



MAFAP SPAANA

Monitoring African Food and Agricultural Policies
Suivi des politiques agricoles et alimentaires en Afrique

ANALYSIS OF INCENTIVES AND DISINCENTIVES FOR COTTON IN KENYA

OCTOBER 2012



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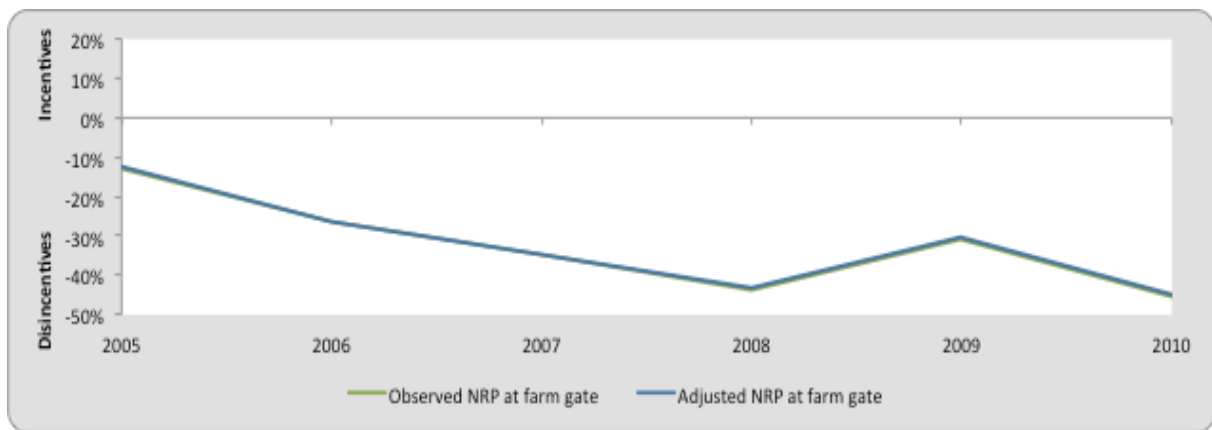
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SUMMARY OF THE NOTE

Product: Cotton
Period analyzed: 2005 – 2010
Trade status: Import in all years

- Once an important cash crop, now the ginnery industry operating at a 24 percent of its capacity due to short supply of cotton.
- Higher production in the 1980s (38,000 tonnes), strongly declining at the 1990s (16,000 tonnes). In 2010 production of only 11,000 tonnes. Almost a 100 percent produced by smallholder farmers.
- National textile industry accounts for 80 percent (up to 300 million USD) of the total exports to the U.S. Due to the lack of local cotton lint supply, industry highly dependent on imported inputs mainly from Uganda and Tanzania.
- Since 2005, strong interest by the government in revitalizing the sector and one of its key initiatives to develop low productive zones, especially at the Arid and Semi Arid Lands (ASALs).



The observed Nominal Rate of Protection (NRP, green line) indicates that cotton farmers received price disincentives under the prevailing cost structure in the value chain, which increased through out the period. The adjusted NRP (blue line) captures the effects of market inefficiencies on farmers. The area in red shows the cost that these inefficiencies represent for producers.

- Our results show that disincentives arise mainly from 1) monopsony market structure, 2) poor quality seed, and 3) old ginning technology.
- Farmer prices did not reflect proportionally the increase in international prices through the period.
- Governmental actions that had been taken to reduce disincentives include 1) strengthening market regulation to reduce the concentration of power among buyers by agreed floor prices, 2) quality seed programs, and 3) provision of extension services.
- Other actions to be taken to reduce disincentives could include 1) access to credit, 2) improvement of ginning technology, and 3) strength relationship between ginners and farmers.

CONTENTS

SUMMARY OF THE NOTE.....	3
1. PURPOSE OF THE NOTE.....	5
2. COMMODITY CONTEXT.....	5
PRODUCTION.....	7
CONSUMPTION/UTILIZATION.....	11
MARKETING AND TRADE.....	14
DESCRIPTION OF THE VALUE CHAIN AND PROCESSING.....	17
POLICY DECISIONS AND MEASURES.....	20
3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS.....	22
TRADE STATUS OF THE PRODUCTS.....	22
BENCHMARK PRICES.....	23
DOMESTIC PRICES.....	24
EXCHANGE RATES.....	26
ACCESS COSTS.....	26
EXTERNALITIES.....	29
BUDGET AND OTHER TRANSFERS.....	29
QUALITY AND QUANTITY ADJUSTMENTS.....	29
DATA OVERVIEW.....	30
CALCULATION OF INDICATORS.....	31
4. INTERPRETATION OF THE INDICATORS.....	33
5. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS.....	36
MAIN MESSAGE.....	36
PRELIMINARY RECOMMENDATIONS.....	37
LIMITATIONS.....	37
FURTHER INVESTIGATION AND RESEARCH.....	38
BIBLIOGRAPHY.....	39
ANNEX I: Methodology Used.....	42
ANNEX II: Data and calculations used in the analysis.....	43

1. PURPOSE OF THE NOTE

This technical note aims to describe the market incentives and disincentives for cotton in Kenya. The note is a technical document and serves as input for the MAFAP Country Report.

For this purpose, yearly averages of 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 the reference prices and the prices along the value chain indicate to which extent incentives (positive gaps) or disincentives (negative gaps) are present at farm gate and wholesale level. In relative terms, the price gaps are expressed as Nominal Rates of Protection. These key indicators are used by MAFAP to highlight the effects of policy and market development gaps on prices.

The note starts with a brief review of the production, consumption, trade and policies affecting the commodity and then provides a detailed description of how the key components of the price analysis have been obtained. The MAFAP indicators are then calculated with these data and interpreted in the light of existing policies and market characteristics. The analysis that has been carried out is commodity and country specific and covers the period 2005-2010. The indicators have been calculated using available data from different sources for this period and are described in Chapter 3.

The outcomes of this analysis can be used by those stakeholders involved in policy-making for the food and agricultural sector. They can also serve as input for evidence-based policy dialogue at country or regional level.

This technical note is not to be interpreted as an analysis of the value chain or detailed description of production, consumption or trade patterns. 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 is preliminary and still subject to review and validation.

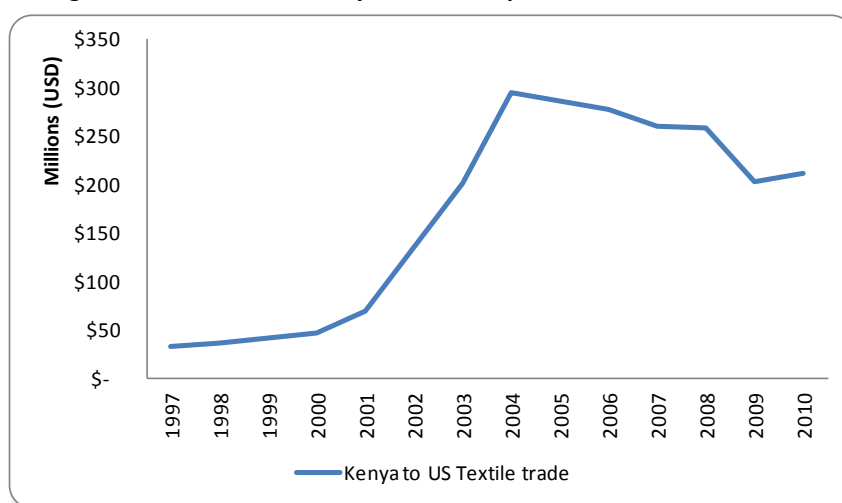
2. COMMODITY CONTEXT

Even though cotton no longer stands among Kenya's leading cash crops, such as tea, horticulture, sugar cane and coffee, it was once an important source of income for rural communities in areas with low agricultural potential, as well as an important source of raw material for a thriving national textile industry. Despite the sector's decline in recent years, cotton is still considered one of the few cash crops with real potential for increasing employment opportunities and food security through income generation in the Arid and Semi Arid Lands (ASALs) of Kenya (CODA, 2008). Thus, revitalizing the cotton sector is one of the government's key development and industrialization initiatives to be implemented mainly in the ASAL regions, but also on other high potential areas for this crop, under Kenya's Vision 2030¹ strategic plan and its Medium Term Plan, 2008-2012 (GOK, 2008).

¹ Kenya Vision 2030 is the country's development blueprint covering the period 2008 to 2030. Its objective is to help transform Kenya into a "middle-income country providing a high quality life to all its citizens by the year 2030". Developed through an inclusive, participatory process, Vision 2030 is based on three "pillars": the economic, the social and the political.

Contrary to the situation in neighboring cotton producing countries, Kenya is endowed with a well-developed textile industry that requires a constant supply of cotton lint. However, this industry has been operating below capacity, partly due to the low supply of domestic cotton lint. In 2000, a preferential trade agreement under the African Growth Opportunity Act was signed with the U.S. Government, which eliminated all duties and quotas on Kenyan textile exports to the U.S. market. As a result, Kenya’s textile exports to the U.S. have increased significantly over the past decade, peaking at 300 million USD in 2004, as shown in Figure 1 (U.S. DoC & ITC, 2012). Despite this growth in exports, very few benefits have been realized by local cotton producers due to the fact that Kenya’s textile industry continues to import most of its factory inputs rather than purchase domestic cotton lint.

Figure 1: Total Value of Kenyan Textile Exports to the U.S., 1997-2010



Source: U.S. DoC & U.S. ITC, 2012

According to the Cotton Development Authority (CODA, 2008), the annual national demand for cotton lint² is equal to about 111,000 tonnes of seed cotton, while the average annual production of seed cotton was only about 18,000 tonnes during the period 2005-2010 (FAOSTAT and CODA). Therefore, the textile industry largely depends on cotton lint imports to meet its annual demand.

Since market liberalization in 1991, the cotton-to-garment value chain in Kenya has lacked the structure and institutional dynamics required to compete with global players like China, or even with regional competitors, and is far from realizing its true potential. According to the World Bank (2005) and the CODA (2008), some of the key factors responsible for the cotton sector’s poor performance in the past, and to some extent today, include: periodic drought, volatile producer prices, delayed payments to farmers, the lack of access to quality seeds, the high cost of pesticides, competition with other farm enterprises over scarce resources, the collapse of co-operative societies and former state-owned textile firms, and competition from synthetic fiber substitutes and cheap imports of new and second-hand clothes.

² Including Carded or combed, and Not Carded or Combed.

In addition to the textile industry, seed processing stands as a downstream industry for the cotton sector, offering several potential business opportunities with respect to oil, animal feed and energy production. The Export Processing Zones Authority (EPZA, 2005) has identified Kenya's large, unmet demand for vegetable oil as an opportunity to further expand and develop its seed processing industry, especially since vegetable oil is the country's second most imported commodity after petroleum and its derivatives.

In an effort to revitalize the country's cotton sector, the Kenyan Ministry of Agriculture (MoA) passed the Cotton (Amendment) Bill in 2006, which provided the legal framework to re-organize the sector, allowing stakeholders to regulate the industry through the Cotton Development Authority, under the supervision of the MoA (CGD Bills Digest, 2005). Although seed cotton production grew in the two years after the Bill was adopted, this growth was largely due to a small increase in the number of producers, rather than an increase in productivity (Gitonga et al., 2007).

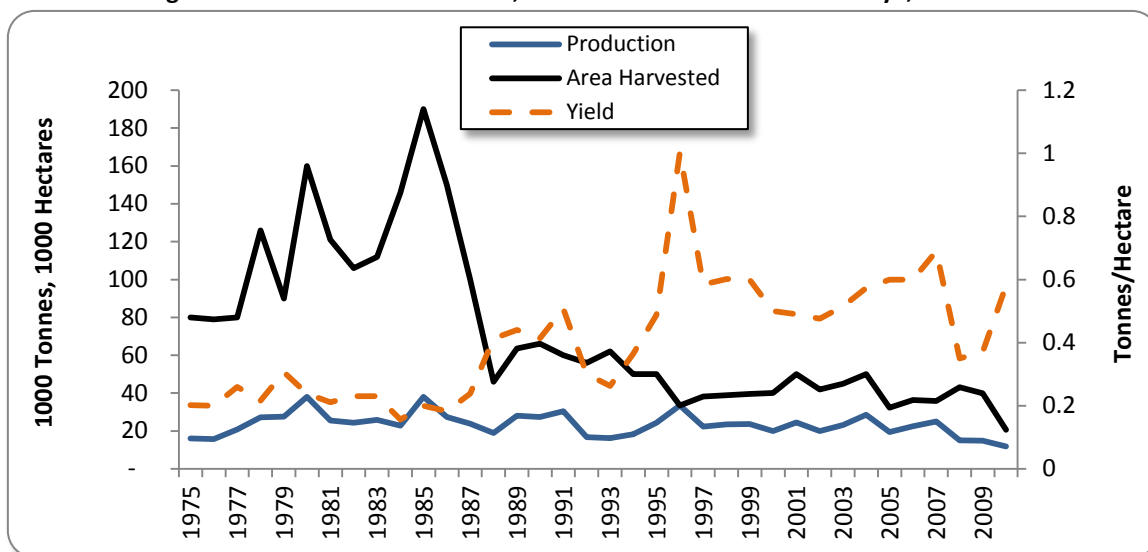
PRODUCTION

Kenya's cotton sector is generally characterized by a large number of smallholder farmers (140,000), with a low average yield (about .53 tonnes of seed cotton per hectare between 2000 and 2010) and poor quality cotton fiber outputs (World Bank, 2005; FAOSTAT, 2012). Approximately 384,500 hectares of irrigated and rain-fed land is available for cotton production, of which only about 10 percent is currently harvested (World Bank, 2005; CODA, 2008). Given the average yield, the national production potential for available land is around 200,000 tonnes of seed cotton. However, the average production of 18,000 tonnes per year over the period 2005-2010 represents a mere 9 percent of this potential.

As shown in Figure 2, growth in seed cotton production during the 1980s was primarily driven by increases in the total land planted to cotton, which peaked in 1985, with production reaching 38,000 tonnes. In the early 1990s, the total area harvested plummeted as a result of market liberalization, but this decline was largely offset by significant increases in yield, which maintained production levels at a little under the historical average.

