Enhancing Competitiveness of Kenya's Cotton and Textile Sector

Christopher Onyango
Fred Miencha
Nicholas Waiyaki
John Omiti
Jane Kiringai

Productive Sector Division
Kenya Institute for Public Policy
Research and Analysis

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Abstract

Cotton farming is a major source of livelihood for rural households in Kenya. It is characterized by a large number of small holder farmers, hence making it a priority crop for improving livelihood and reducing poverty. Besides, value added activities along the cotton value chain have potential for creating new jobs for semi and unskilled workers. Concerns about declining performance of the sector after liberalization of Kenya's economy in the 1990's generated efforts towards its revitalization and sustainable development. Domestically, the key issues have been high costs of inputs, particularly fertilizers and agrochemicals, supply of poor quality seed cotton, dilapidated and old machineries and weak institutional and commercial linkages. At the global level, cotton production and trade is highly distorted by subsidies particularly by the large players like the United States, China and the European Union. These and other factors have depressed domestic cotton productions leading to losses in incomes, unemployment and under utilized capacities.

This study evaluated the cotton sector as an integrated production network where production is sliced into specialized activities and each activity is located where it can contribute the most to the value of the product. In this framework, institutional and governance structures are assumed to play a critical role in determining information flow about production and market attributes along the cotton value chain. The study established that opportunities for value adding activities exist at the four basic levels of the value chain; production, ginning, milling and markets. Furthermore, although Kenya has limited scope in the use of tariff measures due to existing trade commitments, simulation results indicate that increasing currently applied tariffs on imported textile products by 100 per cent can curb competitive pressure from imported cotton products, thereby encouraging increased domestic cotton production and capacity utilization. However, this requires appropriate product market regulations and incentives to generate trickle down effects by stimulating production of intermediate inputs and services along the value chain.

In order to enhance the competitiveness of the cotton sector, the study recommends increased funding to the sector in the form of direct government expenditures, venture capitals and negotiated credit schemes. Besides, attraction of capital investments in new technologies and improvement in the status of physical infrastructure including

roads, water supply and energy supply are expected to raise the productivity and profitability of both farm and non farm activities along the value chain. Finally, the study also recommends fiscal measures to facilitate effective regulation and control of imported second hand and new textile products.

Abbreviations and Acronyms

ACP	African Caribbean and Pacific
AGOA	African Growth and Opportunity Act
ASAL	Arid and Semi Arid Lands
ATC	Agreement on Textiles and Clothing
CoDA	Cotton Development Authority
CDS	Cotton Development Secretariat
CGE	Computable General Equilibrium
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EPZ	Export Processing Zones
ESA	Eastern and Southern Africa
EU	European Union
GDP	Gross Domestic Product
GDS	Global Development Solutions
GOT	Ginning Out Turn
ICAC	International Cotton Advisory Committee
IFPRI	International Food Policy Research Institute
KARI	Kenya Agricultural Research Institute
KIE	Kenya Industrial Estates
KIPPRA	Kenya Institute for Public Policy Research and Analysis
MFA	Multi-Fibre Arrangement
MUB	Manufacturing Under Bond
MVA	Manufactured Value Addition
NIE	New Institutional Economics
NCPA	National Cottonseed Products Association
NESC	National Economic and Social Council
ODI	Overseas Development Institute
PPCB	Pest Product Control Board

RMMTC	Regional Model Manufacturing and Textile Training Centre
ROW	Rest of the World
SAM	Social Accounting Matrix
SMEs	Small and Medium Enterprises
SSA	Sub Sahara Africa
USA	United States of America
VAT	Value Added Tax
WTO	World Trade Organization

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1.   Introduction

Cotton farming is a major source of livelihood for rural households in Kenya. It is estimated that the cotton sub-sector has potential to support up to 8 million people, majority of who live in poor arid and semi arid lands (ASALs) with limited opportunities for development (Ikiara and Ndirangu, 2003). Prior to liberalization of the Kenyan economy in the 1990s, cotton industry experienced a remarkable performance. The industry was government controlled during the first two decades of independence (Nyangito, 2003). The government was instrumental in the acquisition of private ginneries through cooperative societies and establishment of guaranteed farm-gate prices to farmers among other measures. Consequently, there was increased production of cotton reaching 70,000 bales of lint in 1984 (Global Development Solutions, 2004). The trend changed after liberalization of the economy and reduced donor support during the 1980s. The entire cotton sector had literally collapsed by 1991.

