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Analysis of price incentives for sesame seed in Ethiopia for the time period 2005-2012

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Monitoring and Analysing Food and Agricultural Policies (MAFAP)

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CONTENTS

SUMMARY OF THE NOTE

Product: Sesame seed
Period analyzed: 2005 - 2012
Trade status: Export

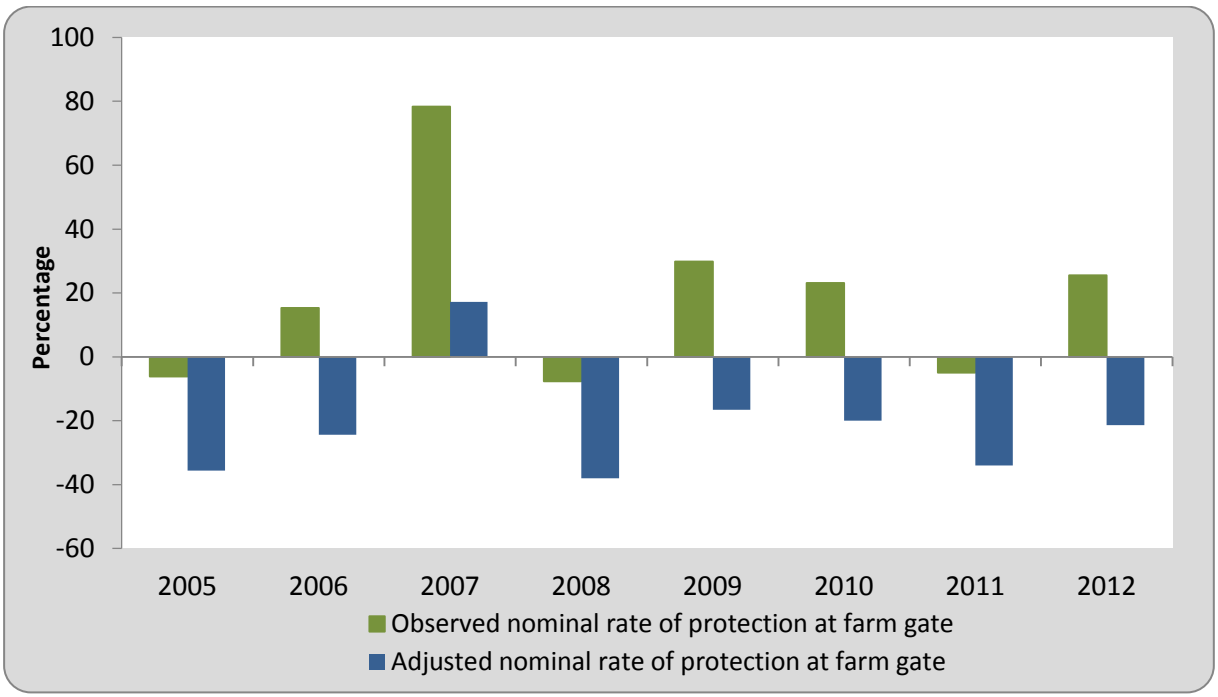
COMMODITY CONTEXT

- The oilseed sector in Ethiopia is one of the fastest growing sectors in the country, both in terms of its foreign exchange earnings and as source of income for millions of Ethiopians. Sesame is among the most important oilseed crops in the country, mainly as a commercial export commodity. Between 2005 and 2012, its production increased from 149 to 181 thousand tonnes (CSA, 2013).

- Sesame marketing has demonstrated highly significant growth. Over the past decade (2002-2012), earnings from sesame exports increased from 66 to 427 million US$ (ERCA, 2012). Its contribution to national export earnings has increased from 6.7 to 13.8 percent in the same period.

- Major sesame production areas in Ethiopia are located in the Humera area in the Tigray, in the Metema and Wollo areas of the Amhara region, in the Chanka area in Wellega of the Oromiya region and in the Pawi area in the Benshangul Gumuz region.

Figure 1: Observed and Adjusted Nominal Rate of Protection at Farm Gate for Sesame in Ethiopia, 2005-2012



Source: **MAFAP, 2014**

The observed Nominal Rate of Protection (NRP, green bars) in the graph above measures the effect of policy distortions and overall market performance on price incentives for producers. The adjusted NRP (blue bars) 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. The difference between the two bars reflects the estimated cost that value chain inefficiencies and exchange rate misalignment represent to producers.

DRIVING FACTORS

As indicated in the detailed analysis of access costs, disincentives are considerable and arise from:

- Overvalued exchange rate;
- Extraordinarily high transport costs mainly owing to divergence in production and marketing areas. Sesame produced in the North and Southwest of Ethiopia is aggregated and transported to marketing centres located far apart from production centres (e.g. Gonder). It's further shipped to the port of Djibouti via Addis Ababa.
- Owing to infrastructure and institutional issues, most export flows are traded through Djibouti, even though Sudan has a port that is adjacent to the production area;
- Local taxes, brokers' fees and transport costs also increased access costs from farm gate to wholesale market;
- Impurity losses resulting from a lack of quality standards and policy exclusion of direct trade between suppliers and exporters also increased exporters' costs.

RECOMMENDATIONS

Regardless of these high disincentives, sesame production and export has increased in recent years perhaps owing to lucrative global prices, improved road networks, price information, and extension services and close policy support from the government.

Ethiopia has untapped potential to be exploited in the future. Towards this end, there are policy measures needed to reduce disincentives, which could include:

- Addressing currency misalignment;
- Reducing the marketing chain from producer to export market;
- Reducing number of fees and taxes for local and export traders;
- Introducing more competitive and cheaper bulk transport systems along the value chain to reduce fees for wholesalers and exporters;
- Strengthening marketing institutions at producer level to raise bargaining power of producers.

1. PURPOSE OF THE NOTE

This technical note is an attempt to measure, analyse and interpret price incentives for Sesame seed 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

The oilseed sector in Ethiopia is one of the fastest growing sectors in the country. It is the second largest source of foreign exchange earnings after coffee (FAO, 2012) and sesame is the main oilseed crop in terms of production value. In 2010, Ethiopia was considered the second main exporter of sesame seeds in the world, behind India (FAOSTAT, 2012). The cultivation of sesame has grown since 2000, owing to its high value on the export market and good adaptability in the country. The many varieties of Ethiopian sesame seeds make it suitable for a wide range of applications, either as seeds or oil products. Another feature of sesame is its flexibility to different soil types and harsh environments, which makes it well suited for production in most of the country. Furthermore, "sesame rotates well with a number of other crops including cotton, corn, peanut and sorghum, and is also a good soil builder. That said, many farmers do not diversify and focus solely on sesame"(Coates et al., 2011).

It also represents an important source of income for many Ethiopians. Since the 2000s, sesame production and marketing has registered significant growth. In 2000, the total area cultivated for sesame was about 16 000 ha (FAOSTAT, 2012). In nearly ten years time (up to 2010), the total area of sesame production has increased more than twentyfold (FAOSTAT, 2012). Similarly, the quantity of sesame produced for export also increased from 26 642 tonnes in 2000 to about 317 653 tonnes in 2012 (FAOSTAT, 2012), which represents an increment of over 1 090 percent.

This strong growth may account for the Ethiopian Government policy support towards promoting commercial agriculture, and notably oilseeds. The Ethiopian Government has indeed pursued the Agricultural Development Led Industrialization (ADLI) Strategy since the mid-1990s with a clear objective: increasing the performance of the agricultural sector by transforming the traditional subsistence-based production system into a market-oriented one.

To this effect, the Ethiopian Ministry of Agriculture (MoA) has developed a master plan to enhance market-oriented production for priority crops and livestock commodities. The oilseed sub-sector, of which sesame is one of the priority crops identified in the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP), was set up by the government for the 2005 to 2010 period with plans to increase sesame production twofold.

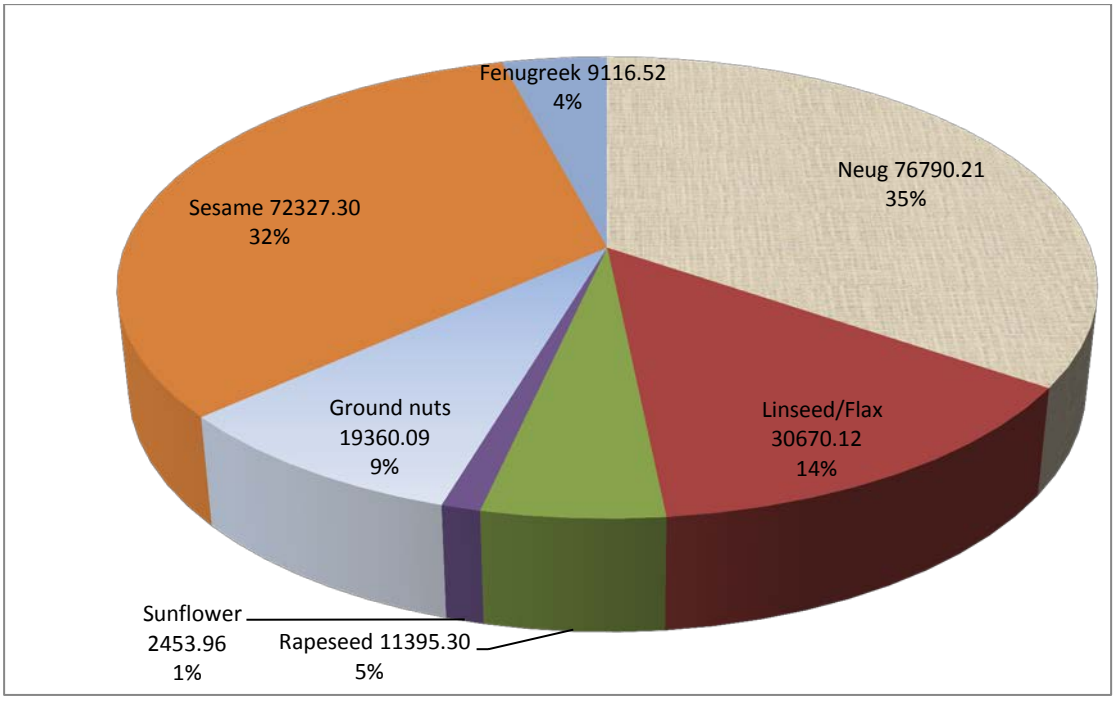
The oilseed sector has received renewed attention in the recent Growth and Transformation Plan (GTP) for the years 2010-2015. The plan states that farmers and pastoralists will be encouraged to shift gradually from low value production to high value products (GTP, 2010), taking into account geographic differences on specializations and the existence of favorable market and infrastructural facilities.

Therefore, sesame is now a priority crop for the government because it is an important source of foreign exchange earnings and as income for many smallholders. However, "despite the high potential for increased production and the rapidly growing demand in the international market for Ethiopian sesame, it is generally felt that the logistical supply chain of sesame suffers from different challenges" (Gelalcha, 2009).

PRODUCTION

According to the CSA (2013), sesame represents, on average, 32 percent of the total cultivated area under oilseed production for the period 2005-2012 (Figure 2), which represents 3 percent of the total cultivated area for major crops.