At the beginning of the period analyzed (2005), production of seed cotton was low, at just above 19,000 tonnes (4,000 tonnes of lint) due to lack of incentives to growers in terms of prices, marketing system, credit and poor coordination of the sector. Production increased to around 22,500 tonnes (9,000 tonnes of lint) in 2006 and 2007 after the promulgation of the Cotton Bill and due to government intervention in form of provision of seeds, chemicals, training and expectation by producers of a more streamlined marketing system (CODA, 2011). In 2008 planted area increased though production fell to 15,000 tonnes (5,000 tonnes of lint) mainly due to poor rains, lack of continuity of government intervention, inadequate access to inputs (chemicals) and difficulties in realization of enough quantities of certified seed for planting. The impact of the world financial crisis in 2008/2009, reduced world garment imports by an average of 4.5 percent, affecting production in 2009 (COMESA, 2009). Production of seed cotton in 2010 was below 12,000 tonnes (4,000 tonnes of lint) due to bad weather (CODA, 2011).

Figure 2: Seed Cotton Production, Area Harvested and Yield in Kenya, 1975-2010



Source: FAOSTAT (1975-2004) & CODA (2005-2010)

Table 1 compares Kenya’s growth in seed cotton production and productivity over the past decade to regional growth in Eastern Africa. It shows that between 2000 and 2005, the country’s average annual growth rates for production and total area harvested were below regional growth rates. Even though the entire region suffered a decrease in seed cotton production between 2005 and 2010, Kenya’s negative growth trend was significantly greater in absolute terms than the negative growth trend for the region. On the other hand, although Kenya’s average yield is lower than the average yield for the region (.53 tonnes/ha versus .66 tonnes/ha), it showed a higher rate of improvement than the region throughout the entire decade analyzed.

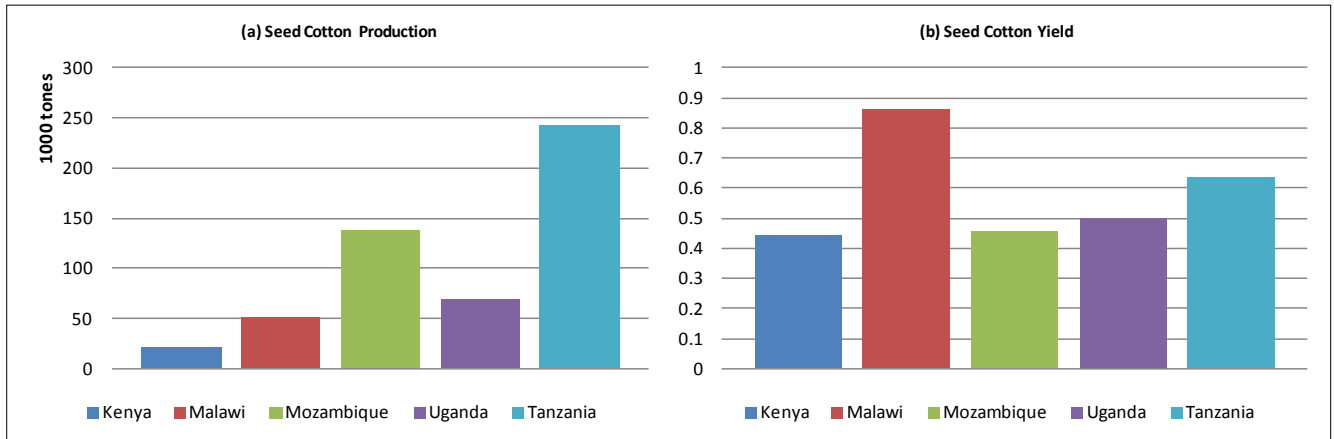
Table 1: Average Annual Growth Rates for Seed Cotton in Kenya and Eastern Africa

	2000-2005	2005-2010
Production		
Eastern Africa	9%	-1%
Kenya	2%	-7%
Area Harvested		
Eastern Africa	7%	-3%
Kenya	-2%	-5%
Yield		
Eastern Africa	2%	1%
Kenya	4%	6%

Source: FAOSTAT & CODA

Figure 3 shows that Kenya’s average seed cotton production and yield over the past decade were the lowest when compared to selected East African countries. This may not only be due to less land planted to cotton, but also to its lower cotton yields relative to other regional competitors.

Figure 3: Average Seed Cotton Production and Yield in Selected East African Countries, 2000-2010

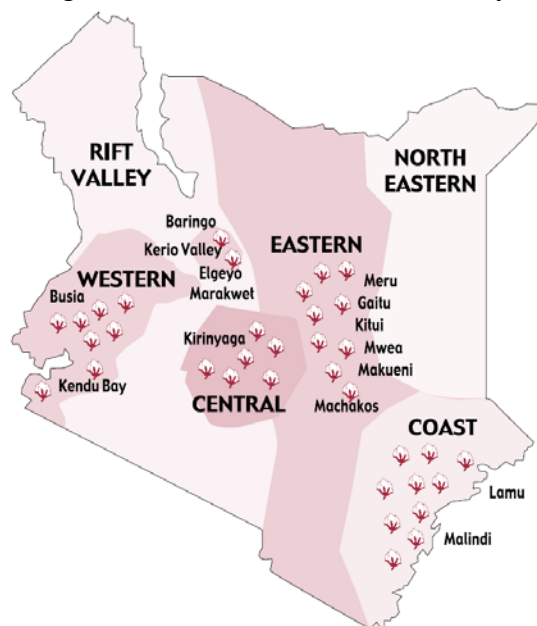


Source: FAOSTAT

As shown in Figure 4, cotton is grown in the following areas under rain-fed conditions or irrigation systems (RATES, 2003):

- **Western and Nyanza provinces** – These provinces have an average annual rainfall ranging from 1000 to 1500 mm and a crop season that lasts from March to October. They also are the only provinces with the potential to grow irrigated cotton.
- **Eastern and Central provinces** – These provinces have an average annual rainfall ranging from 600 to 1200 mm and a crop season that lasts from August to October.
- **Coast Province** – This province has an average annual rainfall ranging from 800 to 1200 mm and a crop season that lasts from April to November.

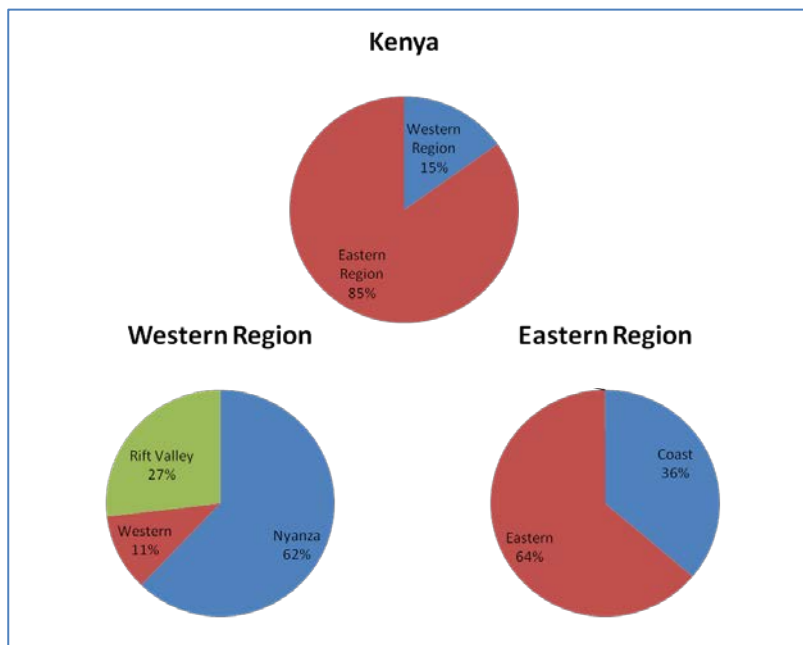
Figure 4: Cotton Production Areas in Kenya



Source: RATES, 2003

The distribution of seed cotton production by region and province, according to CODA, is shown in Figure 5. As illustrated, Kenya's Eastern Region accounted for 85 percent of the country's total production in 2010, while Kenya's Western Region accounted for only 15 percent, despite its more favorable climate conditions. This is possibly due to the fact that the land in this region is allocated to more water demanding crops like sugar cane.

Figure 5: Distribution of Seed Cotton Production by Province in 2010



Source: CODA

While there has been great interest in revitalizing Kenya's cotton sector, national production levels remain low and have been in steady decline. Even though there is general consensus about the sector's high potential for growth and competitiveness, the CODA (2008) has identified a number of constraints that must be addressed before this potential can be realized. These constraints are as follows:

- 1.) **Production issues.** The main production issues affecting most farmers are poor agronomic practices, inadequate extension services, low use of inputs due to their high cost, and poor quality seed.
- 2.) **Weak organization and underdeveloped marketing chain.** Market information flow and pricing mechanisms are not streamlined. Furthermore, producer institutions are weak and unorganized, hindering their capacity for collective bargaining to secure better prices, as well as their ability to access credit. Consequently, ginners often lack sufficient capital for timely purchase of seed cotton from farmers.
- 3.) **Inadequate institutional capacity of CODA to carry out its mandate.** The organization is relatively new and lacks the necessary budget to carry out its mandate effectively.
- 4.) **Inadequate cotton research and extension services.** Limited research and extension has been provided to producers and does not appear to be included within the national research agenda.
- 5.) **Lack of national quality standards.** The processing industry lacks standardized quality assessment guidelines, which makes it more difficult for producers to gain access to markets.

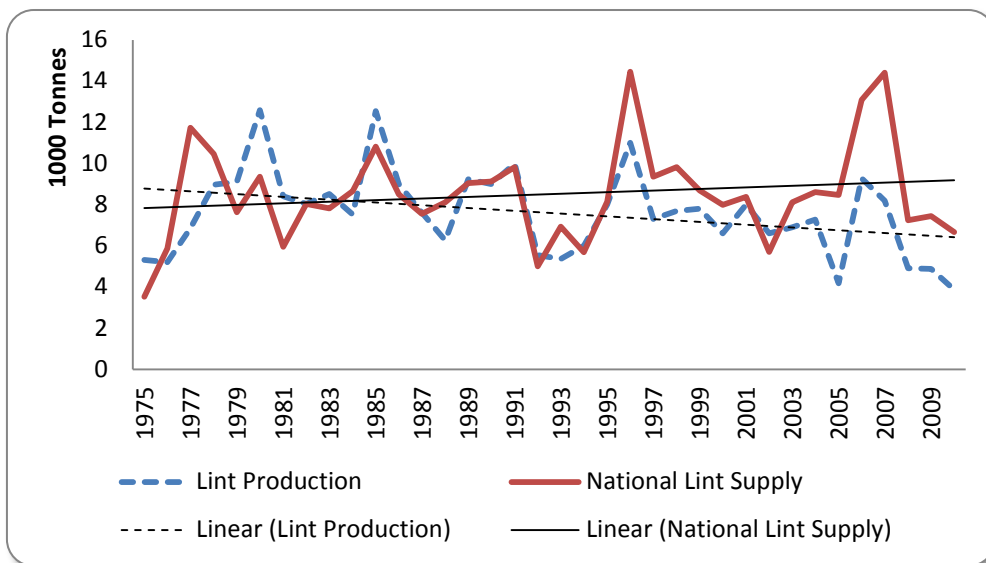
CONSUMPTION/UTILIZATION

Seed cotton is consumed exclusively by local ginners that separate the fiber from the seed to produce cotton lint. The lint then goes to the local textile industry mainly through the spinners that transform the fiber into yarn, while the seed is typically used for planting (10 percent) or for oil and animal feed production.

According to the CODA (2011), 22 operative ginneries are dispersed throughout Kenya’s major cotton producing provinces (Eastern-5, Central-1, Coast-5, Western-5, Nyanza-5 and Rift valley-1). Collectively, these ginneries have the capacity to produce 140,000 bales³ of cotton lint per year; however, they are not operating at their full capacity due to the low supply of domestic seed cotton⁴ (CODA, 2012). COMESA’s 2009 Regional Strategy for the Cotton-to-Clothing Value Chain, indicates that the utilization rate for ginneries in Kenya is only 13 percent, which is the lowest among all of its country members, followed by Uganda (20 percent), Madagascar (20 percent) and Tanzania (26 percent). Furthermore, it is important to note that even if Kenya’s ginneries operated at full capacity, they would still fall short of meeting the country’s annual demand for cotton lint, which is estimated at over 200,000 bales⁵ (CODA, 2009).

As illustrated in Figure 6, the national cotton lint supply (production plus net imports) has an increasing linear trend due to the demand from the expanding textile industry, while domestic cotton lint production has a decreasing linear trend over the period 1975-2010. These diverging trend lines indicate that Kenya faces a growing deficit in cotton lint supply, which is supplied through cotton lint imports, primarily from neighboring countries.

Figure 6: Annual Cotton Lint Production and National Supply in Kenya, 1975-2010



Source: FAOSTAT Food Balance Sheets & CODA

³ As a reference, one bale in Uganda and Tanzania is equivalent to 182 kilograms (www.cotlook.com).

⁴ For the ginneries to meet their full production capacity equal to 25,480 tonnes of cotton lint (140,000 bales*182kg), about 77,212 tonnes of seed cotton (25,480/ 33% GOT) are needed. However, domestic seed cotton production in 2010 was only 11,820 tonnes.

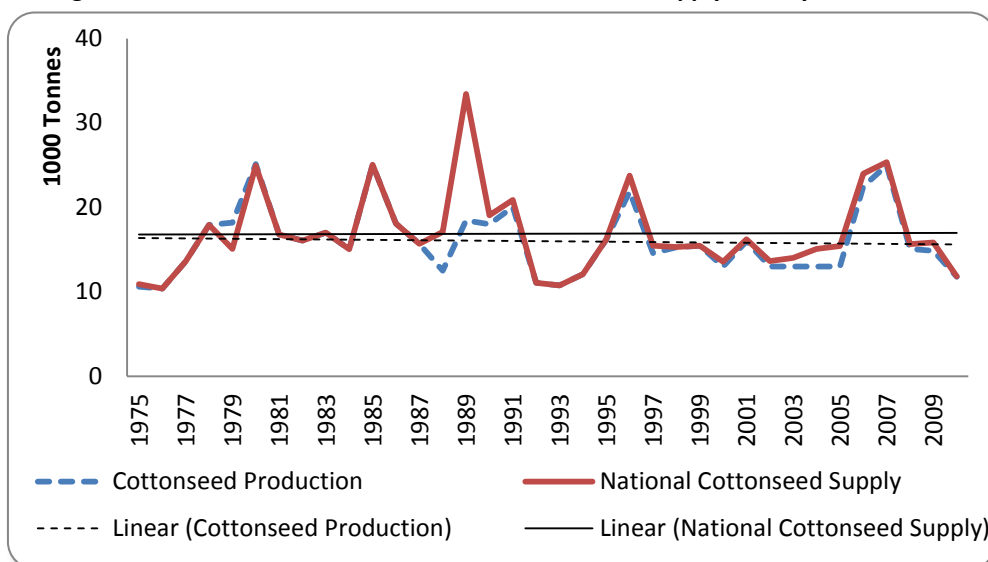
⁵ Including carded, not carded and other cotton first transformed products.