Successive Development Plans in Kenya have identified the cotton sector as among those with prospects to propel economic growth and development. In particular, *Sessional Paper No. 2 of 1997 on Industrial Transformation to the Year 2020* and the *8th* and *9th Development Plans* for the periods 1997-2001 and 2002-2007 respectively, stipulate medium and long-term strategies for industrial transformation through increasing value added activities along the cotton supply chain. In addition, cotton can grow well in arid and semi-arid lands with minimal rainfalls. Cotton growing in Kenya is also characterized by a large number of smallholder farmers, making it a priority and ideal crop for improvement of livelihood and poverty reduction.

Greater efforts are being directed towards reviving the sector amidst severe external and internal challenges. Key among the external factors include increased production and trade in cotton and distortions arising from government policy interventions, notably in the US, China and EU (Overseas Development Institute, 2004). These have led to a strong global downward trend of cotton prices which influence the world cotton supply and demand including improved technology, development of new cotton areas and competition from synthetic fibres (Townsend, 2006). In addition, domestic support measures by governments of major players in the cotton industry like the United States, China and the European Union to farmers also distort production and trade (Organization for Economic Cooperation and Development, 2005).

Previous attempts to revitalize the cotton sector in Kenya in light of the aforementioned challenges have been largely unsuccessful. After 2001, the latest institutional and legal reforms initiated by the government appeared to yield positive results but met initial expectations only partially. This could partly be attributed to the mentality of produce-and-then-sell, which is being quickly replaced by the strategy of determining consumer attributes, product differentiation and value addition (Coltrain *et al.*, 2000).

The Kenya Vision 2030 stipulates that value addition is among the priority activities envisaged to drive Kenya's economy into an industrial status. However, the framework for identifying opportunities and selecting ventures are not clearly defined. This study explores the modalities of exploiting the potential of the cotton industry by engaging in processing new products, enhancing capacity utilization and adding value to meet international competitiveness for effective and sustainable markets.

1.1 Research Problem

The performance of the cotton sector in Kenya took a downward trend after liberalization of the economy in the 1980s amidst weak and inefficient institutional and commercial linkages and governance structures. Presently, cotton farmers face high costs of inputs, particularly fertilizers and agrochemicals. The ginners often complain about poor quality cotton seed and lack incentives for upgrading dilapidated and old machineries while many textile manufacturers cannot effectively compete in the domestic and external markets. Consequently, returns to cotton farmers have been dwindling and many have abandoned its production leading to loss of jobs along the cotton value chain. While about 384,500 hectares of irrigated and rain-fed land is available for cotton production, only 10.4 per cent or 40,000 hectares is under cultivation. Hence, local manufacturers supply only 45 per cent of Kenya's textile market requirements due to reduced production. In addition, cotton ginners operate under very low capacity utilization of about 20,000 bales per annum against an installed capacity of 140,000 bales per annum (Government of Kenya, 2007a).

Further, locally produced cotton is considered to be of poor quality and value. Thus, in order to meet the high international standards in external markets, the Export Processing Zone (EPZ) factories are compelled to

import over 80 per cent of all fabric and other accessories. In addition, the poor infrastructure, lack of venture capital and high interest rates have made Kenya relatively unattractive to investors and affected the demand for long-term capital investment in textile mills. This is largely evident by the short-term investment strategies adopted by EPZ clothing companies, specifically focusing on the market access preferences under Africa Growth and Opportunity Act (AGOA). Low investments and lack of innovativeness make cotton to be grown for its fabrics only, yet seed cotton can produce several high value byproducts.