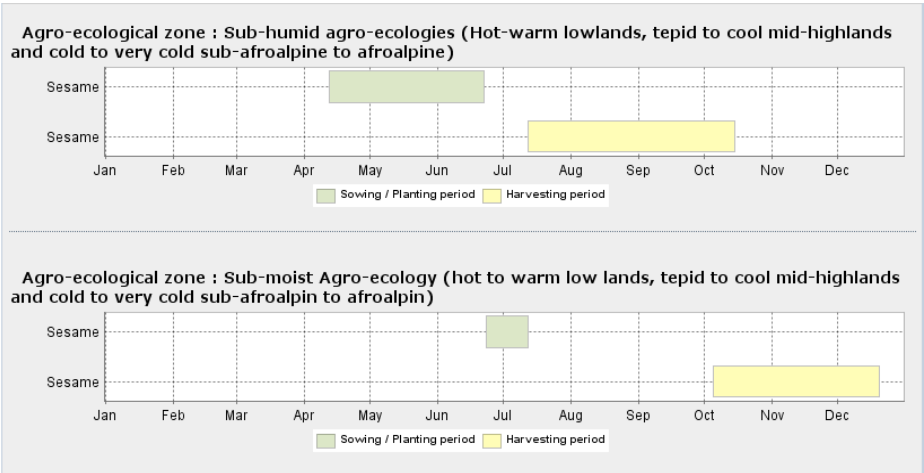
Figure 2: Area Under Production by Oilseed Type in Ethiopia (average 2005-2012)



Source: CSA, 2013

Sesame's planting period falls immediately after the onset of the rainy period (June to mid-September). The planting period is shorter for the sub-moist agro-ecological zones and occurs in July. Accordingly, harvesting happens at two different times: between August-October in sub-humid areas and October-December in sub-moist zones.

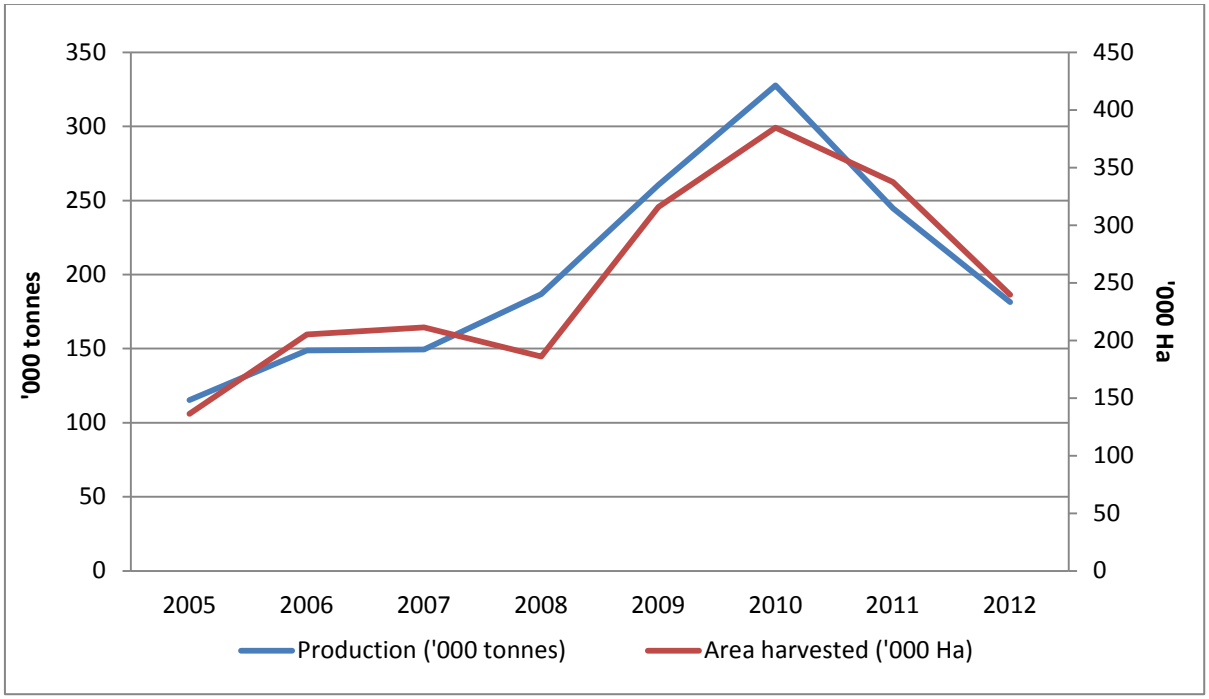
Figure 3: Seasonal Sesame Calendar According to Agro-Climatic Conditions



Source: FAO, 2010

Sesame production is dominated by more than 760 000 small-scale farmers, cultivating approximately 380 000 hectares of land. It is mainly cultivated as a cash crop. Sesame production has grown tremendously over the 2000-2012 period, at an annual average growth rate of 34 percent (FAOSTAT, 2012). This growth in production is mainly explained by extension (see Figure 4), although there has also been intensification. The total area harvested increased by more than 900 percent between 2000 and 2010. It reached a peak of 384 680 ha in 2010, before decreasing to 239 532 ha in 2012. The averaged growth over the 2005-2012 period was about 76 percent (FAOSTAT, 2013). Yields went from 0.4 tonnes/ha in 2000 to 1.0 tonnes/ha in 2008, finally reaching almost 0.8 tonnes/ha in 2012. The decrease was of -10 percent from 2005 to 2012 (FAOSTAT, 2013). Although there was an increase in average yields from 2000 to 2012, they are still considered low compared to the full potential sesame production.

Figure 4: Production ('000 Tonnes) and Area Harvested ('000 Ha), 2005 to 2012



Source: FAOSTAT, 2014

Production is rain-fed, characterized by intensive labour and low levels of inputs (Coates et al., 2011). In Gelacha (2009), it was reported that "the existing production system suffers from traditional farming practices, unimproved seed and lack of fertilizer use." Furthermore, Wijnands et al. (2007) stated that the potential to increase production is not being fully exploited, though higher input use and improved technologies and seeds could double the productivity per hectare, and thus approach the potential yield estimated by FAO, which is about 16 quintals/ha. The reason for low sesame productivity owes to a combination of various factors. The main constraints, highlighted by Gelalcha (2009), are low use of improved seeds, fertilizers and cultivars, biotic stress and lack of knowledge on adequate post-harvest crop management farming practices. The supply system for improved inputs is not well developed, and extension services to improve farming techniques are not sufficient. As a consequence, producers are increasingly betting on other crops, such as maize and sorghum, considered to be ''less risky and more profitable'' (Gelalcha, 2009).

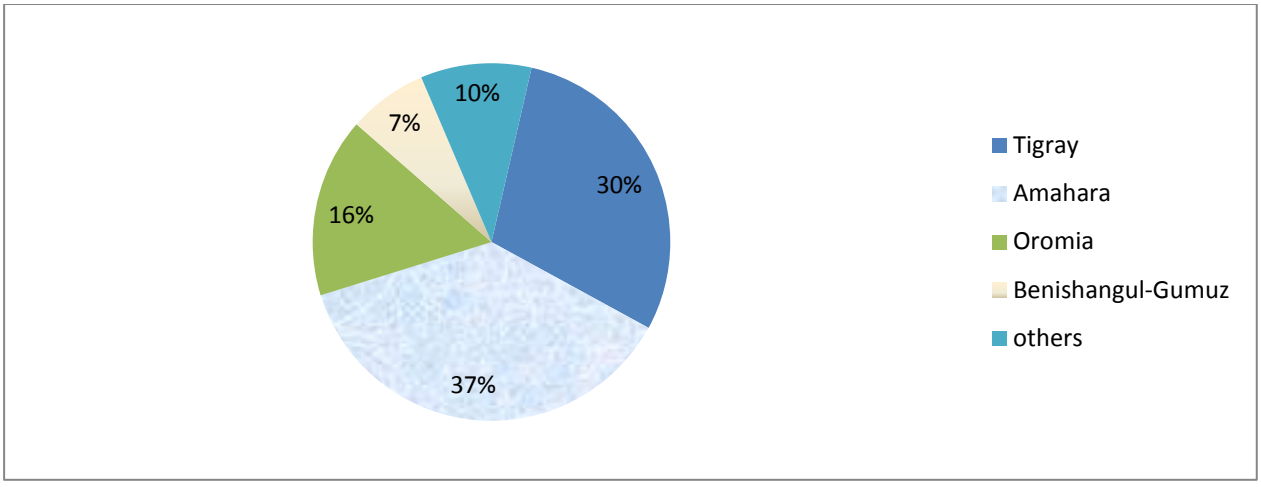
Geographically, sesame is produced in different parts of Ethiopia at an elevation from sea level of about 1 500 meters. The dominant producers, who contribute over 83 percent to national production (CSA, 2010-11), are located in the regions of Tigray (West Tigray), Amhara (North Gonder) and most recently, in Benishangul-Gumuz Region (Metekel).

Figure 5: Main Sesame Growing Regions in Ethiopia, Underlined

Source: Alemu and Meijerink, 2010

As average production statistics (2005-2012) obtained from CSA (2013) depict, almost 37 percent of the country's total sesame seed production comes from the Amhara regional state, with 30 percent coming from Tigray and 16 percent from Oromia. However, for the stated period, the highest average productivity for Tigray was about 9 quintal/hectare, followed by Amhara region about 8 quintal/hectare.

Figure 6: Regional Share of Total Production Volume of Sesame in Ethiopia, 2012



Source: Author's calculation based on 2012/13 Annual Agricultural Sample Survey, CSA

CONSUMPTION/UTILIZATION

Sesame is considered a cash crop in Ethiopia, a high-value crop largely produced in order to be exported as either seed or oil. Thus, consumption of sesame seeds in Ethiopia is almost non-existent. Sesame oil consumption is very low, however, edible vegetable oils are an important source of fat in Ethiopia, as they serve as a substitute for animal fats during fasting days (Ofcansky and Berry, 2004).

Total consumption of sesame in the country cannot be clearly estimated. FAOSTAT reports the total consumption in the country, for the 1999-2009 period, to be less than 5 tonnes, which means close to none.

MARKETING AND TRADE

Sesame seed is Ethiopia's main exported product after coffee. From 2000 to 2012, the total quantity exported annually increased from 31 thousand tonnes to about 317 thousand tonnes, an increase of more than tenfold (ERCA, 2013). Over the 2005-2012 period, exports increased by 61 percent in volume and 178 percent in value (US$), enabling the country to increase its global market share (Figure 7). Over the 1990-2011 period, Ethiopia ranked in the market share behind India, Sudan and China[1] (Ministry of Trade, 2011).

However, sesame exports decreased from 2005 to 2008, and recorded a bumper in 2009 (an increase of 94 percent). Since 2010, exports increased substantially (about 40 percent until 2012) to more than 317 thousand tonnes, the biggest volume over the whole period (see Table 1).