The CODA (2011) indicates that Kenya’s spinners and fabric manufacturers import about 80 percent of their cotton lint inputs required to produce more than 225 million square meters of fabric demanded by local garment manufacturers. The CODA (2011) also indicates that the utilization rate of Kenya’s textile industry is expected to remain low at only 53 percent, unless local lint supply increases.

Currently, Kenya’s textile industry includes 52 textile mills, some of which are also spinners, and more than 110 large-scale garment manufacturers (CODA, 2011). Although many of these factories are operating below capacity and some have even closed (CODA, 2011), there is still an overall consensus that the industry has significant potential to expand if cotton production and market conditions improve (RATES, 2003; World Bank, 2005; CODA, 2011).

With respect to the cottonseed subsector, Figure 7 shows that Kenya has remained almost completely self-sufficient over the period 1975-2010. It also shows that the linear trends for cottonseed production and supply were relatively flat. This is most likely due to the general stagnation of local seed cotton production, as well as the underutilization of cottonseed for oil and animal feed production in Kenya.

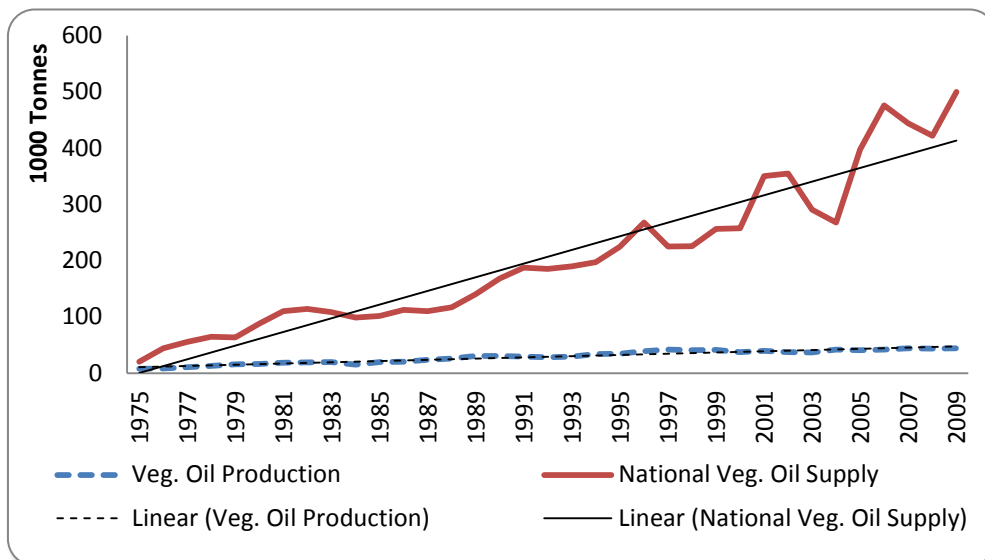
Figure 7: Annual Cottonseed Production and National Supply in Kenya, 1975-2010



Source: FAOSTAT

Kenya’s oil industry is comprised of 20 oil processing and refinery companies, with vegetable oil being one of the country’s more consumed products. Figure 8 shows that Kenya’s national supply of vegetable oil increased sharply from 1975 to 2009, while domestic production remained low. As a result, Kenya’s vegetable oil deficit grew dramatically over the past several decades. Today, Kenya’s domestic production of vegetable oil covers less than one third of its national demand, making vegetable oil the second most imported commodity after petroleum (FAOSTAT). Attempts to increase domestic production of edible oils have largely been constrained by the inadequate supply of raw materials (EPZA, 2005b).

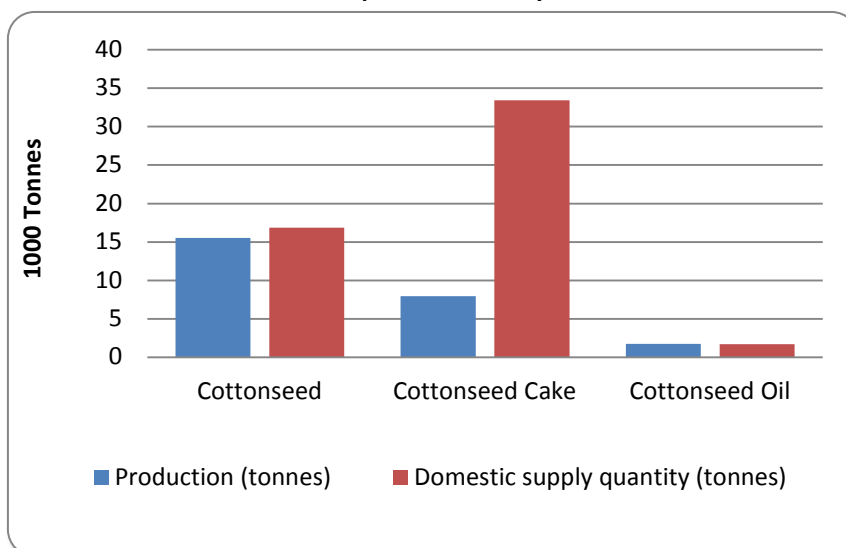
Figure 8: Annual Vegetable Oil Production and National Supply in Kenya, 1975-2009



Source: FAOSTAT

According to FAOSTAT, cottonseed oil accounts for only 3 percent of national vegetable oil production, despite the high demand for raw material inputs to produce edible oils in Kenya. Moreover, Figure 9 shows that while Kenya is generally self-sufficient in cottonseed and cottonseed oil, its domestic production of cottonseed cake for animal feed is not enough to meet the implicit national demand. These trends suggest that both oil and animal feed production represent important market outlets for domestic cottonseed that can be exploited to expand and further develop the country’s cottonseed subsector.

Figure 9: Average Production and National Supply for Cottonseed and Cottonseed Sub-products in Kenya, 2004-2009



Source: FAOSTAT

MARKETING AND TRADE

As stated previously, since cotton production and yields are relatively low in Kenya, the amount of cotton lint marketed is often insufficient to fulfill national demand. Therefore, many local spinners and textile mills rely on processed cotton imports to meet their demand.

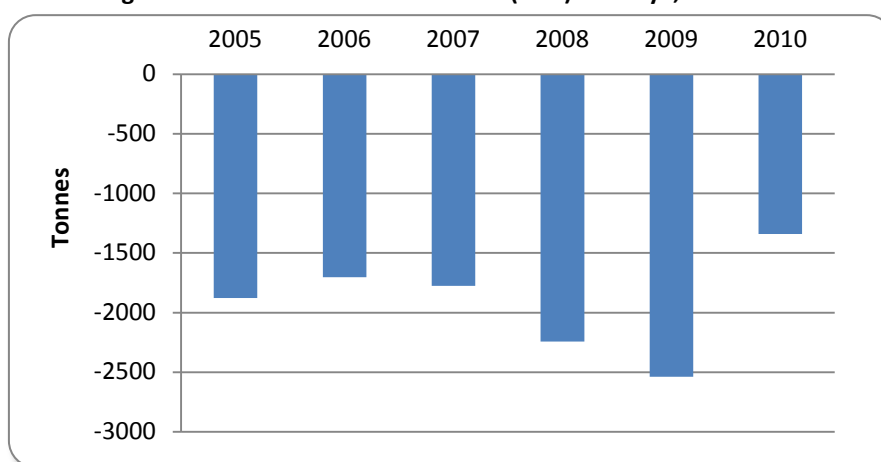
Table 2 shows that Kenya was a net importer of cotton lint (not carded or combed) throughout the entire period under study, with an average import dependency ratio of 27.4 percent. Figure 10 shows the annual variation in the country's negative trade balance during the 6-year period analyzed, which was smallest in 2006 and 2007 due to the increase in national seed cotton/cotton lint production following the promulgation of the Cotton (Amendment) Bill in 2005, as explained previously.

Table 2: Cotton Lint Production and Trade in Kenya, 2005-2010

	2005	2006	2007	2008	2009	2010
Production (tonnes)	4,186.0	9,282.0	8,190.0	4,914.0	4,881.4	3,876.6
Imports (tonnes)	2,195.7	1,785.6	1,867.0	2,243.0	2,545.8	1,452.2
Exports (tonnes)	317.2	81.6	91.2	0.0	7.7	111.1
Import Dependency Ratio (%)	36.2	16.3	18.7	31.3	34.3	27.8
Self-sufficiency Ratio (%)	69.0	84.5	82.2	68.7	65.8	74.3

Source: FAOSTAT & UN Comtrade

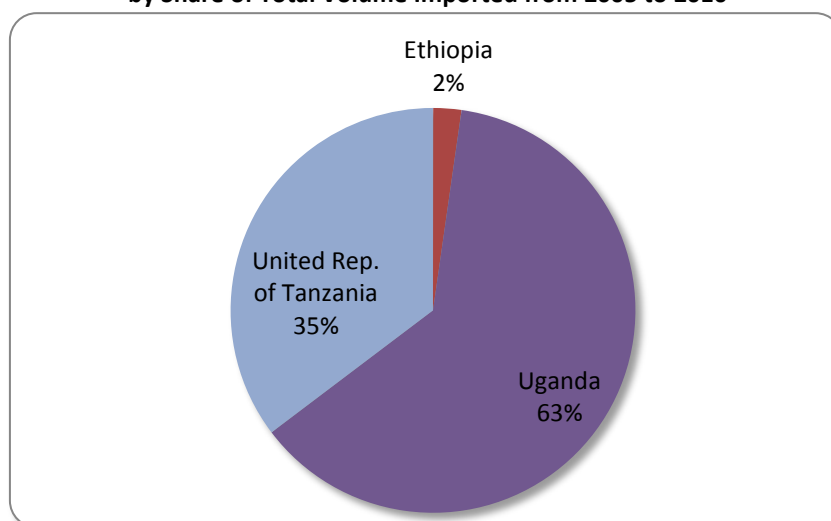
Figure 10: Cotton Lint Trade Balance (X-M) in Kenya, 2005-2010



Source: UN Comtrade

As illustrated in Figure 11, almost all of Kenya's cotton lint imports are from neighboring countries. Uganda and Tanzania are Kenya's top import partners. Together, these two countries accounted for 98 percent of the total volume imported over the period analyzed, with Ethiopia accounting for the remaining 2 percent.

Figure 11: Kenya's Major Import Partners for Cotton Lint by Share of Total Volume Imported from 2005 to 2010



Source: UN Comtrade

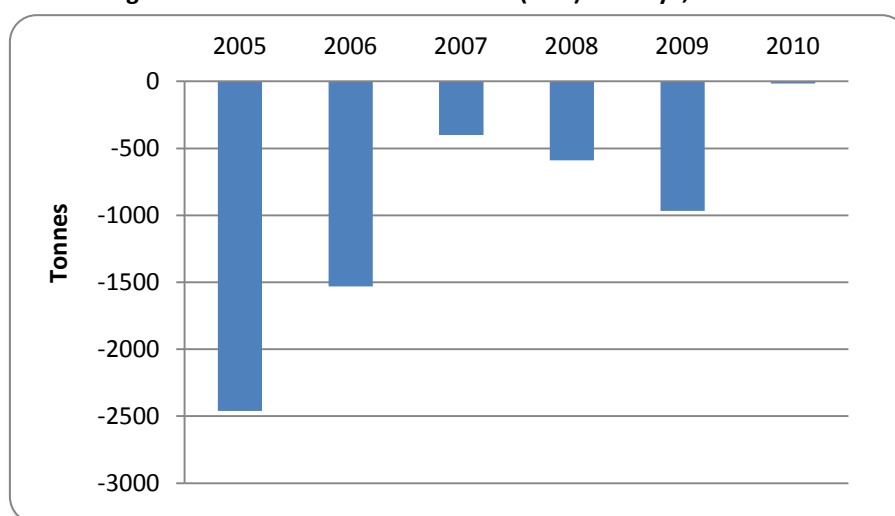
Even though the trade situation for cottonseed in Kenya is similar to that of lint, it differs slightly, as the country imports much lower volumes of cottonseed than it does for lint and shows a constant decline in imports during the period analyzed, reaching self-sufficiency in 2010 (see Table 3 and Figure 12). However, this does not necessarily mean that the national demand for cottonseed sub-products is domestically fulfilled, just that some of these products are imported already processed, as in the case of vegetable oil and cottonseed cake (see Figure 9).

Table 3: Cottonseed Production and Trade in Kenya, 2005-2010

	2005	2006	2007	2008	2009	2010
Production (tonnes)	13,000.0	22,492.0	24,993.0	15,093.0	14,886.0	11,822.0
Imports (tonnes)	2,462.0	1,531.0	400.0	590.0	967.0	15.0
Exports (tonnes)	2.0	-	-	-	-	-
Self-sufficiency Ratio	84%	94%	98%	96%	94%	100%
Import Dependency Ratio	16%	6%	2%	4%	6%	0%

Source: FAOSTAT & Global Trade Atlas

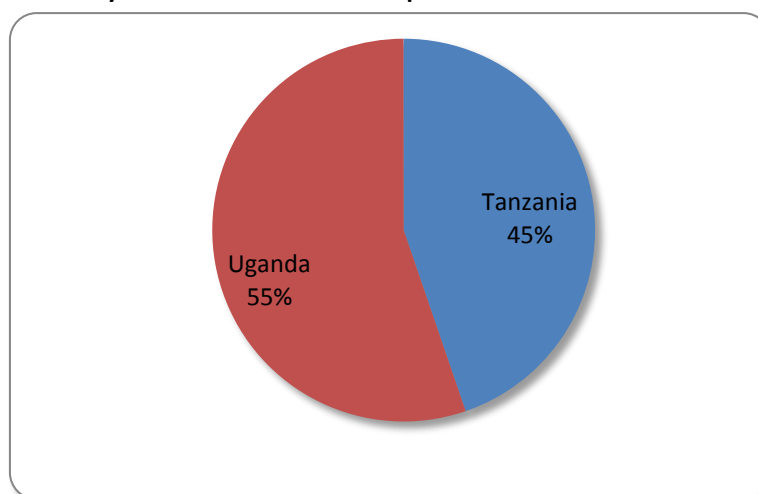
Figure 12: Cottonseed Trade Balance (X-M) in Kenya, 2005-2010



Source: FAOSTAT & Global Trade Atlas

Similar to cotton lint, Uganda and Tanzania are Kenya's top import partners for cottonseed, accounting for 55 and 45 percent of total imports over the period 2005-2010, respectively (Figure 13).

