net exporter of lentils, the reference price gap at farm gate declined. Policy makers should consider that low domestic prices are good for consumers only in the short term. Long-term and sustained gain to consumers can only be achieved through improved incentives for producers, which translates into increased production and hence lower prices.

3)   Promote a long-term strategic framework rather than ad-hoc policies. The instability of incentives and disincentives at wholesale and farm gate should be addressed. It appears that the incentives have followed years of high inflation. These are temporary measures and do not ensure the sustainability of production for exports or the local market.

4)   Support the development of the market structure and the lentils value chain to stimulate efficiency. This support may include increasing access to investments and enhancing the extension services in rural areas for farming and marketing.

5)   The establishment of cooperatives needs to be encouraged in order to increase the bargaining power of producers. MAFAP results indicate that in 2008, wholesalers greatly benefitted from the international price increase, while the producers received very little incentives (see also USAID, 2010). The study shows that the role of cooperative unions in the handling of pulse crops was only about 10 percent of the quantity marketed by smallholders, and that cooperatives delivered their supplies to grain wholesalers (60 percent) and exporters (40 percent), unlike the case of export commodities, such as coffee cooperatives.

6)   Promote private investments along the value chain. Investments in transport and processing, storage and distribution, would greatly enhance the marketing capacity of lentils. Upgrading

infrastructure and maintenance for lentil processing as well as encouraging quality and standards would add value and increase competitiveness in the international market.

7)   Ethiopia imported substantial volumes of lentils during the years of shortage (2005 and 2006). Policies regarding the pricing and distribution of imported lentils should be handled in ways that do not negatively impact producers.

8)   Improve the market information system. So far, the establishment of the Ethiopian Commodity Exchange (ECX) has helped producers get timely information on the prices of selected commodities. Price information on the grain and pulses market could help producers get a better price. Currently, brokers transmit price information to traders regarding transport services. Modernizing the information system, e.g., through website facilities (service availability, route and transport fee information) would decrease the cost of accessing trucks.

9)   Brokers determine the daily price of lentils and other grains and the observed cost paid to brokers is not negligible. A mechanism to check and balance brokers' responsibilities needs to set. Otherwise, brokers could continue a favor-disfavor game. To decrease price disincentives for producers, establishing marketing cooperatives has been encouraged in Ethiopia. Enforcing fair market regulations between private traders and cooperatives could help achieve the aim to reduce price disincentives for producers.

10)   In an open economy, increasing the yield of lentils could have a win-win advantage for producers and consumers, increasing competitiveness for producers in the export market.

7.   CONCLUSION

MAIN MESSAGE

The main findings of the price incentive and disincentive analysis show that lentil producers faced price disincentives during most of the years under consideration. Incentives for lentil producers were observed in 2006, 2007 and 2008, but the years following were characterized by increasing disincentives, most likely due to the export ban on lentils.

In this regard, the comparison of the observed reference prices at the point of competition with the actual wholesale prices indicates that both the observed and adjusted reference prices are higher than the actual price at the point of competition. A higher reference price implies that domestic agents could have received a higher price, more reflective of the international price. Low domestic prices indicate room for higher prices for producers if domestic market and trade policies were removed, and the overall market performance enhanced. The years of higher domestic wholesale prices were in 2006, 2008 and 2011, but they were not sustainable enough to encourage the trade of lentils in Ethiopia for the long run.

These findings also indicate that the nominal rate of protection is predominantly negative at the farm gate levels, except in 2006, 2007 and 2008, which means that lentil buyers at the wholesale level were paying less than equivalent border prices. Lentil producers were implicitly taxed in most of the years (2005, 2009, 2010, 2011 and 2012) for producing lentils. During the remaining years (2006, 2007 and 2008), farmers were protected at an average rate of only 22 percent. It is possible that the incentive was better during these years because (i) there were better domestic prices in 2006 and 2008 than international prices and (ii) domestic prices were higher (USAID, 2010), with little importing and exporting in 2011 and lower yields, all of which are forces derived from high demand and increasing domestic prices.