1.2   Objectives of the Study

The overall objective of this study is to identify value-adding activities in the cotton value chain and associated incentives necessary to trigger increased cotton production in line with the aspirations of the Vision 2030. The specific objectives include:-

(i)   Examine the production and marketing framework for cotton and textiles

(ii)   Identify value-adding activities in the cotton value chain

(iii) Identify key opportunities and challenges in the cotton value chain

(iv)   Assess the impacts of tariff policy simulations on revenue, incomes and capacity utilization in the cotton industry

(v)   Recommend policy interventions that can enhance value addition competitiveness of the domestic cotton sector

1.3   Motivation

The cotton industry is unique in many aspects and its history of transforming many countries into the middle or high-income have made it suitable as a first rung on the industrialization ladder in many poor countries (Hildegunn, 2004). It is widely acknowledged that adding value to agricultural products before they reach the market improves economic well-being through employment creation and generation of higher incomes. Unfortunately, the value-added export-oriented activities that have driven the growth of many dynamic developing economies are not well developed in Kenya (McCormick and Rogerson, 2004). In that respect, only a few export-oriented labour intensive activities exist,

resulting into low share of exported cotton and textile products in the world market. Besides, inter-industry linkages are quite superficial and technology low as evident by low labour productivity, high unit labour costs and low capital labour ratio in the textile and garment sector.

A number of studies regarding constraints and challenges that hinder development of the cotton sector in Kenya have been done before (European Union, 2004; Global Development Solutions, 2004; Ikiara and Ndirangu, 2003; and RATES, 2003). This study builds on previous studies by identifying specific strategies that could facilitate long term sustainable development of the cotton industry. This is necessary especially as the domestic textile and apparel sub sector continue to face stiffer competition from imported fabrics and clothing and also from domestic support given to cotton farmers in large developing and developed countries. The major competition is from second hand clothes, synthetics and counterfeit products (International Cotton Advisory Committee, 2008a and 2008b). Although widely seen to fill the domestic supply gaps and create jobs to thousands of people, imported textile products cut off domestic cotton production and also pose serious health hazards to unsuspecting buyers. Moreover, major changes in the global economic environment and technological advances have brought new challenges to small scale cotton producers like Kenya. Reduced trade restrictions following the global free tree trade initiatives, directly impact on the competitiveness and profitability of domestic cotton farmers.

Besides, there are huge market opportunities for cotton and textile-related products in domestic and external markets. The domestic fabric demand greatly outstrips domestic supply. It is estimated that fabric requirement in Kenya currently stands at 225 million square meters against production of 57.5 million square meters (Government of Kenya, 2007). In the export market, textile exports from Kenya currently enjoy preferential access to regional and world markets under various trade agreements, including the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), the African Growth and Opportunity Act (AGOA) and the Cotonou Partnership Agreement. The potential for increased supply of these markets from local production is therefore high.

1.4   Methodology and Data Sources

The study used mainly secondary data from various sources including the Ministry of Agriculture, Kenya Revenue Authority, Kenya National Bureau of Statistics, the Export Processing Zones Authority (EPZA) and the Cotton Development Secretariat. Data included statistics on domestic production of cotton and cotton seeds, lint, yarn, fabrics and garments, import duties, domestic taxes and levies and value of imported cotton and textile related products as well as employment data. Previous studies on the cotton sub sector mainly by European Union (2004), Global Development Solutions (2004) and Ikiara and Ndirangu (2003), were reviewed to ascertain the main constraints in the cotton sub sector. Consultations with key stakeholders were also conducted in selected parts of the country. The study used the Computable General Equilibrium (CGE) and partial equilibrium analysis to capture the economy-wide and sectoral impacts fiscal policy measures on household incomes, government revenues, capacity utilization and employment. The results from the above analyses were used to draw policy recommendations.