Figure 13: Kenya's Major Import Partners for Cottonseed by Share of Total Volume Imported from 2005 to 2010



Source: FAOSTAT & Global Trade Atlas

International Trade Agreements

As a member of the World Trade Organization (WTO), Kenya has access to more than 90 percent of world markets with Most Favored Nation (MFN) treatment (KIA, 2012). Kenya is also a member of several regional trade organizations and a signatory to multilateral and bilateral trade agreements, some of which provide trade benefits to Kenya's textile industry. These organizations and major trade agreements affecting Kenya's textile industry are as follows:

- 1.) African Growth and Opportunity Act (AGOA).** This act, which was signed in 2000, is a preferential trade agreement with the U.S. Government temporarily eliminating all duties and quotas on Kenyan textile exports to the U.S. market until the year 2015. As a result of this agreement, which took effect in 2001, Kenya's textile exports to the U.S. have increased significantly over the past decade (see Figure 1). However, most of Kenya's textile industry inputs continue to be imported. Due to the minimal benefits captured by cotton producers, the World Bank (2005) identified that a necessary condition for "gearing up the industry" is to improve the coordination and linkages throughout the cotton sector's value chain.
- 2.) ACP-EU Trade Agreement.** This agreement, signed in 2000 between the European Community and the African, Caribbean and Pacific states (ACP), gives Kenya market access to the E.U. In order for textile products to qualify under this agreement, the fabric must be originated in an ACP country.
- 3.) Common Market of Eastern and Southern Africa (COMESA).** Kenya is a member of COMESA, a regional economic co-operation organization, which has been working to reduce trade barriers applied to goods produced within and traded among its 19 member countries. Under COMESA, a Free Trade Area has been in effect since 2000.
- 4.) East African Community (EAC).** Kenya, Tanzania, Uganda, Rwanda and Burundi comprise the East African Community, which aims to achieve cooperation and regional harmonization on issues related to labor movement, work permits, education qualifications, standards, customs, rules of origin and common tariff nomenclature.

DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

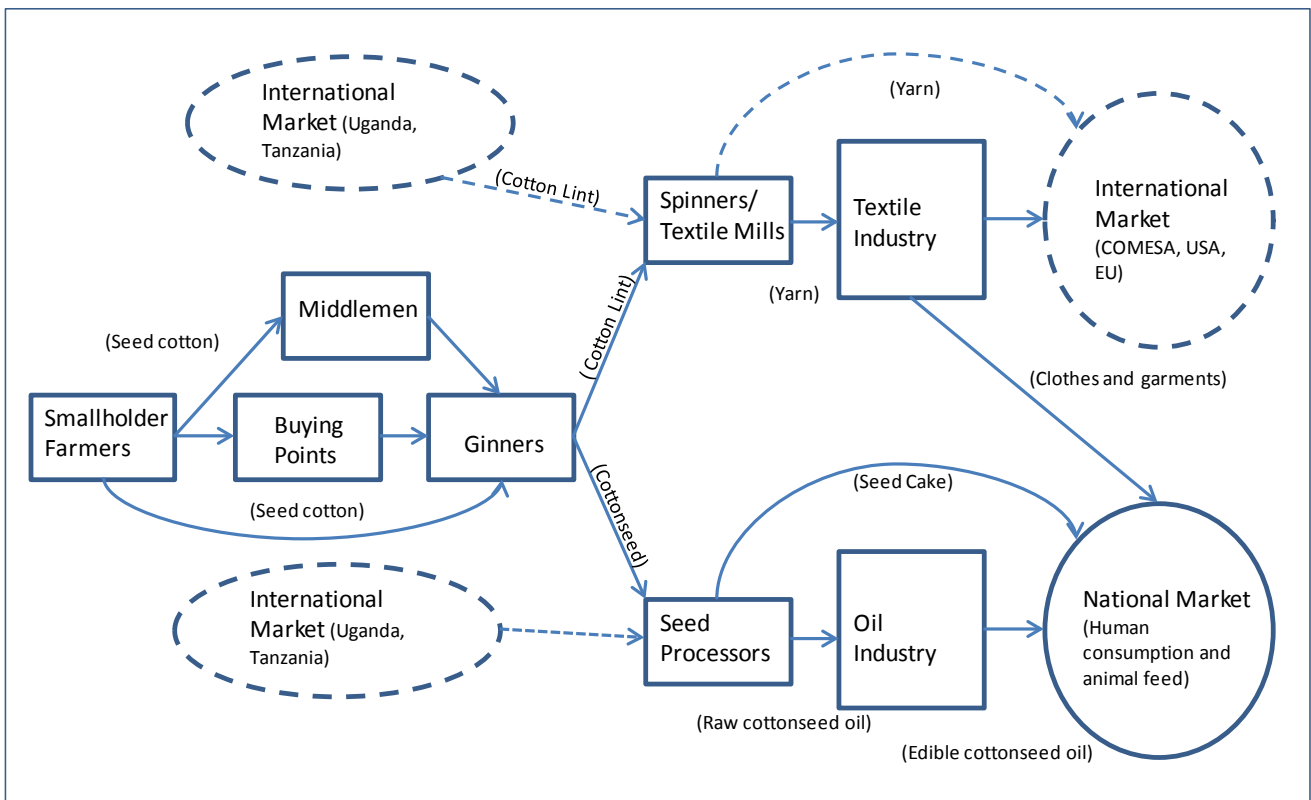
In general, smallholder cotton farmers in Kenya sell their product to local ginneries that separate the fiber from the seed to produce cotton lint. Once the seed cotton is transformed into cotton lint, it is sold to local spinners or textile mills for a second transformation into yarn and fabric. These outputs are then sold to local garment manufacturers that produce clothing and apparel for sale in the domestic or international markets.

Since Kenya’s domestic cotton lint production is not sufficient to meet the quantity and often the quality demands of local spinners and textile mills, a large amount of cotton lint is imported, predominantly from Uganda and Tanzania. As a result, the pre-spinning stage of the value chain is the stage where domestic cotton lint competes with cotton lint imports from the international market.

The cottonseed industry is another key component of the cotton value chain in Kenya, as it is an important by-product of cotton lint production with different uses and marketing outlets. About 10 percent of the country’s cottonseed, once separated from the fiber, is used for planting, while the remainder is processed into oil and cottonseed cake for animal feed. The key players of the oil industry include the oilseed processors, which crush the seed to extract the oil and use the remnants for producing cottonseed cake, and the oil refineries, which convert raw cottonseed oil into edible oil for human consumption.

As illustrated in Figure 14, Kenya’s cotton value chain includes three major groups of actors – smallholder cotton farmers, ginneries, and spinners (or textile mills) and seed processors. Also throughout the cotton value chain are a number of supporting and regulating institutions with varying degrees of organization, market power and effectiveness. Each group of actors and their associated institutions are described in detail below.

Figure 14: Simplification of Kenya’s Cotton Value Chain



Source: Author’s own elaboration

Smallholder Farmers

The cotton sector in Kenya is characterized by a large number of smallholder farmers with an average growing area of 1 ha and low yields. In 2005, the World Bank estimated that it costs Kenyan farmers 0.26 USD to produce one kilogram of seed cotton, with weeding and the application of agrochemicals accounting for more than 45 percent of total production costs⁶ (see Table 3).

Table 3: Production Costs for Smallholder Cotton Farmers in Kenya, 2004

Activity	Land Preparation	Planting	Seed	Weeding	Spraying	Harvest	Total
USD/kg of Seed Cotton	0.04	0.02	0.04	0.04	0.08	0.05	0.26
% of Total	15.3	7.6	15.3	15.3	31.2	17.8	100

Source: World Bank, 2005

Liberalization of the cotton industry in 1991 allowed cotton growers for the first time to negotiate prices directly with buyers. Though this was first seen as an advantage to farmers, the lack of supportive market and governmental institutions, coupled with stiff competition in an unregulated market, led to a general decline in the prices received by producers (CGAE, 2006).

Since no secondary market for seed cotton exists, ginneries are the only market and, therefore, in theory, have significant power to dictate prices paid to local producers. Cotton growers have made some attempts to organize as a way of increasing their market power, but have had little success (Ikiara & Ndirangu, 2003). On the other hand, ginneries are also extremely dependent on local seed cotton supply, so the market relationship is one based on symbiosis that has not been fully potentiated in Kenya.

It is estimated that about 70 percent of Kenyan seed cotton is sold directly to the local ginners, while the remaining 30 percent is sold to agents that work independently or in partnership with the local ginneries (RATES, 2003). In 2003, the Kenya Institute for Public Policy Research and Analysis (KIPPRA) found that in 80 percent of the cases, ginners approached the farmers for seed cotton. Currently, there are more than 250 certified buying points where ginners, agents and farmers meet. Even though it is most common for the buyer to collect the consignment from the farm, farmers may occasionally take their seed cotton to the buying centre for bulking, as it may be more expensive to wait for the buyer to collect the product (CODA, 2012).

In response to the institutional vacuum that developed in the primary marketing and production of cotton after liberalization, and taking into account that the link between cotton farmers and ginners is perhaps the most critical link in the entire cotton-to-garment supply chain (CGAD, 2006), Kenya's Ministry of Agriculture established the Cotton Development Authority (CODA) under the 2005 Cotton (Amendment) Bill. CODA's objective is to facilitate activities between cotton growers and ginners and to coordinate sector decisions, including setting reference prices for seed cotton paid by the ginneries (CGD, 2005).

⁶ The high cost of agrochemicals, mainly due to the high cost of transporting them from Mombasa where they are imported, is one of the main reasons that farmers' profits remain low (World Bank, 2005).

Ginners

Ginners separate seed cotton into lint and cottonseed. They are a focal point in the primary cotton industry, and their location, efficiency and organization are decisive to it. Every ginnery has its traditional cotton supply zones, but most of the time the supply is not enough. This often forces ginneries to expand their zones and compete with other ginneries, which can increase their transport costs to almost 10 percent of the farm gate price (RATES, 2003). Since the creation of CODA in 2005, the establishment of authorized buying centers has been prioritized in an effort to reduce access costs for ginners and seed cotton farmers.

The ginner's main objective is to produce satisfactory lint by ginning cotton with minimum effect on its fiber spinning quality. This requires communication with lint buyers and textile mills and knowledge of the latest ginning technology (Ikiara & Ndirangu, 2003; RATES, 2003). Most ginners in Kenya use technology that has been available since 1935. Even though it is appropriate for the usual type of fiber characteristics found in Kenyan seed cotton, the ginning outturn (GOT) of cotton lint produced per kilogram of seed cotton is only 33 percent, which is well below the 40-42 percent GOT potential of the cotton varieties grown in Kenya as well as the regional GOT average of about 36-40 percent (RATES, 2003; World Bank, 2005).

According to the most recent cotton value chain analysis completed by the World Bank in 2005 (see Table 4), electricity interruptions and frequent machinery breakdowns constitute a problem for ginners, raising the cost of energy demanding activities, such as drying and ginning (RATES, 2003; World Bank, 2005).

Table 4: Production Costs for Cotton Ginneries in Kenya, 2004

Activity	Seed cotton	Drying and Cleaning	Ginning	Cleaning and Packaging	Transport	Administration	TOTAL
Ksh/kg Lint Cotton	68.18	2.45	2.28	3.11	1	2.30	79.3
% of Total	85.9	3.1	2.9	3.9	1.3	2.9	100

Source: World Bank, 2005

As stated previously, most seed cotton is sold directly to ginners. These transactions are characterized mainly by informal relations between cotton growers and local ginneries (Ikiara & Ndirangu, 2003). As shown in Table 4, the cost of seed cotton represents a large share (85.9 percent) of ginners' total production costs. At the same time, many ginners also receive low prices for their lint, partly due to the poor quality of seed cotton inputs available to them. Furthermore, the insufficient supply of seed cotton in Kenya has caused many ginneries to operate at a low capacity utilization rate of about 24 percent (Ikiara & Ndirangu, 2003; World Bank, 2005). The inadequate supply of seed cotton is a major disincentive to investment in ginneries (Ikiara & Ndirangu, 2003). On the other hand, cotton growers complain that seed returned by ginneries for replanting is mainly a second quality seed, most of the time mixed with different varieties and untreated, resulting in low yields and low quality seed cotton (RATES, 2003; World Bank, 2005).

Spinners and Seed Processors

Following the ginning phase, the separated lint and cottonseed go through a secondary transformation process. The cotton lint goes to spinners and textile mills for transformation into yarn, while the cottonseed goes to seed processors for transformation into raw oil and seed cake, which is in high demand for animal feed.

Most of the country's spinning and textile mills are large-scale, and a few are even integrated with local ginneries. In some cases where spinners are integrated with ginners, they have the power to dictate low lint prices paid to ginneries, which are then transmitted back to cotton farmers (RATES, 2003; World Bank, 2005). It is in this stage of the value chain where domestic lint produced by local ginneries competes with imported lint, since the spinners are the ones that decide the volume of each they wish to purchase, according to their quality and price.

Seed processing for oil extraction and animal feed production is often a complementary industry in countries where cotton is produced. Due to the high national demand for vegetable oil, Kenya has considerable seed and oil processing capacity, equipped with more than 20 processors and refineries nationwide (EPZA, 2005). Similar to the spinners, it is in this stage of the value chain where domestic cottonseed produced by local ginneries competes with imported cottonseed.

POLICY DECISIONS AND MEASURES

Developing and expanding Kenya's cotton sector is a key agricultural strategy outlined in the national Vision 2030 plan, capable of benefiting more than 8 million people living in the country's Arid and Semi Arid Lands (CODA, 2008).

The Kenyan government is not providing subsidy to cotton growing or price support for producers or for ginning or marketing. Instead the government is providing targeted support to the smallholder farmers in form of provision of planting seeds as a food security measure, advisory service through extension service and research. It is also supporting rehabilitation of irrigation schemes to reinstate irrigated cotton production in the next 5 to 10 years. Alongside provision of irrigation water, the government is aiming to increase the efficiency of water use by embracing modern production techniques of conservation and management. The government embarked on development of infrastructure that would support reliable testing of cottons through instrument based classing system to pave way for branding of Kenyan cottons (CODA, 2011).

A major policy change affecting the cotton sector in recent years was the promulgation of the 2006 Cotton (Amendment) Act, which created the Cotton Development Authority (CODA), with the mandate of promoting and regulating the cotton industry (Kenya Gazette Supplement, 2006). The CODA was established to replace the Cotton Board of Kenya, moving regulation authority from the government to industry stakeholders, including cotton growers, ginners and manufacturers (CGD, 2005).