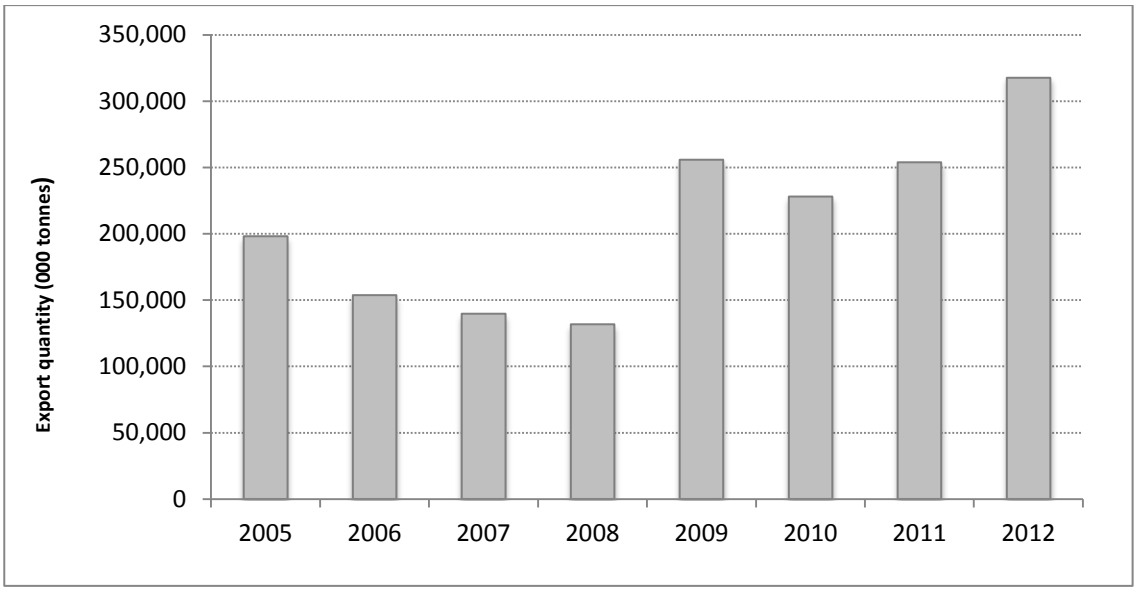
Table 1: Sesame Seed Trade in Ethiopia, 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Export Volumes (tonnes)	197 987,8	153 661,2	139 653,0	131 688,7	255 782,8	228 038,7	253 747,0	317 652,6
Exports Value (*1 000 000 ETB)	1 345,54	1 018,65	1 187,94	2 019,37	3 885,53	4 275,61	5 907,14	7 626,74
Exports Value (* 1 000 000 US$)	153,73	115,96	131,30	208,46	327,26	293,56	346,16	426,90
Import Volumes (tonnes)	0	0	0,47	0,40	0,25	0,39	0,29	0,10
Imports Value (ETB)	0	0	5 397,99	18 072,22	10 275,95	4 484,41	27 190,84	4 864,76
Imports Value (US$)	0	0	596,61	1 865,57	865,50	307,90	1 593,39	272,30

Source: Ethiopian Revenue and Customs Authority, 2013

[1] Rank has been calculated by averaging the level of exports during the period

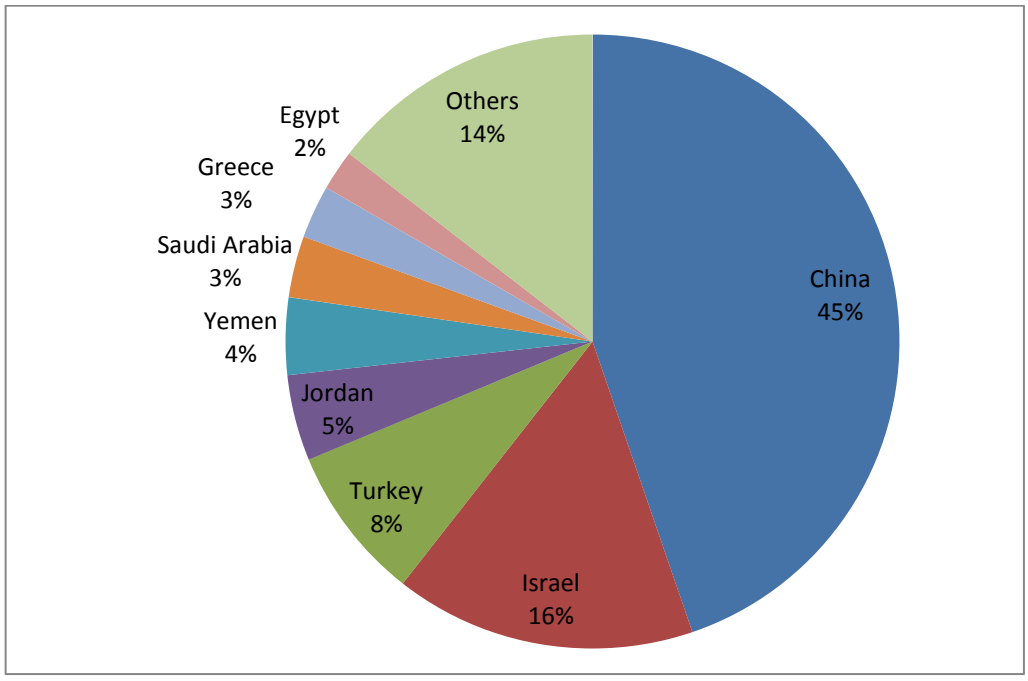
Figure 7: Export Quantity ('000 Tonnes) for Sesame Seed in Ethiopia, 2005-2012



Source: Author's elaboration based on ERCA data, 2013

Ethiopia's main export partner is China, also a top exporter, with a 45 percent average share of the country's total sesame seed exports for the 2000-2012 period. Israel comes second with 16 percent, followed then by Turkey, Jordan, Yemen, Saudi Arabia, Greece and Egypt, accounting for 8, 5, 4, 3, 3 and 2 percent, respectively. Other Middle Eastern and European countries then constitute the rest (i.e. 14 percent of sesame seed exports) (Figure 8). The total number of export destinations grew from about 14 countries in 2000 to 78 countries in the late 2000s.

Figure 8: Sesame Seed Exports Partners for Ethiopia, 2000-2012



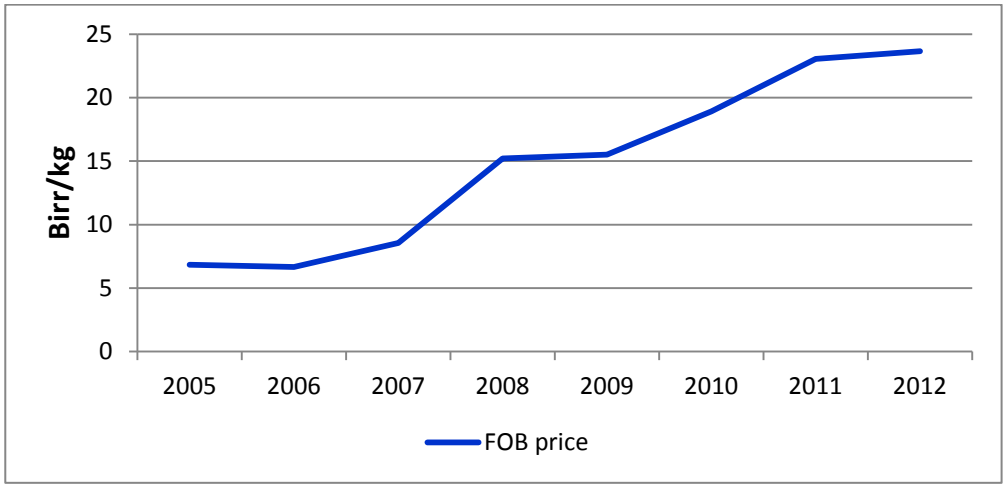
Source: Sesame export data from ERCA, 2012

While the purchase volume of traditional buyers continues to increase, other new buyers, notably from Europe (Greece, Germany, The Netherlands and the UK), are also coming to the market and their

share is growing overtime. Despite its small share of total Ethiopian sesame exports, the European market has high potential owing to the considerable use of sesame seeds for bakery applications and confectioneries in Europe (Shkur, 2011).

The increasing trend in total export revenue can also be associated with a sharp increase in the unit price of sesame, especially after 2007, and it reached its maximum level in 2012. The international price of sesame has indeed increased over the 2005-2012 period.

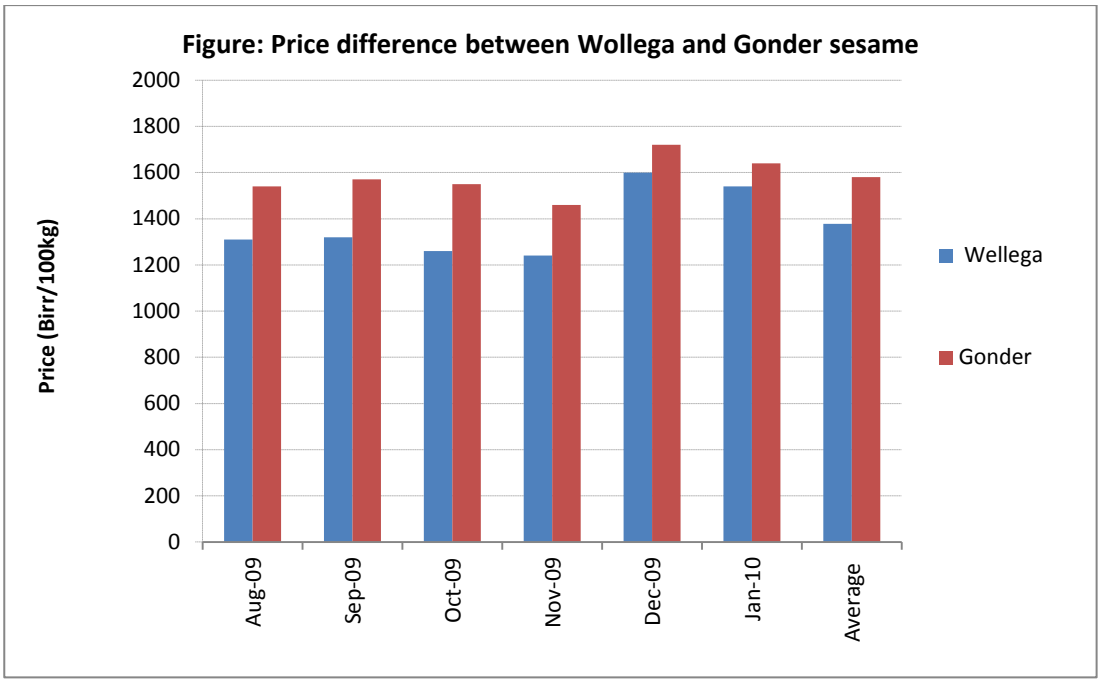
Figure 9: FOB Price for Sesame Seed in Ethiopia (ETB/kg), 2005 to 2012



Source: Author's elaboration based on Ethiopian Revenues and Customs Authority data, 2012

The price of sesame increased from 6.8 ETB/kg in 2005 to 24 ETB/kg in 2012. The price of sesame varies according to quality; the golden sesame fetches a higher price than the white one, see Figure 10 (ECX, 2012). Producers of both sesame types globally face marketing constraints and hence, lose opportunities to obtain higher prices. Ethiopian sesame is seldom selected and graded according to its quality and characteristics, nor is it well traced (Gelalcha, 2009), although the new ECX system has been set up to improve this (see DESCRIPTION OF THE VALUE CHAIN). Thus, Ethiopian sesame quality remains low owing to the mixing of sesame seeds of various qualities, and the adulteration of sesame with foreign materials (Gelalcha, 2009). Furthermore, most producers sell their product during the harvest period, when prices are 30 percent lower, and generally are not well informed on domestic, regional and international prices (Coates et al. 2011).

Figure 10: Price Differential Between Wellega (White) and Gonder (Mainly Golden)



Source: ECX, 2012

Overall export constraints owe to the poor organization of the sesame value chain, with lack of transparency among producers and frequent contract defaults by producers and/or buyers (Gelalcha, 2009).