2.   Literature Review

2.1   Conceptual Framework

The conceptual framework used in this study is part of New Institutional Economics (NIE) as set out by Williamson (2000). In this framework, Williamson makes a distinction between four levels of institutional analysis featuring Informal institutions (L1), Institutional environment (L2), Governance (L3) and Resource Allocation and Employment (L4) as shown in Figure 2.1. The last three levels fit well in the description and analysis of value addition in agriculture and organizational issues in the cotton value chain. The fundamental assumptions are that institutional environment (L2) sets the stage for formal rules critical for enforcement of property rights, policies and contractual arrangements as structural changes in production occur. Williamson (2000) argues that a private-enterprise system cannot work properly unless property rights are created in resources and this is done when someone wishing to use a resource has to pay the owner to obtain it. Once property rights have been defined and their enforcement assured, some order occurs, the government steps aside and the legal system is necessary to arbitrate disputes (Coase, 1959).

Figure 2.1: The economics of institutions
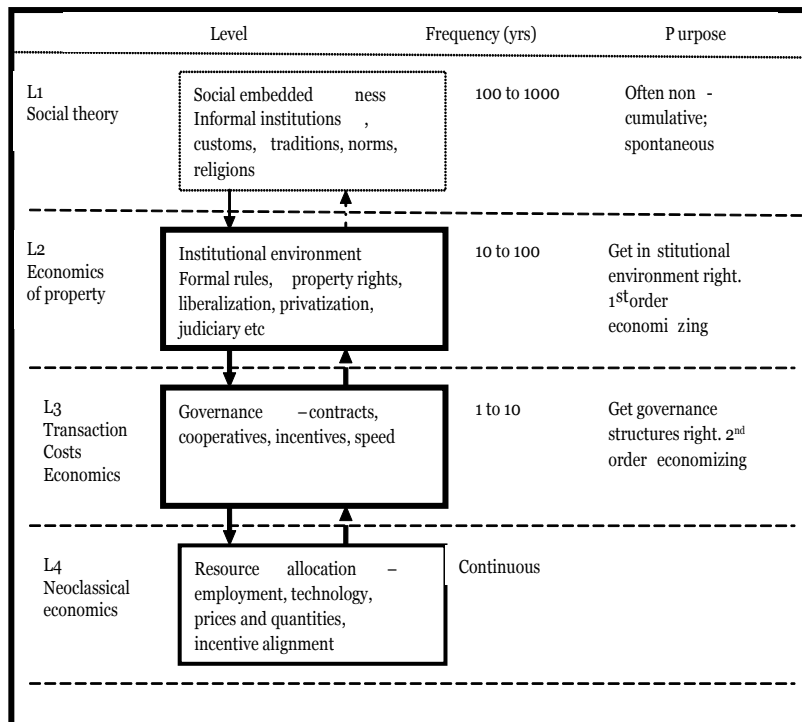
Source: Williamson, 2000

It takes decades or centuries for major structural breaks or departures from such established rules.

At the third level governance or transaction, cost economics (L3) takes centre stage and influences the organizational structure of independent firms and their intra-firm organizational units. As conceived by Commons (1932), transactions do not only provide the basic unit of analysis, but governance attempts to bring order, thereby mitigating conflicts and eventually realizing mutual gains. Governance also determines the rate/speed of change, hence adjustments costs. In this way, governance structures reshape incentives through contractual obligations amongst parties and can be reorganized periodically as deemed appropriate.

At the fourth level, optimality conditions are at play and economic interactions lead to adjustments in prices and output on continuous basis. At this level, resource allocation decisions determine competitiveness, profitability and market share which are the ultimate tests of relevance to the market place.

The NIE is predominantly concerned with the integration of Levels 2 and 3 of the four levels. The importance of institutional and governance factors came to fore following experiences of the Eastern Europe and the Soviet Union which rapidly transformed to market economies without the establishment of appropriate institutional and governance structures (Coase, 1992).