The core functions of CODA are to:

- 1) Promote, co-ordinate and regulate the cotton industry in Kenya;
- 2) Formulate, implement and monitor cotton policies, legislation and regulations;
- 3) Promote research, development and dissemination of cotton production and processing technologies;
- 4) Ensure production, supply and distribution of certified cotton planting seed;
- 5) Collect, analyze and disseminate local and global information on cotton;
- 6) Promote value addition in the cotton industry;
- 7) Promote local, regional and international collaboration;
- 8) Advise on pricing and marketing of cotton and cotton products;
- 9) Ensure development and compliance with quality standards of cotton and cotton products; and
- 10) Promote the establishment and strengthening of stakeholder institutions.

Major challenges and constraints hindering the CODA's ability to meet these objectives include a lack of sustainable financing mechanisms, inadequate management, low institutional capacity, debts from the past and a highly indebted industry (CODA, 2008). The government is supporting CODA through provisional found transfers for staff placement, offices and operational costs.

Apart from this, the government and cotton stakeholders are embodied in the next activities (CODA, 2011):

- Establishment of an National Apex forum that comprises both public and the private sector stakeholders;
- Promoting access to input supply and credit through agreements with banking institutions, which will allow competitive production and recovery of loaned funds and inputs;
- Collaborative Seed production and management system, which will enhance the breeding of certified environmental stable seeds for the local Agro-ecological conditions. This is a collaborative work involving Kenya Seed Company, National Irrigation Board (NIB), Kenya Agricultural Research Institute (KARI) and farmers. Its objective is to produce enough certified seed by 2015.

Marketing and Price Policies

Market and price liberalization of the cotton sector in 1991, as well as the lack of stakeholder organization and institutional support, led to the cotton sector's decline in the 1990s. It wasn't until 2006 that a mechanism to set reference prices was established. The cotton general regulation requires the CODA to arrange a cotton stakeholder meeting to discuss and agree on a floor price for the season. Taking into consideration international cotton prices, FOB adjustments and transport costs, floor prices for both seed cotton and ex-ginnery lint are set each year (CODA, 2010).

Since 2005, CODA had established more than 250 authorized buying points throughout Kenya's cotton production areas in an effort to reduce access costs and facilitate exchange between farmers, agents and ginnerers.

International Trade Policy Measures

No specific trade tariffs have been applied to cotton lint or cottonseed during the period analyzed (WITS, 2012). Additionally, no export subsidies were identified. However, three incentive schemes are available to Kenyan companies to encourage export-oriented activities – the Export Processing Zones (EPZ) Scheme, the Manufacturing under Bond Scheme (MUB), and the Duty Remission Scheme. Firms operating under these schemes are exempted from import duties and VAT for machinery, equipment and raw material (national or imported) (MOT, 2009). Some of the larger spinners and fabric manufacturers operate under these schemes (EPZA, 2005a).

Products high up the value chain (yarn and fabrics) are protected by a 10 and 25 percent tariff for non-EAC. Declining tariffs during the period (10 to 0 percent in 2010) for yarn and fabrics were applied for Uganda and Tanzania.

Taxes and Subsidies to Production

No specific taxes are applied along any portion of the cotton value chain analyzed. Also, there is no record of subsidies provided to cotton growers or ginnerers, except for planting seeds distributed to smallholder farmers.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

To calculate the indicators needed to estimate incentives or disincentives to production (NRP, NRA) as well as the Market Development Gaps (MDGs), several types of data are needed. They were collected and are presented and explained hereafter.

TRADE STATUS OF THE PRODUCTS

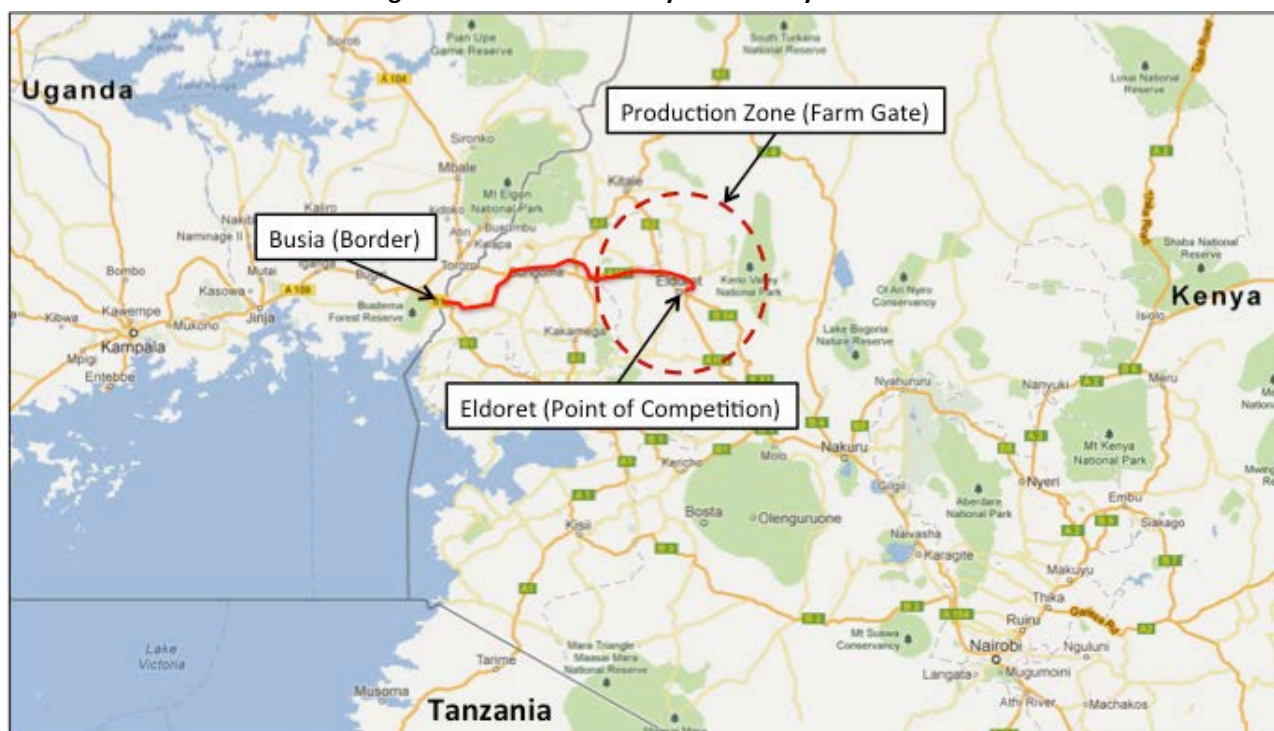
Seed cotton goes through two main stages of processing – primary processing, where it is transformed into lint and seed, and secondary processing, where the lint is transformed into yarn for garment production and seed is transformed into oil and seed cake for animal feed. However, this analysis only focuses on the primary processing (pre-spinning) stage in order to determine the market price incentives and disincentives for farmers and ginners.

Though cottonseed is a by-product of lint production, it has several marketable uses, which raises the value of seed cotton. Therefore, since this analysis of incentives and disincentives is undertaken from the perspective of farmers and ginners, it is imperative to take into account the value (price), marketing, processing and other access costs for both products. Without including seed value in the evaluation of cotton prices, domestic and international prices for cotton will be underestimated, giving rise to inaccurate measures of incentives or disincentives received by producers.

Kenya was a net importer of lint and cottonseed throughout the entire 2005-2010 period, with most imports coming from Uganda. Since both products are primarily imported rather than exported, the ginnery gate was considered the point where domestic lint and cottonseed compete with imported lint and cottonseed. As a result, the ex-ginnery price was taken as the price at the point of competition in this analysis.

For the purpose of calculating access costs, Eldoret in western Kenya was selected as the point of competition because it is situated at the heart of a cotton production zone and is the site of at least 2 ginners, 2 spinners and/or textile mills and 3 seed processors (EPZA, 2005). It is also located in the middle of the main commercial corridor between Uganda's border in Busia (200 km) and Nairobi (275 km). The assumed trade flow analyzed is illustrated in Figure 15.

Figure 15: Trade Flow Analyzed for Kenyan Cotton



Source: Author's own elaboration using Google maps, 2012

BENCHMARK PRICES

Observed

The basis for calculating a reference parity price to determine whether cotton producers receive market incentives or disincentives is to establish a benchmark price, which represents the market price for cotton that would prevail in the absence of domestic policy interventions and market inefficiencies. Given that Kenya was a net importer of lint and cottonseed in all years under review, the benchmark price was calculated by taking the average unit value CIF price for both products, weighted by the amount of lint and seed obtained for one unit of processed seed cotton, known as the ginning outturn (GOT). The local GOT of 33 percent was used (RATES, 2003; World Bank, 2005). This means that for every tonne of seed cotton the ginnery processes, 330 kilograms of lint and approximately 670 kilograms of cottonseed are produced. Thus, the benchmark price reflects the seed cotton equivalent of cotton lint and seed.

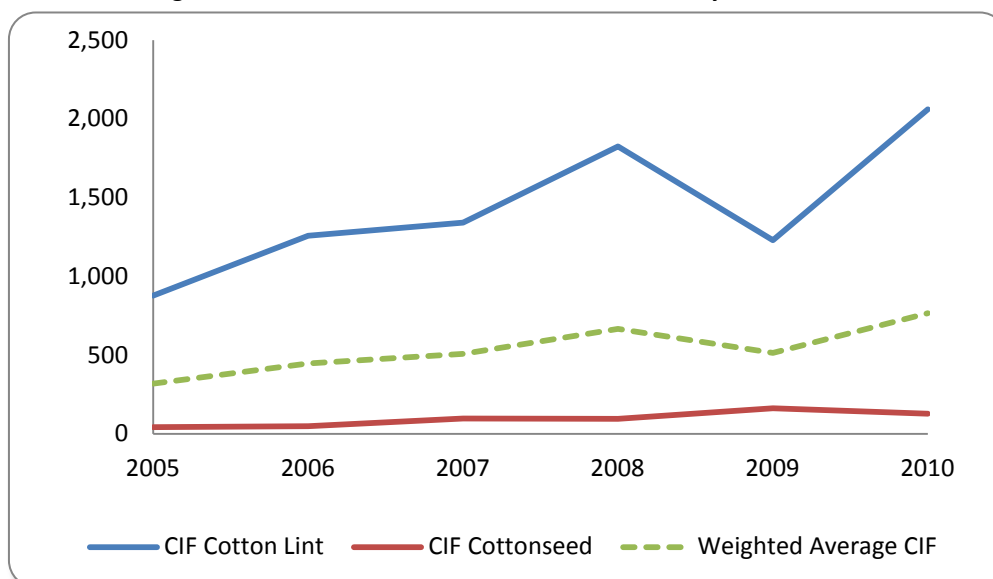
The unit value CIF prices were obtained from UN Comtrade and Global Trade Atlas and then verified using FAOSTAT data. For cotton lint, the prices for "cotton, not carded or combed" (HS code 52031) were used, which is consistent with FAOSTAT data. The CIF prices for each product and the weighted averages are shown in Table 5 and Figure 16.

Table 5: CIF prices for Cotton Lint and Cottonseed in Kenya (USD/Tonne), 2005-2010

	2005	2006	2007	2008	2009	2010
Cotton Lint*	879.1	1,258.5	1,341.3	1,825.7	1,229.2	2,060.9
Cottonseed**	43.8	48.4	97.9	95.7	162.8	127.6
Weighted Seed Cotton CIF Price (0.33 CL; 0.67 CS)	319.5	447.7	508.2	666.6	514.7	765.6

Source: *UN Comtrade; ** FAOSTAT (2005), Global Trade Atlas (2006-2010)

Figure 16: Benchmark Price for Seed Cotton in Kenya, 2005-2010



Source: UN Comtrade, Global Trade Atlas & FAOSTAT

Adjusted

No adjustments to the benchmark price have been made.

DOMESTIC PRICES

Two domestic prices are required for this analysis – the seed cotton equivalent of the prices for lint and cottonseed at the point of competition and the price for seed cotton at the farm gate.

Point of Competition

The prices for both cottonseed and lint at the point of competition were assumed to be the average national prices paid to ginneries at the ginnery gate (ex-ginnery prices). The constructed seed cotton equivalent at the point of competition was calculated as the weighted average of these prices using Kenya's GOT rate of 33 percent for lint and 67 percent for cottonseed.

Ex-ginnery prices for cotton lint were obtained through direct communication with the Cotton Development Authority.

Since Cottonseed prices were difficult to obtain FAOSTAT producer prices for year 2005 to 2009 were used. The prices in 2010 were estimated first by determining to which prices the ex-ginnery prices for cotton seed were more correlated with, farm gate prices for seed cotton or import (CIF) prices for cottonseed. We then took the percentage change between 2009 and 2010 of the more correlated price and applied it to the 2009 ex-ginnery price obtained in FAOSTAT.

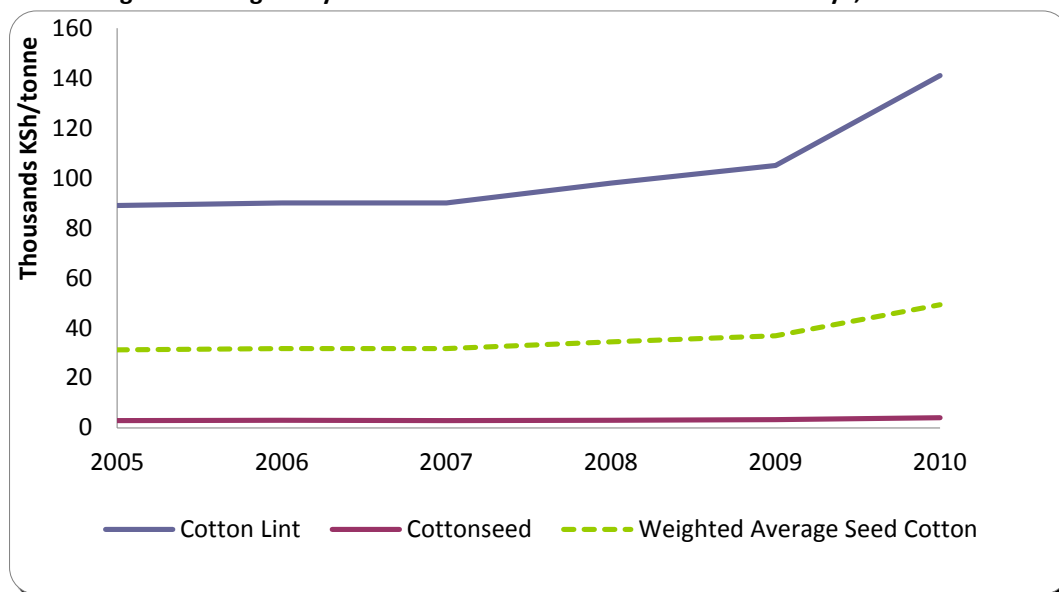
Ex-ginnery prices for local cottonseed showed a stronger correlation with CIF prices for imported cottonseed during the period 2005-2009. It increased by 22 percent between 2009 and 2010 so this increase was applied to the 2009 ex-ginnery price for local cottonseed to estimate its price in 2010. These figures are shown in Table 6 and Figure 17.