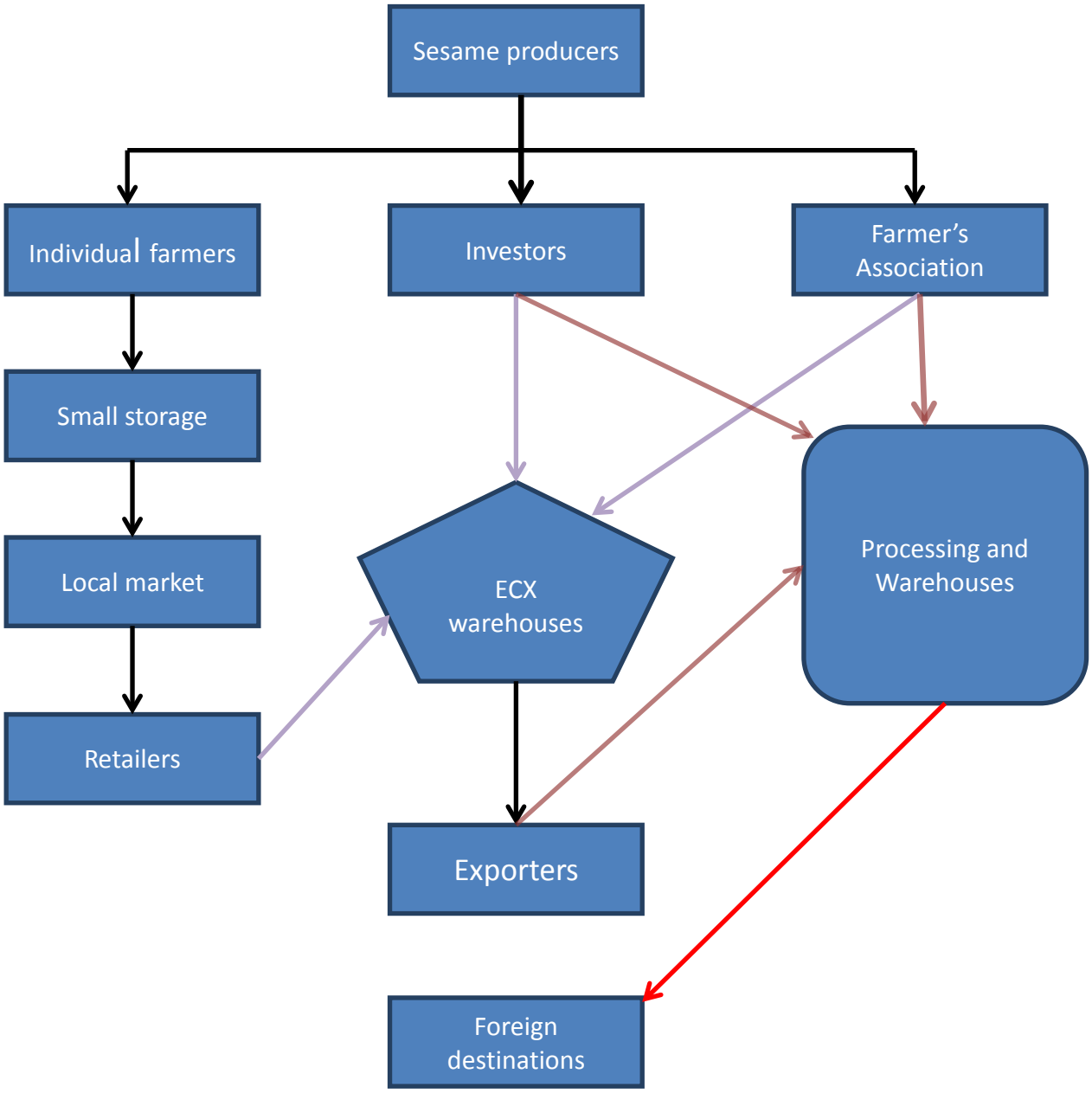
DESCRIPTION OF THE VALUE CHAIN

The sesame value chain in Ethiopia is poorly organized, although it is currently under reform since the introduction of the new market auction system (ECX). The main actors are producers/suppliers, collectors, wholesalers, brokers, farmers associations, the auction market (ECX) and exporters. Other important actors are transporters, agricultural input suppliers, consumers and retailers.

Constraints to the sesame value chain include: lack of improved cultivars; poor seed supply systems; poor agricultural production techniques and post-harvest crop management (Gelalcha, 2009); weak farmers organization to engage in the value chain; poor market information systems; limited financial material and skills for oilseed processing; limited use of traditional agricultural inputs and little research support to increase yields, and; erratic rainfalls (SID-Consult-Support Integrated Development, 2010).

Despite such constraints, actors in the sesame seed value chain operate at local, regional, national and international markets.

Figure 11: Sesame Marketing Chain in Ethiopia



Source: Shkur, 2011

Producers are mostly individual farmers, with a few large-scale farmers/investors and farmers associations at the top of the chain. They sell their product:

- To collectors, who are either independent or work for wholesalers. They sell most of the sesame to wholesalers, and a minor part to local processors or retailers.
- Directly to wholesalers, who are the main actors of the value chain and the link between producers and exporters or local retailers.
- To farmer cooperatives, which do not play a major role in the sesame value chain. Despite their capacity to bulk sesame from many producers, they do not seem to offer benefits to them, neither through good prices nor through input credit (Coates et al. 2011). Cooperatives sell most of the sesame to wholesalers, and a minor part directly to foreign buyers.

Before 2010, all wholesalers would store sesame in their own warehouses, close to the production area, and then sold the sesame to exporters and sometimes through brokers mainly based in Humera, Addis-Ababa or Gondar. The wholesalers and brokers have personal relationships, which make it possible for the broker to arrange the contract with the exporter without the physical presence of the wholesaler.

After 2008, however, the Ethiopian Government introduced ECX, an auction market based in Addis-Ababa, destined to centralize and render more efficient trade for Ethiopia's main export commodities. Sesame was included as an ECX commodity in late 2009 but few traders and exporters decided to go through the ECX system. Thus, this system became compulsory by law in 2010, but only for exporters. Wholesalers and farmer cooperatives can still trade outside of ECX, but they have to use their own network and bypass exporters. As a consequence, a large part of sesame trade has gone through ECX since 2010.

Through the ECX system, traders of sesame seed buy and aggregate in the designated primary markets and deliver to ECX regional warehouses at Humera and Matama, with a capacity of 50 000 quintals each (Alemu & Meijerink, 2010). At the beginning of 2010, there were about 100 registered members of the ECX for sesame trade with buying and/or selling licenses. Most of these members were large traders or farm owners in the major sesame production areas (Humera, Metema and Wellega). There were also some members in Gonder and Addis Ababa (Alemu et al., 2010).

Delivery[2] can be made directly by the trader himself, or through his agent at the ECX quality inspection center. Upon arrival samples are drowned by quality inspectors, and based on visual inspection, they grade the product and issue a printed copy of Goods Received Note (GRN) for wholesalers. An electronic copy of the GRN is sent to the ECX trading floor at Addis Ababa. Wholesalers then unload their product at the closest ECX warehouse and move to the ECX trading floor at Addis Ababa, where they meet with exporters. The wholesaler participates in the auction if he has bought a seat or transacts through his agent. Exporters who agree to buy from suppliers are expected to sign an agreement and then the ECX transfers money from the exporter to the wholesaler's account within two days. Then the exporter travels to the ECX warehouse in order to ship the sesame seeds to their own warehouse. Brokers have no role in this new system. However, local traders officially assign agents on their behalf to execute exchanges and transfer money to their account.

The impact of ECX over transaction costs is controversial. Some studies (Alemu&W.Meijerkin, 2010) estimate that such costs have reduced thanks to the ECX system owing to a smaller number of intermediaries, as brokers became avoided. On the other hand, some exporters complained that due to additional ECX services (mainly export standard testing), the cost of exporting was higher than before. Access to desired sesame seeds was also more complicated for exporters due to the fact that they could only buy through ECX, with more mixing of various qualities and origins of the seeds. Exporters therefore, argue that it is more difficult for them to reach high-value markets because they cannot acquire seeds that have the quality required to reprocess them into confectionery, in order to be exported to the world market. There are a handful of exporting companies based in Addis-Ababa that used to buy sesame, reprocess it and sell abroad. However, processing of raw sesame globally remains a minor activity in Ethiopia because the process is quite capital intensive, and requires the use

[2] The paragraph on ECX derives from the similar section in the technical note for haricot bean in Ethiopia, MAFAP 2012

of large and expensive machinery, which conversely demands skilled operation and maintenance. This local limit represents an additional profit for some specialized importing countries like the UK and the Netherlands, which buy cheap Ethiopian sesames to clean and re-export the grade product (Coates et al., 2011).

POLICY DECISIONS AND MEASURES

There are three types of policy decisions recently adopted by the Ethiopian Government that affect the sesame value chain.

Policy Strategy frameworks. In 2004, the Ethiopian Government adopted a Plan for Accelerated Sustainable Development to End Poverty (PASDEP) for the 2005-2010 period, to enhance market-oriented production for priority crops and livestock commodities (MoARD, 2004/05). Oilseeds, and especially sesame, are mentioned as priority crops under the agricultural sector plan. The government's objective with regards to oilseeds is to ''double the production and export between 2005 and 2010'' (Gelalcha, 2009). In addition to sesame, the plan also envisaged to double production of sunflower seeds. The Agricultural Development Led Industrialization (ADLI) and all subsequent development policies and strategies in Ethiopia, place high weight on grain and cash crop production, as well as oil seeds (including sesame) in overall economic development. The Growth and Transformation Plan (2010-2015) also provides due attention for producing enough food for domestic supply and high value crops for export. Towards the realization of the above objectives, several policies and strategies were designed and implemented. Some of them include: up-scaling good practices of model farmers, technology multiplication and distribution, promotion of modern input supplies, improving infrastructure for agricultural marketing, widening dissemination of market information, rural road and transport network and product storage facilities (PASDEP, 2005; GTP, 2010).

Modification of the legal framework. Over the 2005-2010 period, the government adopted various measures to boost exports, especially coffee and sesame:

- Devaluation of local currency allows the rate to be determined by the banks themselves;
- Improving licensing procedure;
- Continuous improvement of investment incentives;
- Removal of sales and excise tax;
- Abolishment of NBE price control on exportable goods;
- Introduction of the export credit guarantee scheme;
- Introduction of foreign exchange retention up to 10 percent of their earnings for an unlimited period;
- Establishing different institutions that are linked with the export trade as the Ethiopian Commodity Exchange and the Ethiopian export promotion agency;
- Facilitating the participation of exporters in trade fairs, exhibitions and trade missions (Aysheshm, 2007).

However, regardless of the efforts made by the government, the country's export performance remains very weak and the export structure rigid. Furthermore, there are limited trade finance facilities available to exporters, as a result of a ban by the National Bank of Ethiopia (NBE) on private sector banks obtaining foreign currency credit lines from overseas banks (Coates et al., 2011).

Furthermore, the Ethiopian government made sesame trade through ECX compulsory in 2009 (see DESCRIPTION of the VALUE CHAIN section above). Though the ECX was officially opened in 2008, sesame trade through this system did not start until early 2009. "The delayed start was mainly due to the need of setting the standards that are linked with origin and other common quality indicators, and the need to establish the required infrastructure in the main production areas that are far from the central market in Addis Ababa" (Alemu and Meijerink, 2010).

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[3] 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:

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

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

[3] 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.[4] Mathematically, the Nominal Rate of Assistance is defined by the following equation:

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

[4] 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 are made available.

Where PE_{csp} is commodity-specific public expenditure that has been identified and measured as monetary units per tonne.