Additionally, the findings also indicate that the observed and adjusted reference prices at the point of competition were increasing both smoothly and continuously, whereas the domestic prices were fluctuating. The fluctuating domestic prices indicate the instability of the lentil market, which indicates the risks attached to the production and marketing of lentils.

In regards to the market development gap, the findings indicate that it is widening over the period, which shows that the devaluation of the currency in 2008 and 2011 did not help the case of lentils. However, the market development gap compared to the farm gate price declined from 0.15 in 2011 to 0.11 in 2012, mainly due to the declined access costs gap to the point of competition.

LIMITATIONS

Conducting an annual survey at major production areas would provide a reliable source for farm gate price data. There are several major production areas but in this study we took the producer price from a single locality, while the comparison of farm gate prices in other areas could reveal other interesting findings.

It was necessary to take the average of several sources of access costs as data was hardly available. A closer look at them would be more helpful to reach a reliable average access and processing cost.

In addition, among access cost data, getting reliable profit (margin) data at all levels is a challenge. The margins are based on interviews with traders, rather than objective data. The margin on imports, and whether or not the margin has to be adjusted upwards or downwards, is difficult to decide without reliable information.

The study has not looked into distortions in input markets, or public expenditures in support of agriculture and international market distortions, which would improve it significantly.

FURTHER INVESTIGATION AND RESEARCH

Looking for farm gate prices through a survey, margins, processing costs and access costs to farm gate are essential. In this study, average annual producer prices are estimated based on the farm gate prices of lentils from the EGTE for the years 2005-2007. For the remaining years, farm gate prices were estimated by using the annual inflation rate. Using research taken from producers on farm gate prices could be more reliable to use.

In addition, the production of lentils is carried out predominantly in other zones of the Amhara region. It would have been more informative if we had farm gate prices from other zones, which are relatively far from Addis Ababa. To get farm gate prices from remote zones, surveys could be helpful.

The fact that exporters process lentils, load them from remote areas, and then process them for exportation, results in two types of access and processing costs, i.e. the lentils collected by wholesalers and those collected by exporters. In addition, processors found in Addis Ababa, Dire Dawa and Nazareth make the average access cost information complex. To find reasonable average information, we take the case of Addis Ababa, assuming it is the largest share for processing in the export market. However, to get a reasonable average access cost, taking a closer look at the three processing points is advisable.

As a component of the market Development Gap, investigating the international market distortion in the lentils market could reveal interesting facts.

BIBLIOGRAPHY

Barreiro-Hule J., Witwer M. (2013). MAFAP Methodological Implementation Guide: Volume 1. Analysis of price incentives and disincentives, MAFAP Technical Notes Series, FAO, Rome, Italy

CSA (2007/08) Report on Crop and Livestock Products Utilization Agricultural Sample Survey, Addis Ababa, Ethiopia

CSA, May 2012. Volume 1: Report on area and production of major crops. Agricultural sample survey 2011/2012 (2004 E.C)

CSA, 2013. Part 1: Report on area and production of major crops. Agricultural sample survey 2012/2013 (2005 E.C.)
CSA, 2013. Report on the monthly inflation rates, Addis Ababa, Ethiopia

Demeke, M. (2012) Analysis of Incentive and Disincentive for maize in Ethiopia, Technical Note Series, MAFAP, FAO, Rome
Guush, et al. 2011 Food Grain consumptiojn and calorie intake pattern in Ethiopia, ESSP II Working paper 23, IFPRI/EDRI, May 2011

Frehiwot Mulugeta (2009) Lentil Production, Supply, Demand and Marketing issues in Ethiopia, Ethiopia Commodity Exchange Authority, unpublished document, Addis Ababa, Ethiopia

Girma Bekele (2003) "Grain Marketing and Food Security," In: Gezahegn Ayele, Omamo, W., and Gabremedhin, E.Z. (edts.) The state of food security and agricultural marketing in Ethiopia, IFPRI/EDRI.pp.141-145

Gabre-Madhin, E. (2001) Market Institutions, Transaction Costs, and Social Capital in the Ethiopian Grain Market, Research Report 124, IFPRI, Washington D.C