Table 6: Domestic Ex-ginnery Prices for Cotton Lint and Cottonseed in Kenya (Ksh/Tonne), 2005-2010

	2005	2006	2007	2008	2009	2010*
Cotton Lint	89,000	90,000	90,000	98,000	105,000	141,000
Cottonseed	2,863.5	3,078.7	2,975.4	3,099.0	3,279.7	4,083.1
Weighted Ex-ginnery Price (0.33 CL; 0.67 CS)	31,288.55	31,762.73	31,693.54	34,416.37	36,847.42	49,265.71

*Estimated as described above. Source: FAOSTAT

Figure 17: Ex-ginnery Prices for Cotton Lint and Cottonseed in Kenya, 2005-2010



Source: CODA (lint) and FAOSTAT (seed).

Farm Gate

National average farm gate prices for seed cotton were available from various sources (see Table 7). In this analysis, prices provided by the Kenyan National Bureau of Statistics (KNBS) were used.

Table 7: Domestic Farm Gate Prices for Seed Cotton in Kenya (Ksh/Tonne), 2005-2010

Source	2005	2006	2007	2008	2009	2010
CODA	20,000	21,000	20,000	22,000	26,000	48,000
KNBS	19,106	21,917	20,452	24,404	25,844	31,411
FAOSTAT	20,853	18,242	20,465	21,029	27,290	26,488

EXCHANGE RATES

Observed

Average nominal exchange rates between the Kenya Shilling and the US Dollar were used in this analysis. The average rates for each year under review (shown in Table 8) were obtained from the World Bank's World Development Indicators database.

Table 8: Average Nominal Exchange Rates, 2005-2010

	2005	2006	2007	2008	2009	2010
Ksh/USD	75.55	72.10	67.32	69.18	77.35	79.23

Source: World Bank

Adjusted

The observed (free market) exchange rate is believed to measure the equilibrium exchange rate. Therefore, no adjustment was necessary.

ACCESS COSTS

Observed

Observed access costs reflect the actual cost of transporting cotton lint from Busia (the border) to Eldoret (the point of competition) and from the cotton production zone (the farm gate) to Eldoret under current market conditions. These costs include all marketing costs and margins, whether they are paid-for services, bribes or taxes.

Border to Point of competition

Due to the lack of data available for cotton lint, the costs for transporting maize were used as a proxy in this analysis. These costs were obtained from the World Bank's 2009 Regional Maize Market and Marketing Costs Analysis and were estimated for the year 2008. As shown in Table 9, they include transport costs⁷, a border crossing cost from Uganda to Kenya and non-tariff fees, which include bribes and the valuation of long delays due to roadblocks and weighbridges. These costs were extrapolated for all years under review using Kenya's Consumer Price Index (CPI) and taking 2008 as the base year. As a truck can't load the same amount of cotton lint as it does of maize, a density conversion factor of 1.9⁸ for the costs is applied. The volume for cottonseed is considered the same as maize. The costs are applied in seed cotton equivalent applying a weighted average for both products.

⁷ Transport costs per tonne in 2008 were derived using the average unit costs (0.11 USD/tonne/km) for transporting maize 300 km from the secondary to the wholesale market. These average unit costs were multiplied by the distance from Busia to Eldoret (316 km) to obtain the total cost per tonne to transport cotton lint from the border to the point of competition, which includes loading and unloading labor.

⁸ Maize has a density of 760 kilograms/m³ and cotton lint of 400 kilograms/m³. A load of lint would weight 400/760 weight of a load of maize, accordingly, a cost of cotton lint would be equivalent to 760/400 (1.9) the cost of maize.

Table 9: Observed Access Costs for Seed Cotton from Busia to Eldoret (Ksh/Tonne), 2005-2010

	2005	2006	2007	2008*	2009	2010
Border crossing from Uganda to Kenya in Busia	575.84	582.69	567.29	671.00	829.36	884.23
Transport costs	2,063.53	2,088.07	2,032.90	2,404.53	2,972.01	3,168.64
Average Non-Tariff costs	429.21	434.31	422.84	500.14	618.17	659.07
Observed Access Costs from Busia to Eldoret for Maize	3,068.6	3,105.1	3,023.0	3,575.7	4,419.5	4,711.9
<i>Access cost for Lint (1.9 cost of maize)</i>	<i>5,830.31</i>	<i>5,899.63</i>	<i>5,743.76</i>	<i>6,793.78</i>	<i>8,397.13</i>	<i>8,952.68</i>
<i>Access Costs for Cottonseed</i>	<i>3,068.58</i>	<i>3,105.07</i>	<i>3,023.03</i>	<i>3,575.67</i>	<i>4,419.54</i>	<i>4,711.94</i>
Weighted average access costs for seed cotton (0.33 lint + .67 seed)	3,979.95	4,027.28	3,920.87	4,637.65	5,732.15	6,111.38

*Base year. Source: World Bank, 2009

Farm Gate to Point of Competition

Observed access costs from the farm gate to the point of competition were obtained from the World Bank's 2005 Cotton-to-Garment Value Chain Analysis and include transportation, handling, administrative costs, ginning, bailing and ginners mark-up. Since these costs were provided in USD per tonne of cotton lint, they were converted to Ksh per tonne of seed cotton using the exchange rate for each year and the GOT rate of 33 percent (this conversion factor is explained in greater detail in the quality and quantity adjustments section).

Average non-tariff costs, which were not included in the World Bank's 2005 Cotton-to-Garment Value Chain Analysis, were added using non-tariff costs reported in the World Bank's 2009 Regional Maize Market and Marketing Costs Analysis. These costs include council cess and the valuation of long delays due to roadblocks and weighbridges. Kenya's CPI was used to extrapolate access costs for years 2005 to 2010, taking 2004 and 2008 as the base years for each respective data source. All itemized costs and calculations are shown in Table 10.

Table 10: Observed Access Costs for Seed Cotton from the Farm Gate to Eldoret (Ksh/Tonne), 2005-2010

Access costs Farm Gate to Spinners (Ksh/tonns of Seed Cotton)							
Concept	2004*	2005	2006	2007	2008	2009	2010
Drying and Cleaning in KSh/tonne Seed Cotton	808.5	888.6	942.2	982.5	1,130.9	1,250.0	1,301.1
Ginning in KSh/tonne Seed Cotton	752.4	826.9	876.8	914.3	1,052.4	1,163.3	1,210.8
Cleaning and Packing in KSh/tonne Seed Cotton	1,026.3	1,128.0	1,196.0	1,247.2	1,435.5	1,586.8	1,651.6
Transport in KSh/tonne Seed Cotton	330.0	362.7	384.6	401.0	461.6	510.2	531.1
Administration in KSh/tonne Seed Cotton	759.0	834.2	884.5	922.3	1,061.7	1,173.5	1,221.4
Ginner Mark-Up (6% selling price)		1,762.2	1,782.0	1,782.0	1,940.4	2,079.0	2,791.8
Sub-Total (Without seed Cotton)	3,676.2	5,802.5	6,066.2	6,249.3	7,082.5	7,762.8	8,707.8
Non-Tariff costs Farm Gate to Spinners (Ksh/tonns of Seed Cotton)							
		2005	2006	2007	2008*	2009	2010
Farm Gate to Primary Market		220.7	234.0	244.0	280.9	310.4	323.1
Council cess		170.1	180.4	188.1	216.5	239.3	249.1
Roadblocks and weighbridges		50.5	53.6	55.9	64.3	71.1	74.0
Primary to Secondary Market		154.9	164.3	171.3	197.1	217.9	226.8
Council cess		73.4	77.8	81.1	93.4	103.2	107.4
Roadblocks and weighbridges		81.5	86.5	90.1	103.8	114.7	119.4
Sub-Total		375.6	398.2	415.3	478.0	528.4	549.9
Total Access Costs		6,178.1	6,464.4	6,664.6	7,560.5	8,291.2	9,257.7

*Base year for access costs from the World Bank's 2005 Cotton-to-Garment VCA. ** Base year for Non-Tariff costs from the World Bank's 2009 Regional Maize Market and Marketing Costs Analysis. Source: World Bank, 2005 & 2009

Adjusted

Adjusted access costs reflect the cost of transporting the commodity from Busia (the border) to Nakuru (the point of competition) and from the cotton production zone (the farm gate) to Nakuru in an efficient, well-functioning market. Thus, all taxes, fees (excluding fees for services), subsidies and non-tariff measures are omitted and “excessive” costs are adjusted.

Border to Point of Competition

To calculate the adjusted access costs from Busia to Eldoret, all non-tariff costs were omitted⁹, thereby, eliminating the cost of bribes and long delays due to roadblocks and weighbridges. No other costs were identified for exclusion or considered excessive and, therefore, were not adjusted. The total adjusted access costs are shown in Table 11.

Table 11: Adjusted Access Costs for Seed Cotton from Busia to Eldoret (Ksh/Tonne), 2005-2010

	2005	2006	2007	2008*	2009	2010
(a) Weighted average access costs for seed cotton (0.33 lint + .67 seed)	3,979.95	4,027.28	3,920.87	4,637.65	5,732.15	6,111.38
(b) Weigthed Non Tariff Cost	556.69	563.30	548.42	648.68	801.77	854.81
Total Adjusted Access Costs (a-b)	3,423.27	3,463.97	3,372.45	3,988.97	4,930.38	5,256.57

*Base year. Source: World Bank, 2009

Farm Gate to Point of Competition

To calculate the adjusted access costs from the farm gate to Eldoret, all non-tariff costs were omitted, thereby, eliminating the cost of council cess and long delays due to roadblocks and weighbridges. No other costs were identified for exclusion or considered excessive and, therefore, were not adjusted. Traditionally, the profit margins of the ginneries have not exceeded more than 6.7 percent of the selling price (RATES, 2003; Ikiara & Ndirangu, 2003; World Bank, 2005).

Table 12: Adjusted Access Costs for Seed Cotton from the Farm Gate to Eldoret (Ksh/Tonne), 2005-2010

Access costs Farm Gate to Spinners (Ksh/tonns of Seed Cotton)							
Concept	2004*	2005	2006	2007	2008	2009	2010
Drying and Cleaning in KSh/tonne Seed Cotton	808.5	888.6	942.2	982.5	1,130.9	1,250.0	1,301.1
Ginning in KSh/tonne Seed Cotton	752.4	826.9	876.8	914.3	1,052.4	1,163.3	1,210.8
Cleaning and Packing in KSh/tonne Seed Cotton	1,026.3	1,128.0	1,196.0	1,247.2	1,435.5	1,586.8	1,651.6
Transport in KSh/tonne Seed Cotton	330.0	362.7	384.6	401.0	461.6	510.2	531.1
Administration in KSh/tonne Seed Cotton	759.0	834.2	884.5	922.3	1,061.7	1,173.5	1,221.4
Ginner Mark-Up (6% selling price)		1,762.2	1,782.0	1,782.0	1,940.4	2,079.0	2,791.8
Sub-Total (Without seed Cotton)	3,676.2	5,802.5	6,066.2	6,249.3	7,082.5	7,762.8	8,707.8

⁹ Weighted according to Kenya's GOT.

EXTERNALITIES

No externalities have been taken into account in the analysis.

BUDGET AND OTHER TRANSFERS

There were no specific budget transfers to cotton producers or ginners, as subsidies or price support, with the exception of the distribution of seeds to farmers. The Government of Kenya has mainly provided targeted support to smallholder farmers in the form of extension and research, as well as a national plan to construct and restore irrigation systems (CODA, 2011).

QUALITY AND QUANTITY ADJUSTMENTS

All prices and access costs are expressed in terms of seed cotton. In computing the benchmark prices, domestic prices at the point of competition and access costs, ratios of 33 percent and 67 percent were used to convert cotton lint and cottonseed to seed cotton, respectively. Therefore, quantity conversions were not needed in the MAFAP template, since all of the conversions were completed before the data was entered.

Even though the literature suggests significant quality differences exist between imported and domestic lint, which affect the conversion ratio from lint to yarn¹⁰, this analysis does not include a quality conversion factor due to the difficulties in obtaining this information from spinners and literature specific to the region. Direct conversation with CODA staff suggested that quality varies along time but it is not exclusively to local lint.

Another quantity conversion that might taken into account as transport costs for other commodities were used as a proxy, are the differences in volume and density between products. In this case, cotton has a lower density than maize, so it requires almost double the amount of space to transport the same weight (400 kg/m² as compared to 760 kg/m²). One way to do this is to convert transport costs per tonne to its cubic meter equivalent. The result was a cost conversion factor of 1:1.9 between lint and maize.

¹⁰ As an example, an integrated mill using imported Indian lint produced 99 kg of yarn from every 100 kg of lint. However, when using local lint, this conversion factor decreases to 60 kg of yarn per 100 kg of lint (World Bank, 2005).

DATA OVERVIEW

Following the discussions above here is a summary of the main sources and methodological decisions taken for the analysis of price incentives and disincentives for cotton in Kenya.