Finally, MAFAP methodology estimates the ***Market Development Gap (MDG),*** which is the portion of the price gap that can be attributed to "excessive" or inefficient access costs within a given value chain, exchange rate misalignments, and imperfect functioning of international markets. "Excessive" access costs may result from factors such as poor infrastructure, high processing costs due to obsolete technology, government taxes and fees (excluding fees for services), high profit margins captured by various marketing agents, bribes and other non-tariff barriers. Therefore, the total MDG at farm gate is comprised of three components – gaps due to "excessive" access costs, the exchange rate policy gap and the international market gap. When added together, these components are equivalent to the difference between the observed and adjusted price gaps at farm gate.

Similar to the price gaps calculated, the MDG is an absolute measure, which is also expressed as a ratio to allow for comparison between years, commodities, and countries. This relative indicator of the total MDG affecting farmers is derived by calculating the ratio between the total MDG at farm gate and the adjusted reference price at farm gate as follows:

$$MDG_{fg} = \frac{(ACG_{wh}+ACG_{fg}+EXPG+IMG)}{RP_{afg}}$$

Where ACG_{wh} is the access cost gap at wholesale defined as the difference between observed and adjusted access costs at wholesale, ACG_{fg} is the access cost gap at farm gate defined as the difference between observed and adjusted access costs at the farm gate, ERPG is the exchange rate policy gap, and IMG is the international market gap.

A more detailed description of the methodology applied in this analysis is available on MAFAP's website atwww.fao.org/mafap/en/.

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

Sesame seed is among the major export commodities in Ethiopia that has a substantial share of the earnings from oilseed exports. Sesame was mainly exported over the period and averaged more than 209 thousand tonnes annually (see Table 2). At the same time, imports started in 2007 at 470 kg (ERCA, 2013).

Table 2: Trade Balance for Sesame in Ethiopia in Tonnes, 2005-2012

Ethiopian Revenue and Customs Authority data								
	2005	2006	2007	2008	2009	2010	2011	2012
Export Volumes (*1000 tonnes)	197.98	153.66	139.65	131.69	255.78	228.04	253.75	317.65
Import Volumes (tonnes)	0	0	0,47	0,40	0,25	0,39	0,29	0,10
Trade balance (1000 tonnes)	197.98	153.66	139.65	131.69	255.78	228.04	253.75	317.65
FAOSTAT data								
	2005	2006	2007	2008	2009	2010	2011	2012
Exports (tonnes)	219,043	189,515	139,653	130,997	255,783	228,039	254,127	-
Import Volumes (tonnes)	0	15,368	3	7,502	7,502	-	-	
Trade Balance (1000 tonnes)	219.04	174.15	139.65	123.48	248.28	228.04	254.13	

Source: ERCA, 2013 and FAOSTAT, 2013

MARKET PATHWAY ANALYSED

The North Gonder zone in the Ahmara region is the main producing area for sesame seeds in Ethiopia (see PRODUCTION and Marketing& Trade sections). Thus, the farm gate level reflects the prices around Metema city, which is part of the North Gonder zone.

Metema sesame seeds were traded in the open wholesale markets before the government introduced compulsory trade through ECX in late 2009 (see description of the value chain section). One of the two regional warehouses of ECX is also located in Metema. Therefore, the Point of Competition considered is Metema (Figure 12).

Though the fastest road from Metema to Djibouti could pass through Debre Tabor and Weldiya, the preferred market pathway comes through Addis Ababa owing to bad road conditions and safety along the direct one.

Sesame production is mainly concentrated in the north-western part of the country, close to Port Sudan. However, the FOB price at the port of Djibouti has been chosen over Port Sudan, as exports through Port Sudan are currently low due to limited availability of basic infrastructure, institution and services. Besides, official historical reference prices are available for Port Djibouti (see Figure 12).

Figure 12: Market Pathway for Sesame Seeds in Ethiopia from Farm Gate and Wholesale (Metema) to Djibouti (Exit Point), 2005 – 2012

Source: Authors from Google maps, 2014

BENCHMARK PRICES

Observed

A benchmark price is established as a basis to calculate a reference parity price to determine whether Ethiopia's sesame farmers receive market incentives or disincentives.

Since Ethiopia is considered to be one of the major exporters of sesame seeds, the FOB or reference price is obtained from the Ethiopia Revenue and Customs Authority (ERCA), which is responsible for compiling all export and import data. The FOB price is the average price per tonne of all varieties of raw, unprocessed sesame seeds (Wollega, Humera and Metema) exported from Ethiopia. Sesame production is mainly concentrated in the north-western part of the country, close to Port Sudan. However, the FOB price at the port of Djibouti has been chosen over Port Sudan, as exports through Port Sudan are currently low owing to limited availability of basic infrastructure, institution and services. Besides, official historical reference prices are available for Port Djibouti.

Table 3: Unit Value FOB Prices of Raw Sesame Seeds in Ethiopia (ETB/tonne and US$/tonne), 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Quantity exported (tonne)	197,988	153,661	139,653	131,689	255,783	228,039	253,747	317,653
Value (1000 US$)	153,727	115,957	131,297	208,457	327,261	293564	346,161	426,895
Unit Value (US$/tonne)	790	767	949	1,584	1,304	1,287	1,363	1,344
Unit Value (ETB/tonne)	6,849	6,704	8,740	15,223	15,778	16,585	23,035	23,654

Source: Ethiopia Revenue and Customs Authority, 2013

Adjusted

There was no justification to adjust the benchmark price.

DOMESTIC PRICES

Observed prices at point of competition

Two prices were considered for wholesaler prices: "regular" wholesale prices from the EGTE between 2005 and 2008 and ECX prices for the North Gonder area between the 2009 and 2012 period.[5] Both sets of prices are considered to reflect prices in the city of Metema. Metema sesame seeds were traded in the open wholesale markets before the government introduced compulsory trade through ECX in late 2009 (see description of the value chain section). The North Gonder region was chosen because it is a hub for sesame trading and marketing. One of the two regional warehouses of ECX is also located in Metema.

Table 4: Wholesale Prices for Sesame Seeds, Metema, ETB/tonne and US$/tonne, 2005-2012

	Source	Unit	2005	2006	2007	2008	2009	2010	2011	2012
Wholesale price (Birr)	EGTE/ECX	ETB/Ton	5470	5660	6340	13550	15135	15320	23,072	35,881
Official nominal exchange rate	NBE	ETB/US$	8.67	8.74	9.21	9.80	12.10	12.89	16.90	17.60
Wholesale price (US$)	EGTE	US$/Ton	631	648	688	1383	1251	1189	1365	2039

Source: EGTE (2010): 2005-2008 and ECX (2013): 2009-2012 period

Observed prices at farm gate

Producer prices were calculated from monthly average prices of sesame seeds at the farm gate in the North Gonder region, obtained from the Central Statistical Agency (CSA). The North Gonder zone in the Ahmara region is the main producing area for sesame seeds in Ethiopia. Prices are considered to reflect the prices around Metema city, which is part of the North Gonder zone. The prices in Ethiopian Birr have been used for the analysis, however they are also presented in US$.

[5]There are limited observations of CSA data for producer price at district level (i.e. Metema) that the average of the zone is used as a representative price.

Table 5: Producer Prices for Sesame Seeds, North Gonder Average, in ETB/tonne and US$/tonne, 2005-2012

	Source	Unit	2005	2006	2007	2008	2009	2010	2011	2012
Producer price[6] (ETB)	CSA	ETB/Ton	4090	4450	9280	9460	12640	12820	14091	16280
Official nominal exchange rate	NBE	ETB/US$	8.67	8.74	9.21	9.80	12.10	12.89	16,9	17,6
Producer price (US$)	CSA	US$/Ton	472	509	1008	965	1045	995	834	925

Source: CSA and National Bank of Ethiopia, 2013

EXCHANGE RATES

Observed / Adjusted

The observed exchange rate change varied little between 2005 and 2008. It increased from an average of Birr 8.67 per US$ in 2005 to 9.80 in 2008. The rate increased to Birr 12.10 in 2009 and Birr 12.89 in 2010. The annual average exchange rate further devalued in 2011 and 2012 to 16.9 and 17.6 per US$, respectively. This continued devaluation had a direct bearing on the government's intention to promote exports and hence, reduce foreign exchange shortages, while encouraging direct foreign investment.

Despite this devaluation, it is believed that the domestic currency (Birr) was still overvalued, especially in 2008, 2009 and 2010. The extent of overvaluation was estimated at 40 percent during this period. A study by Dorosh et al. (2009) suggests that the real exchange rate was appreciated by 9.7, 12.8, 14.9 and 33.8 percent in July 2005, July 2006, July 2007, July 2008 and by 26.3 percent in June 2009. To curb excessive drawdown of the foreign exchange reserve, access to foreign exchange for imports was restricted in March 2008. This was aggravated by high rates of domestic inflation in Ethiopia relative to the country's major trading partners.

As stated by Demeke (2012), the local currency was, on average, 20 percent overvalued during the period 2005-2010, and an adjusted exchange rate has been accordingly calculated. 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 19.70 in 2012 (Table 6).

Table 6: 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	16.9	17.6
Adjustment Factor	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.2
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 and Demeke, 2012

[6] . Average price for sesame producers in the North Gonder from CSA

ACCESS COSTS

Observed

Point of competition to Port Djibouti

From 2005 to 2008, exporters purchased sesame seeds either from wholesalers or their agents directly at Metema, and then brought the sesame to Addis-Ababa for reprocessing in order to send it to Djibouti. For 2009 and 2012, they purchased the sesame at the Addis-Ababa ECX trading floor, and then picked it from the regional ECX warehouse at Metema and others.

Once the sesame is bought, exporters transport it to their own warehouse, re-clean it through machine cleaning up to export quality standards, re-bag the sesame in 50 kg bags, get clearances from the Ministry of Agriculture on phyto-sanitary and customs permit, and then transport it to Djibouti.

Major marketing costs for exporters include transport, loading and unloading, cleaning, costs of impurity loss, bagging and packing, fumigation, capital cost, maritime and overhead costs. The aggregate transport cost of Metema to Addis Ababa and Addis Ababa to Djibouti together account for 37.8 percent of the observed access costs.

The access costs were collected through discussions with traders currently engaged in sesame trade.

Table 7: Access Costs Observed from Wholesale Market to Border (Djibouti) for Sesame in Ethiopia, 2005-2012 (ETB/tonne)

Data	Units	2005	2006	2007	2008	2009	2010	2011	2012
Processing and handling									
Re-bagging and loading fees	ETB/tonne of sesame	40	40	40	50	50	50	60	80
Phyto-sanitary Fees	ETB/tonne of sesame	4.5	4.5	4.5	4.5	4.5	4.5	5	5
Clearing and Forwarding	ETB/tonne of sesame	173	174	179	192	233	282	332	477
Impurity Losses	ETB/tonne of sesame	137	142	159	813	908	919	1384	2153
Machine cleaning	ETB/tonne of sesame	20	20	20	20	20	20	24	24
Cost of bags (two 50 kg bags)	ETB/tonne of sesame	60	80	100	120	140	160	189	165
Storage costs	ETB/tonne of sesame	16	16	18	22	26	30	35	35
Tax and admin									
Insurance	ETB/tonne of sesame	5.4	5.4	5.4	5.4	5.4	5.4	4	4
Certification	ETB/tonne of sesame	2.6	2.6	2.6	2.6	2.6	2.6	3	3
Interest on capital (10 percent for 4 months)	ETB/tonne of sesame	159	167	188	368	422	434	627	784
Transport cost									
Transport Addis-Djibouti	ETB/tonne of sesame	300	400	450	520	560	560	650	740
Transport Gonder-Addis	ETB/tonne of sesame	400	450	500	550	600	600	798	922

Data	Units	2005	2006	2007	2008	2009	2010	2011	2012
Overhead costs (1 pct of wholesale price)	ETB/tonne of sesame	55	57	63	136	151	153	231	359
Estimated margins for traders (observed 5% total costs)	ETB/tonne of sesame	342	361	403	818	913	927	1371	2082
Total Observed Access Costs from Border to PoC	ETB/tonne of sesame	1714	1919	2133	3621	4036	4147	5712	7831

Source: Author's calculation based on access data obtained from traders

Farm gate to point of competition

The second segment used for the calculation of access costs is between the farm gate in the Amhara region and the wholesale market in Metema. They were obtained from discussions with traders in the Metema area. Traders' margins were obtained through focus group discussions with wholesalers in Metema. According to them, their margin was higher before ECX in 2007 and 2008 compared to after ECX from 2009 to 2012 because of improved price information and institutional change. This aligns with recent study results by Minte et.al. (2011), where he identified that net margins declined significantly in 2010 compared to 1996 due to improvements in road networks and market information, making it highly difficult for traders to increase their margins.