2.2   Value Addition in Agriculture

In the past, value-addition has been a frequently mentioned and emphasized economic term when discussing effectiveness, competitiveness, profitability and sustainability in the agri-business chain. Value added agriculture refers to a process of increasing the economic value and consumer appeal of an agricultural commodity (Zoltan *et al.*, 2000). It constitutes a coordinated production system that designs agricultural production to meet the more specified and differed consumer demand on one hand, and an alternative production and marketing strategy that requires a better understanding of the rapidly changing consumer preferences. In such a system, specific product attributes are key items of information and the focus is always on end-use rather than the initial bulk commodity. Besides, production levels are interdependent, the degree depends on the institutional and governance framework. The higher values of agricultural products result

in higher profit margins whose allocation principles depend on who governs or controls the vertically linked production system.

Value is the perceived balance between what people receive and what they must give up (Trischler, 1996). Thus, value added activities encompass all activities that increase what people are willing to give up in exchange for a product or service within their supply chain. The reward maybe in the form of increased prices, increased certainty in demand and/or increased access to the market (Boadu, 2003a). The reward forms the underlying economic logic associated with the firm's strategy and comes from one or more value creating elements. It maybe higher prices because of activities that reduce the customers' cost such as quality improvement, standardization or improvement of the customer's operational efficiency such as innovative service or speed of service. It is important for a firm to be competitive in every dimension of the value creation in order to either differentiate itself or maintain a competitive position against its rivals in the market place (Boadu, 2003a).

Adding value to products can be accomplished in two dimensions: innovation and coordination. Innovation is the introduction of new products, new processes or opening of new markets. Innovation focuses on improving existing processes, procedures, products and services or creating new ones (Kraybill and Johnson, 1989). A critical policy issue in developing innovative value added activities is the design of appropriate incentives to ensure that research efforts are directed to the problems faced by entrepreneurs and further ensure that innovations are commercialized (Coltran *et al.*, 2000)

On the other hand, coordination focuses on the arrangements among those that produce and market farm products in a harmonious way such that functioning of all parts of the system creates opportunities for enhancing rewards and value along the chain. Coordination can be horizontal or vertical. Horizontal coordination involves pooling or consolidating individuals or companies from the same level of the chain e.g. cotton farmers combining cotton seed to make a truckload. Vertical coordination includes contracting, strategic alliances, licensing agreements and single ownership of multiple market stages in different levels of the value chain. Vertical coordination, either through ownership integration or contractual arrangements, is necessary to link production processes and product characteristics to the preferences of consumers and processors (Royer, 1995). Thus, coordination-type value added initiatives focus on the vertical and horizontal relationships among

the producers, processors, handlers, distributors and retailers. Baodu (2003a) further considered six dimensions in which innovation and coordination may occur to generate value added initiatives, that is, time, location, product/service, process/methods, incentives and information (Table 2.1).

The transition process of the agricultural sector from a government controlled to a market driven one required new market based economic needs and conditions for economic entities. The cotton industry with a long value chain requires closer coordination mechanisms of firms/ entities located at different levels of the chain. The state has a big role to play in managing such transitions. Following Polanyi (1957), it is suggested that an appropriate public policy is required to "alter the rate of change, speed it up or slow it down", when factors of production are unemployed or underemployed in the process of structural change. This is particularly so within the agricultural sector where the rate of change has been particularly rapid resulting into high adjustment costs.

2.3   Analytical Framework

The basic elements of the cotton and textile supply chain can be divided into four levels, namely cotton production, ginning, textile manufacturing, and garment/apparel manufacturing as shown in Figure 2.2. The dotted lines represent the flow of information, while the solid lines represent the flow of goods. The direction of the arrows indicates a demand-pull-driven system. Value addition in the cotton industry involves performing activities that have traditionally been done at another stage further down the supply chain or those discovered to be necessary but had never been performed (Boadu, 2003b).