Table 1: Sources of data used in the calculations of indicators

Concept	Description		
	Observed	Adjusted	
Benchmark price	<p>1. A weighted average of unit value CIF prices for cottonseed (HS 120720) and cotton lint (HS 5201) was used to calculate the seed cotton equivalent benchmark price for each year analyzed. CIF prices were obtained from UN Comtrade, Global Trade Atlas and FAOSTAT.</p> <p>2. A regional ginning outturn (GOT) of .36 tonnes of lint (and .64 tonnes of cottonseed) per tonne of seed cotton was used as the conversion factor because it is a more conservative estimate of the regional average GOT, which ranges from .36 to .40 (RATES, 2003 and World Bank, 2005).</p>	N.A.	
Domestic price at point of competition	<p>3. A weighted average of ex-ginnery prices for cottonseed and cotton lint was used to obtain the seed cotton equivalent price at the point of competition. Data was obtained from CODA (lint) and FAOSTAT (seed).</p> <p>4. Kenya's ginning outturn (GOT) of .33 tonnes of cotton lint (and .67 tonnes of cottonseed) per tonne of seed cotton was used as the conversion factor (RATES, 2003 and World Bank, 2005).</p>	N.A.	
Domestic price at farm gate	<p>5. The price for seed cotton paid to the farmers was obtained from the Kenya National Bureau of Statistics.</p>	N.A.	
Exchange rates	<p>6. Average nominal exchange rates reported by the World Bank.</p>	N.A.	
Access costs from border to point of competition	<p>7. Itemized costs were based on 2008 estimates from the World Bank's 2009 Regional Maize Market and Marketing Costs Analysis. Kenya's CPI was used to extrapolate costs for all other years based on 2008 figures.</p>	<p>8. Adjusted access costs were calculated the same way as observed access costs. However, non-tariff costs (bribes and long delays in weighbridges and roadblocks) were omitted.</p>	
Access costs from farm gate to point of competition	<p>9. Itemized costs were based on 2004 estimates from the World Bank's 2005 Cotton-to-Garment VCA and 2008 estimates for non-tariff costs from the World Bank's 2009 Regional Maize Market and Marketing Costs Analysis. Kenya's CPI was used to extrapolate costs for all other years based on 2004 and 2008 figures from each respective data source.</p> <p>10. Ginners, spinners and farmers were assumed to be within the same general area.</p>	<p>11. Adjusted access costs were calculated the same way as observed access costs. However, non-tariff costs (bribes and long delays in weighbridges and roadblocks) were omitted.</p>	
QT adjustment	Bor-Wh	A regional GOT (36%) was applied directly to CIF prices.	N.A.
	Wh-FG	Kenya's GOT (33%) was applied directly to all access costs and ex-ginnery prices.	N.A.
QL adjustment	Bor-Wh	Data on quality differences between imported and domestic cotton lint were not available. Therefore, no quality conversions were applied in this analysis.	N.A.
	Wh-FG		N.A.

CALCULATION OF INDICATORS

The indicators and the calculation methodology used are described in Box 1. A detailed description of the calculations and data requirements is available on the MAFAP website or by clicking [here](#).

Box 1: MAFAP POLICY INDICATORS

MAFAP analysis uses four measures of market price incentives or disincentives. *First*, are the two observed nominal rates of protection one each at the wholesale and farm level. These compare observed prices to reference prices free from domestic policy interventions.

Reference prices are calculated from a benchmark price such as an import or export price expressed in local currency and brought to the wholesale and farm levels with adjustments for quality, shrinkage and loss, and market access costs.

The **Nominal Rates of Protection - observed (NRPo)** is the price gap between the domestic market price and the reference price divided by the reference price at both the farm and wholesale levels:

$$NRPo_{fg} = \frac{(P_{fg} - RPo_{fg})}{RPo_{fg}}; \quad NRPo_{wh} = \frac{(P_{wh} - RPo_{wh})}{RPo_{wh}};$$

The $NRPo_{fg}$ captures all trade and domestic policies, as well as other factors which impact on the incentive or disincentive for the farmer. The $NRPo_{wh}$ helps identify where incentives and disincentives may be distributed in the commodity market chain.

Second are the **Nominal Rates of Protection - adjusted (NRPa)** in which the reference prices are adjusted to eliminate distortions found in developing country market supply chains. The equations to estimate the adjusted rates of protection, however, follow the same general pattern:

$$NRPa_{fg} = \frac{(P_{fg} - RPa_{fg})}{RPa_{fg}}; \quad NRPa_{wh} = \frac{(P_{wh} - RPa_{wh})}{RPa_{wh}};$$

MAFAP analyzes market development gaps caused by market power, exchange rate misalignments, and excessive domestic market costs which added to the $NRPo$ generate the $NRPa$ indicators. Comparison of the different rates of protection identifies where market development gaps can be found and reduced.

In this analysis, only Nominal Rates of Protection were calculated. The NRA includes budgetary and other transfers. In the case of tobacco in Malawi, calculations of transfers that can be assigned to tobacco production will be calculated and incorporated in a revised version of this technical note. When transfers have been included, the Nominal Rate of Assistance will also be calculated.

Nominal Rates of Protection were calculated and the results are presented in Tables 13-15.

Table 13: MAFAP Price Gaps for Cotton in Kenya (Ksh/Tonne), 2005-2010

	2005	2006	2007	2008	2009	2010
Trade status for the year	m	m	m	m	m	m
Observed price gap at competition point	3,168.52	(4,549.42)	(6,441.21)	(16,338.73)	(8,704.10)	(17,510.00)
Adjusted price gap at competition point	3,725.20	(3,986.11)	(5,892.78)	(15,690.05)	(7,902.33)	(16,655.19)
Observed price gap at farm gate	(2,835.93)	(7,930.74)	(11,018.14)	(18,790.58)	(11,416.33)	(26,106.98)
Adjusted price gap at farm gate	(2,654.83)	(7,765.68)	(10,884.99)	(18,619.90)	(11,142.92)	(25,802.10)

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

Table 14: MAFAP Nominal Rates of Protection (NRPs) for Cotton in Kenya (%), 2005-2010

	2005	2006	2007	2008	2009	2010
Trade status for the year	m	m	m	m	m	m
Observed NRP at competition point	11.27%	-12.53%	-16.89%	-32.19%	-19.11%	-26.22%
Adjusted NRP at competition point	13.52%	-11.15%	-15.68%	-31.31%	-17.66%	-25.27%
Observed NRP at farm gate	-12.92%	-26.57%	-35.01%	-43.50%	-30.64%	-45.39%
Adjusted NRP at farm gate	-12.20%	-26.16%	-34.74%	-43.28%	-30.13%	-45.10%

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

Table 15: MAFAP Market Development Gaps for Cotton in Kenya (Ksh/Tonne), 2005-2010

	2005	2006	2007	2008	2009	2010
Trade status for the year	m	m	m	m	m	m
International markets gap (IRG)	-	-	-	-	-	-
Exchange policy gap (ERPG)	-	-	-	-	-	-
Access costs gap to competition point (ACG _{wh})	556.69	563.30	548.42	648.68	801.77	854.81
Access costs gap to farm gate (ACG _{fg})	(375.58)	(398.25)	(415.28)	(478.00)	(528.36)	(549.94)
Externality gap	-	-	-	-	-	-

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

4. INTERPRETATION OF THE INDICATORS

Figures 18-20 show the results for the set of MAFAP indicators generated, which include price gaps, Nominal Rates of Protection (NRPs) and Market Development Gaps (MDGs) at wholesale (point of competition) and farm gate. Price gaps are market price differentials between the commodity's domestic and reference parity price in each respective year. More conceptually, they provide an absolute measure of the extent to which producers and ginners are protected under the existing market conditions and structure, while NRPs express this measure of protection as ratios that are comparable across countries and commodities. MDGs measure the gap between the observed and adjusted access costs, which helps identify potential inefficiencies along the value chain that may be affecting the level of protection provided to producers and ginners, as well as the overall marketability of cotton in Kenya.

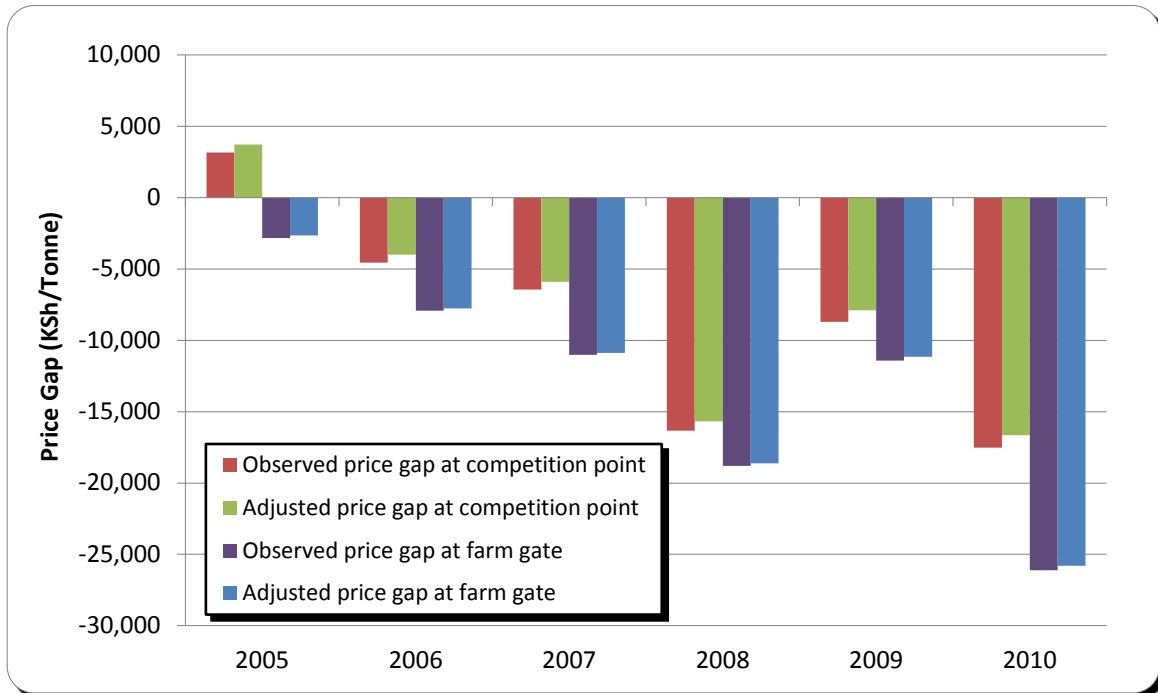
Price Gaps and Nominal Rates of Protection (NRPs) at Point of Competition

At the point of competition (ex-ginnery), the average observed and adjusted NRP throughout the period under review was -16 and -15 percent, respectively. As shown in Figures 18-19, the observed price gaps and NRPs were negative in all years except 2005, indicating that ginners are receiving market disincentives. The observed NRP was highest in 2005 at 11 percent and lowest in 2008 at -32 percent. The higher NRP in 2005 was mainly due to a low benchmark price that year. After 2005, a constant increase in import prices, combined with stable ex-ginnery selling prices, resulted in a decreasing NRP for the rest of the period, with the lowest NRP in 2008, when import prices peaked. However, it is important to note that in the following year, a significant decrease in the import price occurred, which didn't affect the ex-ginnery price, so the price gap and NRP in that year increased. This trend suggests that ex-ginnery prices remained relatively stable compared to the international prices. Thus the NRPs increased when import prices went down and decreased when import prices went up. This might be due to the price setting policy implemented in the sector.

Price Gaps and Nominal Rates of Protection (NRPs) at Farm Gate

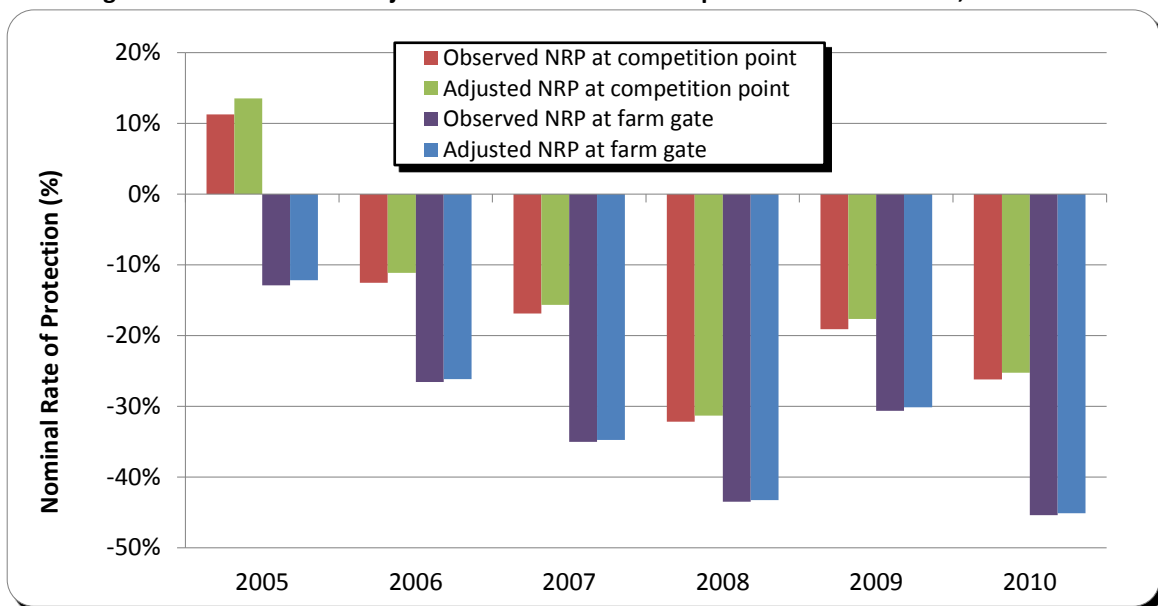
At the farm gate level, the average observed and adjusted NRP throughout the period under review were -32 and -31 percent, respectively. As shown in Figures 18-19, the observed price gaps and NRPs were negative in all years, indicating that seed cotton farmers are receiving market disincentives. The observed NRP was highest in 2005 at -13 percent and lowest in 2010 at -45 percent. Similar to the ex-ginnery level situation, the NRP at farm gate generally decreased as import prices rose throughout the period under review, with a slight increase in 2009, when import prices dipped. This slight increase in protection in this year suggests that prices at the farm gate level were not as adversely affected by the decrease in the import price possibly due to floor prices set for farmers each season.