Table 8: Access Costs (ETB/tonne) Observed from Farm Gate to Wholesale Market/Point of Competition

Processing and handling		2005	2006	2007	2008	2009	2010	2011	2012
Loading Unloading	ETB/tonne of sesame	20	30	30	40	40	50	100	100
Storage costs	ETB/tonne of sesame	10	10	10	10	10	10	13	15
Losses (spillage 0.5% of purchase price)	ETB/tonne of sesame	20	22	46	47	63	64	70	81
Brokers fee	ETB/tonne of sesame	25	25	30	40	50	50	100	100
Tax and admin									
Local tax	ETB/tonne of sesame	20	20	50	50	100	100	100	100
Interest rate	ETB/tonne of sesame	107	118	235	245	322	327	402	470
Transport cost									
Transport cost	ETB/tonne of sesame	300	400	400	600	600	600	800	900
Other									
Overhead costs	ETB/tonne of sesame	41	45	93	95	126	128	140	200
Estimated margins for wholesalers, observed (5%)	ETB/tonne of sesame	232	256	509	529	698	700	780	890
Total Observed Cost	**ETB/tonne of sesame**	**775**	**926**	**1403**	**1656**	**2010**	**2029**	**2505**	**2856**

Source: Author's calculation based on access data obtained from traders

Transport costs account, on average, for 33.7 percent of total access costs during the period (2005-2012). They doubled between 2005 and 2010 in nominal terms. The main factors behind increasing transport costs include high fuel costs, high rates of general inflation and lack of competition in transport delivery service. High transport costs are also related to the use of smaller trucks (often less than 10 tonne capacity) for transporting goods from regional centers to wholesale market

Adjusted

Border to point of competition

From the point of competition to the border, observed costs were adjusted by reducing some of the costs related to system inefficiency. These costs include impurity losses, estimated at 2.5 percent of the FOB price before ECX and 6 percent after, based on discussions with traders. Observed costs were adjusted by reducing some of the costs related to system inefficiency, including impurity losses (estimated), transport costs were also not competitive and excessively high for exporters.

Table 9: Total Observed and Adjusted Costs from Wholesale Market to Border

	2005	2006	2007	2008	2009	2010	2011	2012
Total access costs exporters - observed	1,714	1,919	2,133	3,621	4,036	4,147	5,712	7,831
Total access costs exporters - adjusted	1,403	1593	1,769	2,378	2,649	2,741	3,246	4,100

Source: Authors

Farm gate to point of competition

For the farm gate to wholesale segment, adjusted access costs were estimated with adjusted transport costs, estimated 25 percent lower than the observed ones and the adjusted traders' margins were estimated to be 2.5 percent of the access costs.

Table 10: Total Observed and Adjusted Costs from Farm Gate to Point of Competition

	2005	2006	2007	2008	2009	2010	2011	2012
Total access costs traders - observed	775	926	1403	1656	2010	2029	2505	2856
Total access costs traders - adjusted	462	568	799	975	1129	1148	1444	1670

Source: Authors

BUDGET AND OTHER TRANSFERS

No budgetary transfer has been taken into account in the analysis.

QUALITY AND QUANTITY ADJUSTMENTS

No quality or quantity adjustments were used for the analysis.

DATA OVERVIEW

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

Table 11: Data Sources and Methodological Decisions

		Description	
Concept		***Observed***	***Adjusted***
Benchmark price		FOB price at Port Djibouti for sesame seeds, obtained from the Ethiopian Customs Authority	No adjustment is possible given the current information
Domestic price at point of competition		1. price of sesame seeds in "regular" wholesale in the North Gonder regions, collected from the Ethiopian Grain Trade Enterprise, for 2005/2008 2. ECX prices for sesame seeds, obtained from EGTE, for 2009/2010.	N.A.
Domestic price at farm gate		Farm-gate price for sesame seeds, in the North Gonder region, collected from the Central Statistic Agency	No adjustment is necessary given the available information
Exchange rate		Birr-US dollar exchange rate collected from National Bank of Ethiopia	1.2 Adjustment factor to take into account estimated overvaluation of birr, computed from M. Demeke's work (2012) and International Monetary Fund misalignment rate.
Access cost from the point of competition to the border		Transport, loading/unloading, cleaning, costs of impurity loss, bagging and packing, fumigation and traders' margins. Data were obtained from traders engaged in the sesame market.	Impurity losses estimated at 2.5% before ECX was put in place, and 6% afterwards, based on discussion with traders.
Access costs from the point of competition to farm gate		Transport, loading/unloading, store rent, losses, local taxes, overhead costs, brokers fee and capital costs. Traders' margins were obtained in a focus group discussion with wholesalers at Metema.	Adjusted access costs are estimated to be 32.3 percent lower compared to observed access costs (due to market inefficiency and distortion of sesame market in Ethiopia). Transport costs adjusted 25% lower than observed ones.
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 12: Indicators of Sesame Price Analysis

		Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
		trade status	*x*	*x*	*x*	*x*	*x*	*X*	*x*	*x*
DATA	*Unit*	*Symbol*								
Benchmark Price										
Observed	US$/tonne	$P_{b(int\$)}$	**790**	**767**	**949**	**1,584**	**1,304**	**1,287**	**1,363**	**1,344**
Adjusted	US$/tonne	P_{ba}								
Exchange Rate										
Observed	ETB/US$	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	11.75	14.52	15.47	19.10	19.70
Access costs border - wholesale										
Observed	ETB/tonne	AC_{owh}	1,714	1,919	2,133	3,621	4,036	4,147	5,712	7,831
Adjusted	ETB/tonne	AC_{awh}	1403	1593	1,769	2,378	2,649	2,741	3,246	4,100
Domestic price at wholesale	ETB/tonne	P_{dwh}	**5,470**	**5,660**	**6,340**	**13,550**	**15,135**	**15,320**	**23,072**	**35,881**
Access costs wholesale - farm gate										
Observed	ETB/tonne	AC_{ofg}	775	926	1,403	1,656	2,010	2,029	2,505	2,856
Adjusted	ETB/tonne	AC_{afg}	462	568	799	975	1,129	1,148	1,444	1,670
Farm gate price	ETB/tonne	P_{dfg}	**4,090**	**4,450**	**9,280**	**9,460**	**12,640**	**12,820**	**14,091**	**16,280**
Externalities associated with production	ETB/tonne	E	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Budget and other product related transfers	ETB/tonne	BOT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quantity conversion factor (point of competition – farm gate)	Fraction	QT_{fg}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quality conversion factor (point of competition – farm gate)	Fraction	QL_{fg}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source: MAFAP, 2014

Table 13: MAFAP Price Gaps for Sesame in Ethiopia, (ETB/tonne), 2005-2012

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Trade status for the year	x	x	x	x	x	x	x	x
Observed price gap at point of competition	334.5	875.3	-267.3	1,647.4	3,392.8	2,877.7	5,749.4	20,057.8
Adjusted price gap at point of competition	-1,343.4	-792.5	-2,377.6	-2,699.4	-1,150.15	-1,848.4	285.0	13,504.0
Observed price gap at farm gate	-270.0	591.3	4,075.6	-786.7	2,907.3	2,407.0	-726.1	3,313.3
Adjusted price gap at farm gate	-2,260.9	-1,434.8	1,361.6	-5,814.6	-2,516.60	-3,200.9	-7,252.0	-4,426.9

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

Table 14: MAFAP Nominal Rates of Protection and Assistance for Sesame in Ethiopia, (%), 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status for the year	x	x	x	X	x	x	x	x
Observed NRP at point of competition	7%	18%	-4%	14%	29%	23%	33%	127%
Adjusted NRP at point of competition	-20%	-12%	-27%	-17%	-7%	-11%	1%	60%
Observed NRP at farm gate	-6%	15%	78%	-8%	30%	23%	-5%	26%
Adjusted NRP at farm gate	-36%	-24%	17%	-38%	-17%	-20%	-34%	-21%
Observed NRA at farm gate	-6%	15%	78%	-8%	30%	23%	-5%	26%
Adjusted NRA at farm gate	-36%	-24%	17%	-38%	-17%	-20%	-34%	-21%

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

Table 15: MAFAP Market Development Gaps for Sesame in Ethiopia, (%), 2005-2012

	2005	2006	2007	2008	2009	2010	2011	2012
Trade status for the year	X	x	x	x	x	x	x	x
Access costs gap to competition point (ACGwh)	-311.2	-325.5	-364.2	-1242.2	-1,387	-1,406	-2,466	-3,731
Access costs gap to farm gate (ACGfg)	-313,0	-358,4	-603,7	-681,1	-881,0	-881,7	-1 061,5	-1 186,4
Exchange rate policy gap (EXRP)	-1 366,7	-1342.3	-1746.2	-3104.7	-3155.7	-3320.5	-2 998,6	-2 822,4
International markets gap (IMG)	-	-	-	-	-	-	-	-

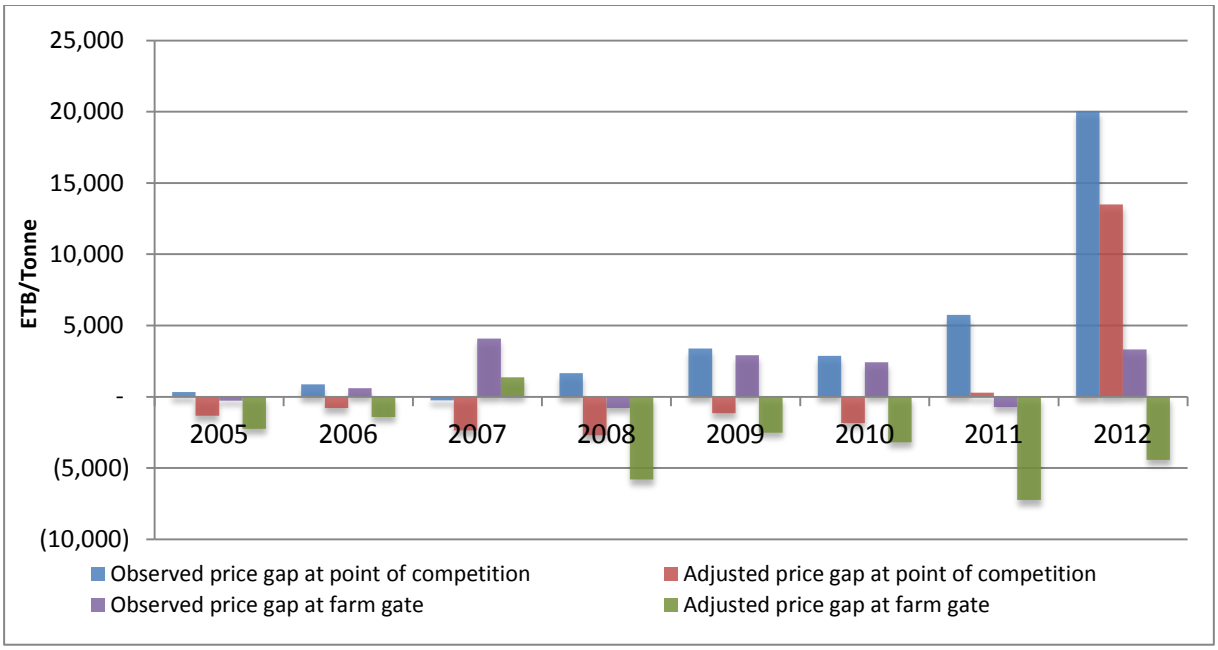
Source: Author's own calculations using data as described above.