Gereffi, G.and Memedovic, O. (2003) The global apparel Value-chain: what prospects for upgrading by developing countries? United Nations Industrial Development Organization, Vienna

IPMS Ethiopian Farmers Project, Development context, Annex 1: Accessed on April 1, 2014http://cgspace.cgiar.org/bitstream/handle/10568/16819/annex%201.pdf?sequence=2

Wakeyo, Mekonen B. and Tadesse Kuma (2013) Performance Evaluation of Cotton Production and Marketing in Ethiopia: Demand and Supply Gap Analysis, draft paper, Ethiopian Development Research Institute, October 2013, Addis Ababa, Ethiopia

Ministry of Finance and Economic Development/MOFED (2010) Growth and Transformation Plan (GTP) 2010/11-2014/15 Draft, Addis Ababa, Ethiopia

Rashid S. and A. Negassa (2011), Policies and Performance of Ethiopian Cereal Markets, IFPRI/ EDRI, Ethiopia Strategy Support Program II (ESSP II) ESSP II Working Paper No. 21, May

Schneider, K. and L. Anderson (2010) Yield Gap and Productivity Potential in Ethiopian Agriculture: Staple Grains & Pulses, EPAR Brief No. 98, prepared *for the Farmer Productivity Team,* Evans School Policy Analysis and Research (ESPAR) of the Bill & Melinda Gates Foundation, Evan School of public Affairs, University of Washington

USAID (2011), USAID Office of Food For Peace Ethiopia, Bellmon Estimation, Annex 1 Economic Data and Trends, September

United States Agency for International Development/USAID (2010) Staple Foods' Value Chain Analysis Country Report- Ethiopia, The competitiveness and trade expansion program, April 2010

US$A (2013) Ethiopia Grain and Feed Annual Report, Global Agricultural Network Information, GAIN report number ET-1301.

Wikipedia: http://en.wikipedia.org/wiki/Lentil

ANNEX I: Data and calculations used in the analysis

Name of product	LENTILS
International currency	US$

Local currency	ETB

	DATA	Unit	Symbol	trade status	2005	2006	2007	2008	2009	2010	2011	2012
	Year				*m*	*m*	*x*	*x*	*x*	*x*	*x*	*m*
	Benchmark price											
1	*Observed*	US$/TON	$P_{b(int\$)}$		**580.00**	**331.00**	**598.40**	**779.6**	**894.6**	**874.1**	**931.6**	**1134**
1b	*Adjusted*	US$/TON	P_{ba}									
	Exchange rate											
2	*Observed*	ETB/US$	ER_o		8.67	8.74	9.21	9.80	12.10	12.89	16.90	17.60
2b	*Adjusted*	ETB/US$	ER_a		10.40	10.49	11.05	11.76	14.52	15.47	19.10	19.70
	Access costs border - point of competition											
3	*Observed*	ETB/TON	ACo_{wh}		630	617	956	1,157	1,387	1,500	2,000	2,025
3b	*Adjusted*	ETB/TON	ACa_{wh}		574	549	949	1,147	1,376	1,489	1,986	1,901
4	**Domestic price at point of competition**	ETB/TON	P_{dwh}		3861.0	4483.0	4275.0	9325.0	8337.0	8585.0	16758.0	16143.0
	Access costs point of competition - farm gate											
5	*Observed*	ETB/TON	ACo_{fg}		773	798	841	1,088	1,176	1,221	1,700	1,782
5b	*Adjusted*	ETB/TON	ACa_{fg}		748	755	783	1,007	1,114	1,124	1,559	1,626
6	**Domestic price at farm gate**	ETB/TON	P_{dfg}		3,930.00	4,364.00	4,233.00	5841.5	6367.3	6685.6	10763.9	12701.4
7	Externalities associated with production	ETB/TON	E									
8	Budget and other product related transfers	ETB/TON	BOT									
	Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}									
	Quality conversion factor (border - point of competition)	Fraction	QL_{wh}									