Figure 18: Observed and Adjusted Price Gaps at Point of Competition and Farm Gate, 2005-2010



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

Figure 19: Observed and Adjusted NRPs at Point of Competition and Farm Gate, 2005-2010

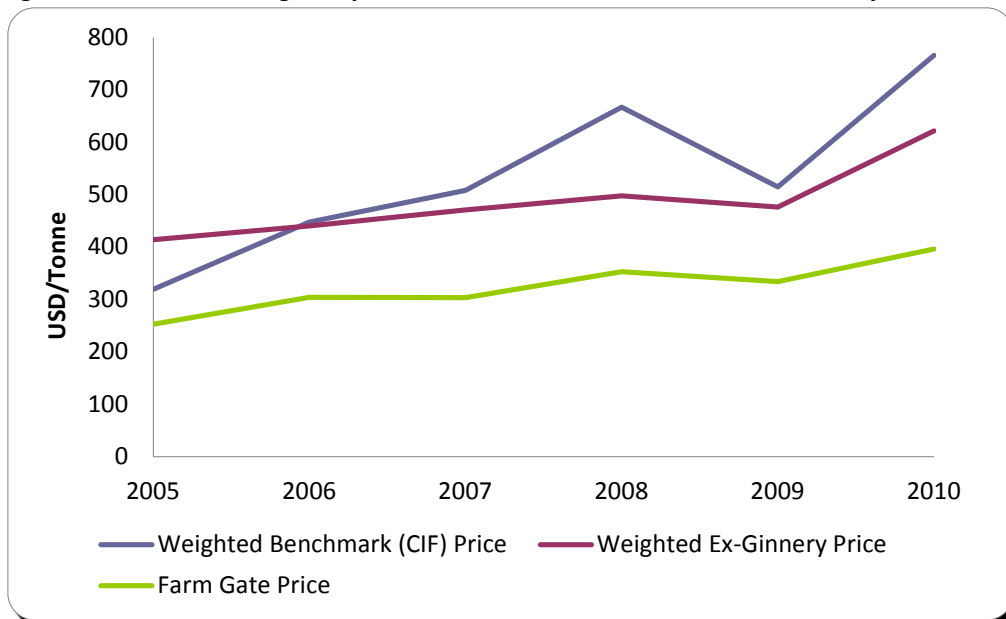


Source: Author's own calculations using data as described above.

Price Dynamics at Point of Competition and Farm Gate

Figure 18 shows a general increase in price gaps at the ex-ginnery and farm gate levels throughout the period analyzed. This is mainly explained by the increase in import (benchmark) prices in all years, except 2009, which was generally not proportionally reflected in the domestic prices, as shown in Figure 20. As import prices went up and domestic prices remained low, the NRPs showed a decreasing trend for both farmers and ginners (Figure 19). This result is likely due to two key factors, which are discussed in more detail in the next section: (1) spinners' and textile mills' monopsony power over ginners and consequently over cotton farmers; and (2) significant differences in the quantity supply of local lint relative to cotton lint imports.

Figure 20: Farm Gate, Ex-ginnery and Benchmark Prices for Seed Cotton in Kenya, 2005-2010



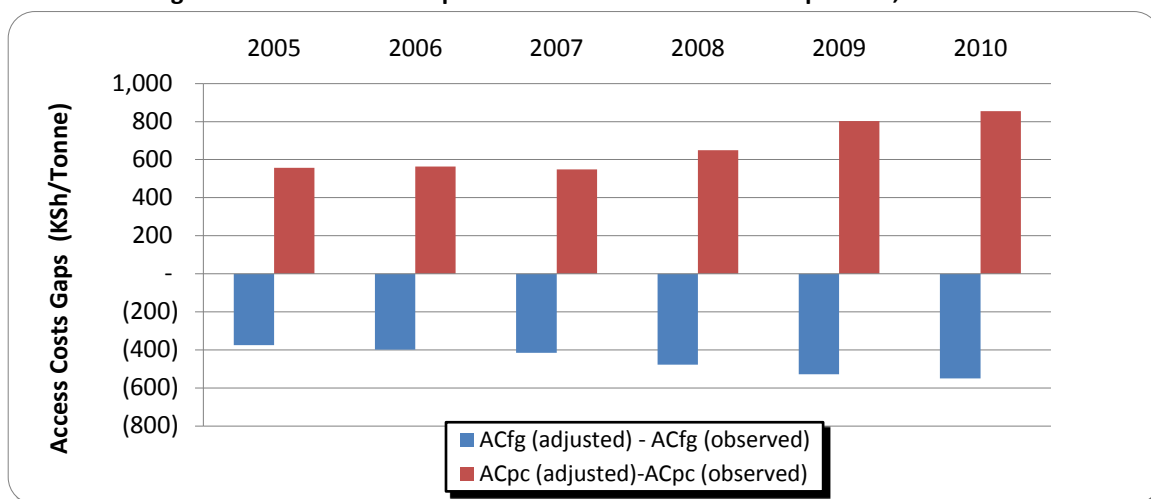
Source: FAOSTAT, UN Comtrade, GTA & CODA

Market Development Gaps (MDGs)

Given that no international trade tariffs, subsidies or quotas are applied to cotton in Kenya, it is assumed that the negative protection at the ex-ginnery and farm gate might be a direct result of market structure and inefficiencies affecting economic agents along the value chain. Some of these inefficiencies are reflected in the access costs gaps from the border to the point of competition and from the farm gate to the point of competition shown in Figure 21, which are mainly due to non-tariff trade barriers, such as council cess, bribes paid at roadblocks and excessive delays at weighbridges. The gaps show a general increasing trend during the period under review. However, this trend is mainly explained by the use of Kenya's CPI to extrapolate access costs based on figures for years 2004 and 2008.

The identified access costs gaps were low in all years and, therefore, do not represent a large proportion of the total observed access costs (1 percent of the adjusted farm gate reference price). However, this may be due to incomplete information regarding non-tariff trade barriers and "excessive" margins of middlemen economic agents along each segment of Kenya's cotton value chain.

Figure 21: Access Costs Gap to Farm Gate and Point of Competition, 2005-2010



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

5. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

MAIN MESSAGE

Kenya's cotton sector has significant potential to increase incomes for farmers in ASAL regions due to its institutional framework and the presence of a thriving textile industry and the industry's preferential trade agreement with the United States, which has expanded the export market for Kenyan textiles. However, due to the sector's market structure and high disincentives faced by the farmers and the primary textile industry (ginneries) described in this analysis, the cotton sector has not reached its potential and cotton growers have not been able to take full advantage of the national demand for cotton lint inputs, leaving the textile industry highly dependent on imports. Thus, the results of this analysis indicate that farmers and ginneries receive negative protection and, therefore, face significant market price disincentives to production.

These disincentives are mainly due to spinners' and textile mills' market power over ginners and consequently over farmers. Under these market conditions, losses borne by primary level producers are gains for secondary level producers, as spinners and millers seem to have better access to market information and control over prices.

In addition to a monopsony market structure, primary level producers face several critical issues, which raise production costs and reduce the value of their products. The first, and perhaps the most important issue, is the poor quality cottonseeds used by farmers for planting, which result in low yields and low quality outputs that, in turn, adversely affect the volume and quality of lint outputs produced by ginners. Other issues include the lack of government support (i.e. no trade tariffs or subsidies to producers), and producers' poor access to credit, as well as out-dated ginnery equipment, which adversely affects the ginning outturn and spinning quality of lint produced.

Finally, CODA's apparent lack of effective regulatory power and Kenya's general high transportation and energy costs are issues that need to be addressed in order to improve the cotton sector and increase returns for primary producers.

PRELIMINARY RECOMMENDATIONS

Agricultural support to farmers is a key initiative of Kenya's national poverty reduction and economic growth strategy, which specifically targets the cotton sector to increase its competitiveness through improved yields, quality, and logistics, as well as reduced costs. Furthermore, the CODA has established several strategies to strengthen the cotton sector, including the establishment of an Apex cotton stakeholder's forum, the promotion of access to inputs and credit, the implementation of a collaborative seed production and management system and research and extension support to producers through the Kenya Agricultural Research Institute (KARI).

Although Kenya's existing strategies address many of the issues described in this analysis, they should be accompanied by efforts to increase market organization among primary producers and producers' access to market information in order to increase their bargaining power and reduce the market power of spinners and textile mills. They should also be accompanied by more broad based initiatives to reduce the cost of electricity and transportation through infrastructure improvements and the removal of taxes and other fees levied on traders transporting agricultural inputs and products.

As mentioned previously, improving the quality of cottonseed available to farmers is a critical issue that can only be addressed through the cooperation of both farmers and ginners, since ginners produce a large portion of the seed available to farmers for planting. There is a need for both groups to agree on formal quality standards for cottonseed, which could be enforced by CODA in collaboration with stakeholder groups and producer organizations. Producing higher quality cottonseeds may, however, require better ginning equipment. Thus, the government could help ginners gain access to credit for necessary capital improvements. Increasing the quality of cottonseed used for planting will also increase the quantity and quality of seed cotton inputs available for ginners, which will raise the value of ginners' cotton lint outputs and potentially increase their returns, thereby, creating more favourable conditions for additional investment in ginners.

LIMITATIONS

- Lack of detailed transport costs (from the border to the point of competition) that are specific to cotton.
- Lack of sufficient information regarding the relationship between ginners and spinners.
- Lack of information regarding the difference in quality between local and imported lint. This seems to be relevant for the construction of indicators, as cotton prices vary significantly according to quality.

FURTHER INVESTIGATION AND RESEARCH

- Further investigate potential informal trade of seed cotton. The concentration of several ginneries near the Ugandan border might imply some unregistered trade of Ugandan seed cotton for ginnery processing in Kenya;
- Further detailed investigation of the cottonseed processing segment, as well as the ginners to spinners segment of the cotton-to-garment value chain.
- Explore potential export market opportunities for Kenyan cotton lint as an alternative market outlet for local producers, which may help to alleviate the adverse effect of spinners' market power over prices.

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ANNEX I: Methodology Used

A guide to the methodology used by MAFAP can be downloaded from the MAFAP website or by clicking [here](#).

ANNEX II: Data and calculations used in the analysis

DATA	Unit	Symbol	Year trade status	2005	2006	2007	2008	2009	2010
				m	m	m	m	m	m
Benchmark Price									
Observed	USD/TONNE	$P_{b(int)}$		319.5	447.8	508.2	666.7	514.8	765.6
Adjusted	USD/TONNE	P_{ba}							
Exchange Rate									
Observed	KSH/USD	ER_o		75.6	72.1	67.3	69.2	77.4	79.2
Adjusted	KSH/USD	ER_a							
Access costs border - point of competition									
Observed	KSH/TONNE	ACo_{wh}		3,980.0	4,027.3	3,920.9	4,637.6	5,732.1	6,111.4
Adjusted	KSH/TONNE	ACa_{wh}		3,423.3	3,464.0	3,372.4	3,989.0	4,930.4	5,256.6
Domestic price at point of competition	KSH/TONNE	P_{dwh}		31,288.5	31,762.7	31,693.5	34,416.4	36,847.4	49,265.7
Access costs point of competition - farm gate									
Observed	KSH/TONNE	ACo_{fg}		6,178.1	6,464.4	6,664.6	7,560.5	8,291.2	9,257.7
Adjusted	KSH/TONNE	ACa_{fg}		5,802.5	6,066.2	6,249.3	7,082.5	7,762.8	8,707.8
Farm gate price	KSH/TONNE	P_{dfg}		19,106.0	21,917.0	20,452.0	24,404.0	25,844.0	31,411.0
Externalities associated with production	KSH/TONNE	E							
Budget and other product related transfers	KSH/TONNE	BOT							
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}		1.0	1.0	1.0	1.0	1.0	1.0
Quantity conversion factor (border - point of competition)	Fraction	QL_{wh}		1.0	1.0	1.0	1.0	1.0	1.0
Quantity conversion factor (point of competition - farm gate)	Fraction	QT_{fg}		1.0	1.0	1.0	1.0	1.0	1.0
Quantity conversion factor (point of competition - farm gate)	Fraction	QL_{fg}		1.0	1.0	1.0	1.0	1.0	1.0

CALCULATED PRICES				2005	2006	2007	2008	2009	2010
	Unit	Symbol							
Benchmark price in local currency	Observed	KSH/TONNE	P _{b(loc\$)}	24,140.08	32,284.87	34,213.88	46,117.45	39,819.37	60,664.33
	Adjusted	KSH/TONNE	P _{b(loc\$)a}	24,140.08	32,284.87	34,213.88	46,117.45	39,819.37	60,664.33
Reference Price at point of competition	Observed	KSH/TONNE	RP _{o_{wh}}	28,120.03	36,312.15	38,134.75	50,755.10	45,551.51	66,775.71
	Adjusted	KSH/TONNE	RP _{a_{wh}}	27,563.34	35,748.85	37,586.33	50,106.42	44,749.75	65,920.90
Reference Price at Farm Gate	Observed	KSH/TONNE	RP _{o_{fg}}	21,941.93	29,847.74	31,470.14	43,194.58	37,260.33	57,517.98
	Adjusted	KSH/TONNE	RP _{a_{fg}}	21,760.83	29,682.68	31,336.99	43,023.90	36,986.92	57,213.10
INDICATORS				2005	2006	2007	2008	2009	2010
	Unit	Symbol							
Price gap at point of competition	Observed	KSH/TONNE	PG _{o_{wh}}	3,168.52	(4,549.42)	(6,441.21)	(16,338.73)	(8,704.10)	(17,510.00)
	Adjusted	KSH/TONNE	PG _{a_{wh}}	3,725.20	(3,986.11)	(5,892.78)	(15,690.05)	(7,902.33)	(16,655.19)
Price gap at farm gate	Observed	KSH/TONNE	PG _{o_{fg}}	(2,835.93)	(7,930.74)	(11,018.14)	(18,790.58)	(11,416.33)	(26,106.98)
	Adjusted	KSH/TONNE	PG _{a_{fg}}	(2,654.83)	(7,765.68)	(10,884.99)	(18,619.90)	(11,142.92)	(25,802.10)
Nominal rate of protection at point of competition	Observed	%	NRPO _{wh}	11.3%	-12.5%	-16.9%	-32.2%	-19.1%	-26.2%
	Adjusted	%	NRPA _{wh}	13.5%	-11.2%	-15.7%	-31.3%	-17.7%	-25.3%
Nominal rate of protection at farm gate	Observed	%	NRPO _{fg}	-12.9%	-26.6%	-35.0%	-43.5%	-30.6%	-45.4%
	Adjusted	%	NRPA _{fg}	-12.2%	-26.2%	-34.7%	-43.3%	-30.1%	-45.1%
Nominal rate of assistance	Observed	%	NRA _o	-12.9%	-26.6%	-35.0%	-43.5%	-30.6%	-45.4%
	Adjusted	%	NRA _a	-12.2%	-26.2%	-34.7%	-43.3%	-30.1%	-45.1%
Decomposition of PWA _{fg}				2005	2006	2007	2008	2009	2010
	Unit	Symbol							
International markets gap	KSH/TONNE	IRG		-	-	-	-	-	-
Exchange policy gap	KSH/TONNE	ERPG		-	-	-	-	-	-
Access costs gap to point of competition	KSH/TONNE	ACG _{wh}		556.69	563.30	548.42	648.68	801.77	854.81
Access costs gap to farm gate	KSH/TONNE	ACG _{fg}		(375.58)	(398.25)	(415.28)	(478.00)	(528.36)	(549.94)
Externality gap	KSH/TONNE	EG		-	-	-	-	-	-



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