5. RESULTS AND INTERPRETATION

Based on the MAFAP methodology and calculation of the relevant indicators summarized in Box 1, domestic prices at both the farm gate and wholesale levels are compared with observed and adjusted reference prices. Reference prices reflect prices that producers could get in the absence of policies. Indicators of price differences between domestic and references prices are calculated at the wholesale and farm level.

Assuring that producers gain the proper share of the market value of their products has been a concern for policy makers, as well as for development partners. Understanding market price incentives and disincentives facing producers using firm methods of analysis has great value for future development. MAFAP analysis contributes towards this end by comparing gaps between domestic prices and reference prices, both at farm gate and wholesale levels. Reference prices reflect prices that producers could get in the absence of policies. Indicators of price gaps in between domestic and references prices are calculated at wholesale and farm level (seeMETHODOLOGY) to analyse incentives and disincentives facing the producer.

Figure 13: Observed and Adjusted Price Gaps at Point of Competition and Farm Gate Levels for Sesame Seeds in Ethiopia, 2005-2012 (ETB/tonne)

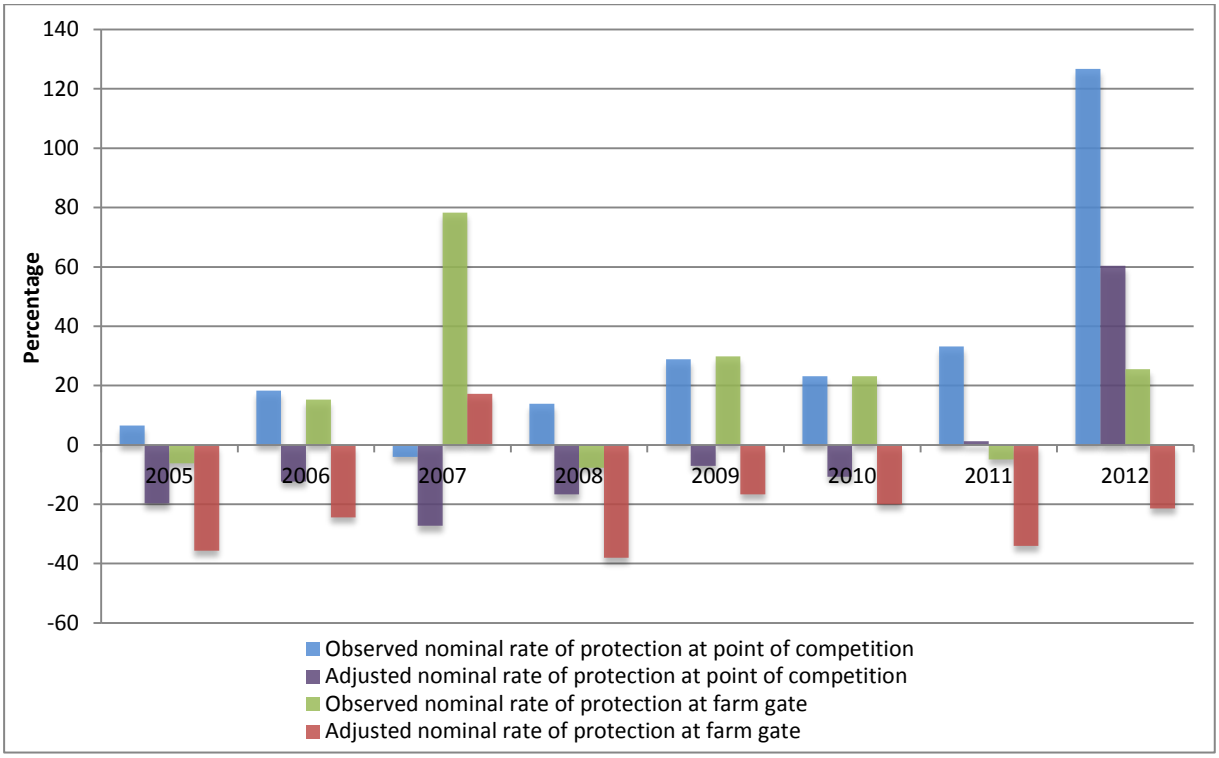


Source: MAFAP, 2014

Figure 13 exhibits price gaps between wholesale and border prices, which were very high in 2012. On average, the price gap at the point of competition was 4 333 ETB/tonne. Overall, price gaps at wholesale were increasingly positive even though very small until 2008 (see Figure 13). In 2012, the domestic price surged up to 35 881 ETB/tonne of sesame. The successive devaluation of the Birr in 2010 and 2011 had a substantial impact on the upward trend of prices on the domestic market. At the same time, the international price has remained stable since 2010 between -1 to +6 percent change. Still, due to an appreciated exchange rate and substantial inflation in the country, the international price in local currency has continued growing.

At the farm gate level, the price gaps averaged 1 439 ETB/Tonne, meaning that farmers have received incentives to produce over the period. Though, the situation of 2012 revealed that producers did not benefit fully from the high price increase at wholesale level. One main reason might be due to the foreign exchange control from March 2008 that hindered production of tradables due to a loss of economic activity (Dorosh *et al.,* 2009). Also another structural factor could be the possibility for wholesalers to stock the product and wait for the international price to rise, which could have led to an artificial shortage in the domestic market and increased drastically the price. Furthermore, limiting seats in the ECX has reduced competition and gave an additional bargaining power to wholesalers. At the same time, the lack of post-harvest management, market information systems and producers' organizations at the farm level did not allow them sufficient bargaining power for higher prices from the wholesalers.

Figure 14: Observed and Adjusted Nominal Rate of Protection at Point of Competition and Farm Gate Levels for Sesame Seed in Ethiopia, 2005-2012 (ETB/tonne)



Source: MAFAP, 2014

The observed nominal rate of protection at wholesale level (NRPowh) remained stable over the years, except in 2012. Sesame exporters have paid a greater price than the equivalent border prices. Since 2009, wholesalers have benefit significantly from the incentive environment in Ethiopia. In fact, owing to the bumper harvest in 2008, Ethiopian sesame seeds became cheaper, while still being high quality. Besides, international prices decreased due to a strong dollar and ended up lowering demand at the beginning of the year). Still, domestic prices went up that year because traders did not stop buying seeds to wait for higher international prices.

Another explanation for the wholesalers' incentive environment is that ERCA data might not capture the exact figures by exporters who may under-invoice their earnings to the Customs Authority in order to keep some of the foreign exchange. Additionally, it could also be that exporters are

compensated by benefitting preferential exchange rates through commercial banks to import other items for professional purposes.

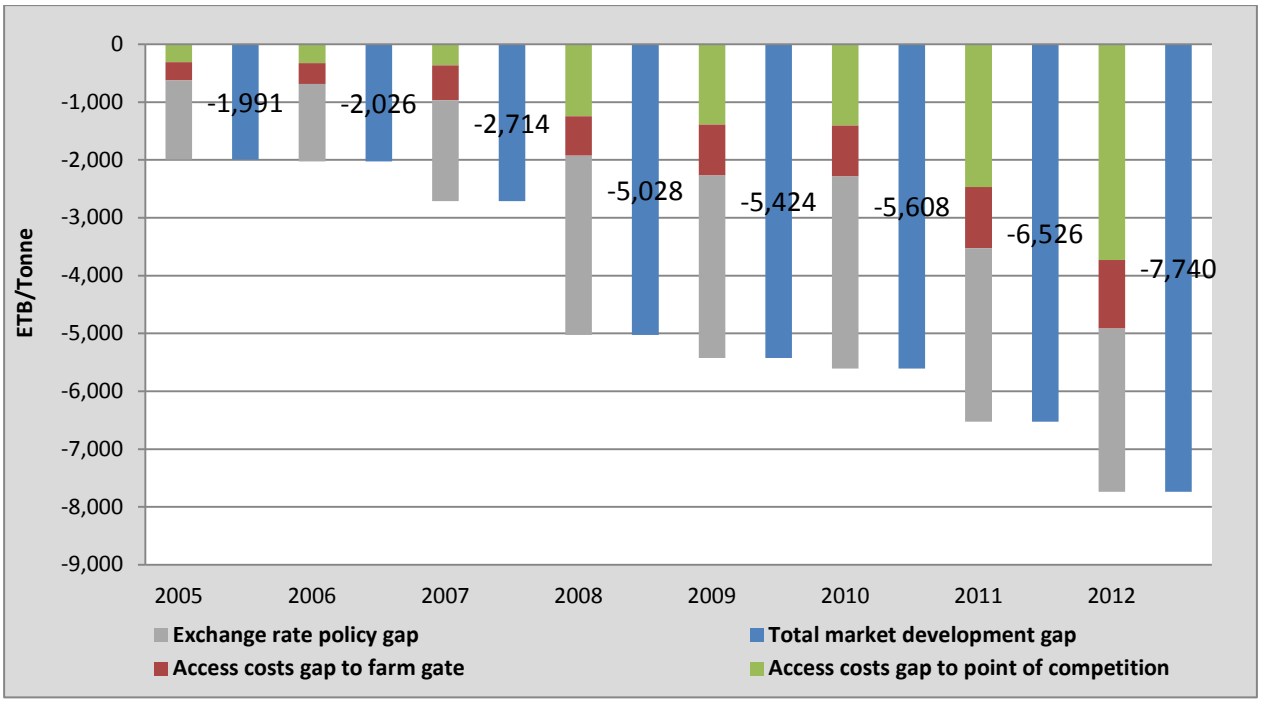
By contrast, the incentive environment for sesame producers did not show a clear trend. Though they have received on average a positive incentive over the period, incentives to produce went back and forth. Only in 2007, farmers benefitted from high incentives thanks to an even production during that year. This might be due to the little increase of the farm-gate price of the previous year (by 9 percent), which encourage farmers to substitute to other, and more profitable, commodities as maize and sorghum (Gelalcha, 2009). In 2008, thanks to a positive price signal,

In 2008, we can see that the area cultivated diminished while the volume of production increased; the sesame production intensified. This might be due to the farmers' reaction following the high price signal of the past year (+109 percent). This might have resulted in higher level of investment in production means. Though further study might need to be undertaken to assess the exact level of investment, it is likely that, due to the high production risk for sesame, farmers would rather secure their cultivated areas to ensure the production.

The adjusted nominal rate of protection at farm gate (NRPofg) followed the same trend as the one at wholesale but tended to be more negative, due to greater inefficiencies along the Metema-Addis Ababa route. For instance, producers have faced high impurity losses that increase access costs. More research on quality seed and efficient techniques and machinery could mitigate these losses. Additionally, more cohesive organisation at the producer level could enhance post-harvest management and bargaining power at the same time. The lack of an efficient post harvest management (as losses during cleaning), especially at the farm gate, is also substantially increasing the marketing costs. Moreover, sesame seeds have to be sold in designated market centers that have increased transportation and overhead costs. Furthermore, farmers are often located in places without good market infrastructure (Amha, 2012).