	Quantity conversion factor (point of competition - farm gate)	Fraction	QT_{fg}								
	Quality conversion factor (point of competition - farm gate)	Fraction	QL_{fg}								

	CALCULATED PRICES	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012
	Benchmark price in local currency										
9	*Observed*	ETB/TON	$P_{b(loc\$)}$	5,029	2,893	5,511	7,640	10,825	11,268	15,743	19,958
10	*Adjusted*	ETB/TON	$P_{b(loc\$)a}$	6,032	3,472	6,612	9,168	12,990	13,523	17,793	22,340
	Reference price at point of competition										
11	*Observed*	ETB/TON	RPo_{wh}	5,659	3,510	4,556	6,483	9,438	9,767	13,743	21,983
12	*Adjusted*	ETB/TON	RPa_{wh}	6,606	4,022	5,663	8,020	11,614	12,034	15,807	24,241
	Reference price at farm gate										
13	*Observed*	ETB/TON	RPo_{fg}	4,886	2,712	3,714	5,395	8,263	8,547	12,043	20,201
14	*Adjusted*	ETB/TON	RPa_{fg}	5,859	3,267	4,880	7,014	10,499	10,910	14,248	22,614

	INDICATORS	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011	2012
	Price gap at point of competition										
15	*Observed*	ETB/TON	PGo_{wh}	-1,798	973	-281	2,842	-1,101	-1,182	3,015	-5,840
16	*Adjusted*	ETB/TON	PGa_{wh}	-2,745	461	-1,388	1,305	-3,277	-3,449	951	-8,098
	Price gap at farm gate										
17	*Observed*	ETB/TON	PGo_{fg}	-956	1,652	519	447	-1,896	-1,861	-1,279	-7,500
18	*Adjusted*	ETB/TON	PGa_{fg}	-1,929	1,097	-647	-1,172	-4,132	-4,224	-3,484	-9,913
	Nominal rate of protection at point of competition										
19	*Observed*	%	$NRPo_{wh}$	-32%	28%	-6%	44%	-12%	-12%	22%	-27%
20	*Adjusted*	%	$NRPa_{wh}$	-42%	11%	-25%	16%	-28%	-29%	6%	-33%
	Nominal rate of protection at farm gate										
21	*Observed*	%	$NRPo_{fg}$	-20%	61%	14%	8%	-23%	-22%	-11%	-37%

#					2005	2006	2007	2008	2009	2010	2011	2012
22		*Adjusted*	%	$NRPa_{fg}$	-33%	34%	-13%	-17%	-39%	-39%	-24%	-44%
	Nominal rate of assistance											
23		*Observed*	%	NRAo	-20%	61%	14%	8%	-23%	-22%	-11%	-37%
24		*Adjusted*	%	NRAa	-33%	34%	-13%	-17%	-39%	-39%	-24%	-44%

					-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
					(1,003.40)	(579.25)	(1,101.06)	(1,527.92)	(2,165.02)	(2,255.29)	(2,049.41)	(2,381.40)
	DECOMPOSITION OF MDG		*Unit*	*Symbol*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
25	International markets gap		ETB/TON	IMG	0	0	0	0	0	0	0	0
26	Exchange rate policy gap		ETB/TON	ERPG	-1,003	-579	-1,101	-1,528	-2,165	-2,255	-2,049	-2,381
27	Access costs gap to point of competition		ETB/TON	ACG_{wh}	56	68	-7	-9	-10	-11	-15	124
28	Access costs gap to farm gate		ETB/TON	ACG_{fg}	-26	-43	-58	-82	-61	-96	-140	-156
29	Externality gap		ETB/TON	EG	0	0	0	0	0	0	0	0
30	Total market development gap		ETB/TON	MDG	-973	-554	-1,165	-1,619	-2,236	-2,363	-2,204	-2,413
31	Market development gap as share of farm gate price		%	MDG	-25%	-13%	-28%	-28%	-35%	-35%	-20%	-19%
32	Market development gap as share of adjusted reference price at farm gate		%	MDG	-17%	-17%	-24%	-23%	-21%	-22%	-15%	-11%

**Food and Agriculture Organization
of the United Nations**