Table 12 indicates the market development gap for sesame seeds in Ethiopia. Market development gaps could arise from market power concentration, exchange rate misalignments and excessive domestic market costs, which added to the NRP*o* generate the NRP*a* indicators. Comparison of the different rates of protection enables the identification of areas of intervention where development gaps can be reduced. The exchange rate misalignment related gap is much more excessive compared to access costs related gaps at both wholesale and farm gate owing to a strong exchange rate policy in the country.

Figure 15: Market Development Gaps for Sesame Seeds in Ethiopia, 2005 – 2012 (ETB/tonne)



Source: Authors' compilation with MAFAP calculations

6. RECOMMENDATIONS

There are several policy measures that would need to be implemented to reduce producers' disincentives. These could include:

- Remove indirect taxes for exporters by addressing currency misalignment and relax foreign exchange control to allow sesame value chain to benefit fully from the high quality ;
- Support Research on quality seed and efficient techniques and more cohesive organisation at the producer level to address market inefficiencies along the Metema-Addis Ababa route such as high impurity losses, weak post-harvest management and lack of market infrastructures, which increase access costs.
- Increase public investment (or through credit subsidies) to introduce a more competitive bulk transport system;
- Strengthening marketing institution at the producer level (such as producer organizations) to raise bargaining power of producers and lower processing and transport costs;
- Addressing farmers' agricultural limitations, such as low yields and limited access to credit;
- Improving ECX platform management in terms of:
    - Delays due to ICT and management issues that lead to significant increases in transportation costs and relative loss of quality of sesame seeds (storage is a substantial component of the post harvest management to keep the quality of the product good).
    - Rent-seeking behavior within ECX.
    - Lack of transparency in ECX grading, standardizing and transporting system.

7. CONCLUSION

Ethiopia is among the top producers of oilseeds in the world and sesame is one of the oilseeds for which Ethiopia is known in the international market. In the last few years, sesame production and marketing has shown very significant growth. Sesame production is also expected to triple again in the Growth and Transformation Plan period (2010 – 2015). Its demand at the global and local level has been growing. Overall, contribution from the sector to the national economy in terms of employment, income and foreign exchange generation will be high in the coming years.

Findings from the MAFAP incentives and disincentives analysis shows that the total estimated Nominal Rate of Protection has remained on average positive over the period 2005-2012. It has to be noted also that wholesalers have benefited from a greater incentive environment than farmers. This might be due to two main reasons: first, sesame production is risky due to the lack of improved seeds and use of fertilizers and second, wholesalers have a better capacity to stock their production and sell it when high profitable.

The disincentives in the adjusted domain arose from misalignments in the exchange rate, extraordinarily high transport costs, local taxes, brokers' fees and impurity losses resulting from system failure to enforce clear and transparent quality inspection and grading. Despite these disincentives, sesame production and exportation has increased in recent years, perhaps owing to lucrative global prices, improved road networks, price information and extension services from agricultural offices.

LIMITATIONS

This note is based on access cost information obtained from few actors in the market.

FURTHER INVESTIGATION AND RESEARCH

For various reasons, there are no official records compiled on access costs. Informants may under-or over-estimate when they express their marketing costs from farm gate to the port, depending on their perception. Thus, to carry out more reliable work, panel data compiled from systematic surveys on access costs is highly important to analyse incentives and disincentives.

BIBLIOGRAPHY

Ahma Wolday, 2012. Supporting primary cooperatives and unions to optimally use the Ethiopian Commodity Exchange (ECX) platform and access potential export markets: the case of coffee, sesame and haricot bean value chains. Submitted to Synergos, Addis Ababa, January 2012.

Alemu, D., 2010: http://www.dgis.wur.nl/NR/rdonlyres/20E27CF8-02D2-4D4C-AF5F-8682338A9485/111369/Brief8Alemu.pdf

Alemu, D., G.W. Meijerink, 2010. The Ethiopian Commodity Exchange: an overview.

Aysheshm, K. 2007. Sesame market chain analysis: the case of Metema Woreda, North Gondar Zone, Amhara National Regional State. MSc., Addis Ababa University.

Coates, M., R. Kitchen, G. Kebbell, C. Vignon, C. Guillemain, R. Hofmeister, 2011. Financing Agricultural Value Chains in Africa. Focus on Coffee and Sesame in Ethiopia. GIZ Bonn and Eschborn, Germany

CSA, 2008.Agricultural Sample Survey 2008/2009.Area and production of crops.Central Statistical Agency of Ethiopia, Addis Ababa.

CSA, 2010.Agricultural Sample Survey 2010/2011.Area and production of crops.Central Statistical Agency of Ethiopia, Addis Ababa.

Dawit Alemu & Gerdien Meijerink (2010). An overview of the Ethiopian Commodity Exchange (ECX). Development Cooperation of Ministry of Foreign Affairs, Wageningen UR, June 2010.

Dorosh P, S. Robinson and H. Ahmed (2009), Economic Implications of Foreign Exchange Rationing in Ethiopia, IFPRI/EDRI ESSP2 Discussion Paper 009.

FAO (http://www.fao.org/agriculture/seed/cropcalendar/cropcalendar.do)

Gelalcha, S.D. 2009. Sesame trade arrangements, costs and risks in Ethiopia. Ministry of Foreign Affairs, TheHaque.

Minten B., Stifel D., and Tamiru S. (2011). Structural transformation in Ethiopia: Evidence from cereal markets. International Food Policy Research Institute (IFPRI).

MoARD, 2004. Market-Oriented Development Master Plan, Addis Ababa.

Mulat Demeke (2012). Preliminary analysis of incentives and disincentives for Maize in Ethiopia, for Monitoring African Food and Agricultural Policy (MAFAP). Draft note

Ofcansky, T.P., L. Berry 2004. Ethiopia A Country Study. Kessinger Publishing, LLC.

Shkur, K. 2011. Supply chain assessment of sesame oilseed: From Humera to Djibouti Port MSc., Haramaya University.

SID-Consult-Support Integrated Development, 2010. Market Assessment and Value Chain Analysis in Benishangul Gumuz Regional State, Ethiopia Final Report.

Wijnands, J., J. Biersteker, R. Hiel, 2007. Oilseeds business opportunites in Ethiopia, The Hague.

ANNEX I: Data and Calculations Used in the Analysis

	DATA		Unit	Symbol	Year trade status	2005	2006	2007	2008	2009	2010	2011	2012
						x	x	x	x	x	x	x	x
	Benchmark price												
1		*Observed*	US$/TONNE	$P_{b(int\$)}$		790	767	949	1,584	1,304	1,287	1,363	1,344
1b		*Adjusted*	US$/TONNE	P_{ba}									
	Exchange rate												
2		*Observed*	ETB/US$	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/TONNE	ACo_{wh}		1,714	1,919	2,133	3,621	4,036	4,147	5,712	7,831
3b		*Adjusted*	ETB/TONNE	ACa_{wh}		1,403	1,593	1,769	2,378	2,649	2,741	3,246	4,100
4	**Domestic price at point of competition**		ETB/TONNE	P_{dwh}		5,470	5,660	6,340	13,550	15,135	15,320	23,072	35,881
	Access costs point of competition - farm gate												
5		*Observed*	ETB/TONNE	ACo_{fg}		775	926	1,403	1,656	2,010	2,029	2,505	2,856
5b		*Adjusted*	ETB/TONNE	ACa_{fg}		462	568	799	975	1,129	1,148	1,444	1,670
6	**Domestic price at farm gate**		ETB/TONNE	P_{dfg}		4,090	4,450	9,280	9,460	12,640	12,820	14,091	16,280
7	Externalities associated with production		ETB/TONNE	E									
8	Budget and other product related transfers		ETB/TONNE	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	$P_{b(loc\$)}$	6,849	6,704	8,740	15,523	15,778	16,589	23,035	23,654
10	*Adjusted*	ETB/TON	$P_{b(loc\$)a}$	8,216	8,046	10,486	18,628	18,934	19,910	26,033	26,477
	Reference price at point of competition										
11	*Observed*	ETB/TON	RPo_{wh}	5,135	4,785	6,607	11,903	11,742	12,442	17,323	15,823
12	*Adjusted*	ETB/TON	RPa_{wh}	6,813	6,452	8,718	16,249	16,285	17,168	22,787	22,377
	Reference price at farm gate										
13	*Observed*	ETB/TON	RPo_{fg}	4,360	3,859	5,204	10,247	9,733	10,413	14,817	12,967
14	*Adjusted*	ETB/TON	RPa_{fg}	6,351	5,885	7,918	15,275	15,157	16,021	21,343	20,707

	INDICATORS	*Unit*	*Symbol*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
	Price gap at point of competition										
15	*Observed*	ETB/TON	PGo_{wh}	334.47	875.25	-267.28	1,647.42	3,392.79	2,877.74	5,749.43	20,057.81
16	*Adjusted*	ETB/TON	PGa_{wh}	-1,343.42	-792.49	-2,377.64	-2,699.37	-1,150.15	-1,848.40	284.97	13,504.01
	Price gap at farm gate										
17	*Observed*	ETB/TON	PGo_{fg}	-269.95	591.29	4,075.59	-786.72	2,907.32	2,406.94	-726.09	3,313.30
18	*Adjusted*	ETB/TON	PGa_{fg}	-2,260.87	-1,434.82	1,361.56	-5,814.60	-2,516.56	-3,200.86	-7,252.01	-4,426.91
	Nominal rate of protection at point of competition										
19	*Observed*	%	$NRPo_{wh}$	7%	18%	-4%	14%	29%	23%	33%	127%
20	*Adjusted*	%	$NRPa_{wh}$	-20%	-12%	-27%	-17%	-7%	-11%	1%	60%
	Nominal rate of protection at farm gate										
21	*Observed*	%	$NRPo_{fg}$	-6%	15%	78%	-8%	30%	23%	-5%	26%
22	*Adjusted*	%	$NRPa_{fg}$	-36%	-24%	17%	-38%	-17%	-20%	-34%	-21%
	Nominal rate of assistance										
23	*Observed*	%	NRAo	-6%	15%	78%	-8%	30%	23%	-5%	26%
24	*Adjusted*	%	NRAa	-36%	-24%	17%	-38%	-17%	-20%	-34%	-21%

				-		**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
				(1,366.70)	(1,342.25)	(1,746.16)	(3,104.64)	(3,155.68)	(3,320.46)	(2,998.60)	(2,822.40)
	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	-1,367	-1,342	-1,746	-3,105	-3,156	-3,320	-2,999	-2,822
27	Access costs gap to point of competition	ETB/TON	ACG_{wh}	-311	-325	-364	-1,242	-1,387	-1,406	-2,466	-3,731
28	Access costs gap to farm gate	ETB/TON	ACG_{fg}	-313	-358	-604	-681	-881	-882	-1,061	-1,186
29	Externality gap	ETB/TON	EG	0	0	0	0	0	0	0	0
30	Total market development gap	ETB/TON	MDG	-1,991	-2,026	-2,714	-5,028	-5,424	-5,608	-6,526	-7,740
31	Market development gap as share of farm gate price	%	MDG	-49%	-46%	-29%	-53%	-43%	-44%	-46%	-48%
32	Market development gap as share of adjusted reference price at farm gate	%	MDG	-31%	-34%	-34%	-33%	-36%	-35%	-31%	-37%

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