The idea is to identify or facilitate the identification of activities that will add/create value to various products in the chain by changing their current places, time, form and characteristics preferred more in the

Table 2.1: Opportunity set for value added initiatives

Dimension	Innovation	Coordination
Time	Speed	Just-in-time delivery
Location	Convenience	Efficiency
Product/service	Form	Logistics
Process/method	Technology	Strategic alliances
Information	Safety, Ethics	Information systems
Incentives	Motivators	Transparency

Source: Boadu, 2003a

Figure 2.2: A generalized cotton and textile value chain
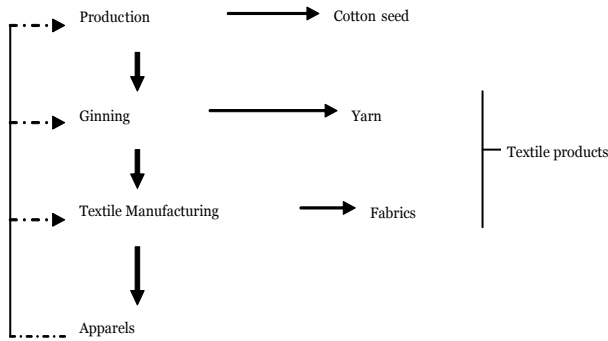
Source: Adapted from RATES, 2003

market place. Overall, the chain needs to be flexible enough to deal with changes in underlying economic or market conditions and yet remain sustainable and economically viable in the long run (Zoltan *et al.*, 2000)

Thus, successful development of long-term partnership relationships depends on commercial linkages based on interdependence at all stages of the chain whereby chain members hold a common view about consumer needs (Zoltan *et al.*, 2000). In addition, the partners should have a good strategic fit, mutual trust and respect and focus on sharing information required to make partnership a success.

In the case of Kenya's cotton and textile industry, this study seeks to identify the crucial dimensions of the cotton value chain and establish the major challenges and constraints along the chain that inhibit exploitation of domestic and external market opportunities. The study looks at the cotton sector as an integrated production network where production is sliced into specialized activities and each activity is located where it can contribute most to the value of the product.

Following the work of Boehlje *et al.* (1999), the study attempts at each stage of the value chain, to identify the process or activities that are necessary to create a product that will be demanded by end users or buyers as well as an appropriate incentive system necessary to reward performance and share risks across the chain. Ultimately, the choice of governance structure will have significant impacts on who has power and control in value chain and how risks and rewards are shared among participants in the value chain.

2.4   Empirical Estimations

For purposes of this study, the WITS/SMART model was applied to analyse the influence of tariff changes on imported cotton and textiles on revenue and welfare in the domestic economy. Following Laird and Yeats (1986), the model can be described in a series of equations and identities from which the formulation for the simulations is derived. Assuming full transmission of tariff changes to prices, the derivation begins with the following basic trade model composed of simplified import demand, export supply functions and an equilibrating identity.

The importing country j's import demand function (M) for commodity i produced in country k may be expressed as:

$$M_{ijk} = F(Y_j, P_{ij}, P_{ik}) \dots\dots\dots(1)$$

The producer/exporting country k's export supply function (X) for commodity i may be expressed as:

$$X_{ijk} = F(P_{ikj}) \dots\dots\dots(2)$$

The equilibrium in trade between the two countries is the standard partial equilibrium expressions (1) and (2) related by the following identity:

$$M_{ijk} = X_{ikj} \dots\dots\dots(3)$$

In a free trade environment, the domestic price (p) of commodity i in country j from country k would change with the change in an ad valorem tariff (t) as follows:

$$P_{ijk} = P_{ikj}(1 + t_{ijk}) \dots\dots\dots(4)$$

In theory, tariff revenue is given as the product of the tax rate (tariff rate in this case) and the tax base (value of imports). Thus, before the change in the ad valorem incidence of the trade barriers, the revenue is given as:

$$R_0 = \sum \sum t^0{}_{ijk} \; P_{ijk} \; M_{ijk} \dots\dots\dots(5)$$

After the change in tariff rate, the new revenue collection will be given by:

$$R_1 = \sum \sum t^1{}_{ijk} \; P_{ijk} \; M_{ijk} \dots\dots\dots(6)$$

The revenue change as a result of the tariff changes will be net between R_1 and R_0 which is the same as:

$$\Delta R = \sum \sum \Delta t_{ijk} \; P_{ijk} \; M_{ijk} \dots\dots\dots(7)$$

On the other hand, assuming that the elasticity of export supply is less than infinity, the welfare effects is a combination of consumer and producer surplus and estimated as the net effect of the changes in import values times the average between the ad valorem tariffs changes. It can be written as:

$$W_{ijk} = 0.5 \, (\text{“}t_{ijk} \, \text{“}M_{ijk}) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (8)$$

The policy simulations are based on the KIPPRA-IFPRI CGE model. The model is calibrated on the 2003 Social Accounting Matrix (SAM) for Kenya described in Kiringai *et al.* (2007). The SAM is highly disaggregated and constitutes 48 sectors of production, 12 labour categories and 2 household categories (rural and urban) by income deciles. The high level of sector desegregation therefore allows experiments of various policy options. The analysis is conducted using constants for everything else that determines the underlying supply and demand conditions for cotton and the market equilibrium, apart from the changes in policy being analysed.

3. Overview of the Cotton Value Chain in Kenya

The cotton supply chain can be divided into four major levels namely, cotton growing, ginning, textile manufacturers (yarn & thread), and garment and apparel manufacturers. The major institutions can be categorised into three broad areas: those concerned with policy development and research; training and capacity building; and manufacturing. On the other hand, the market structure comprises cotton lint, fabrics, garments and apparels in both domestic and external markets. Figure 3.1 shows the industry's institutional and market structure.

3.1 Cotton Production

The cotton sector in Kenya is characterised by a large number of smallholder farmers (about 140,000) with a low average yield (620kg/ha) and poor cotton fiber quality. Cotton production in Kenya peaked in 1984, when production reached 39,300 tonnes (about 70,000 bales of lint cotton) but the production almost collapsed during the 1990s. Recently, some upward trends in production have been realised following government efforts towards revival of the cotton sector (Figure 3.2). Some of the important measures included the amendment of the Cotton Act,

Figure 3.1: Kenya's cotton-to-garment institutional and market structure
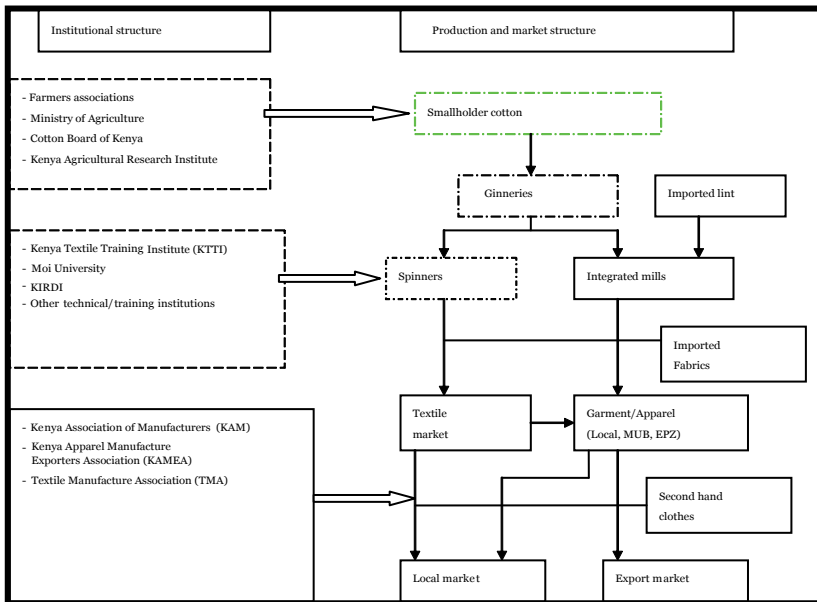
Source: Adapted from Global Development Solutions, 2004

Figure 3.2: Cotton production trends in Kenya (1980–2003)
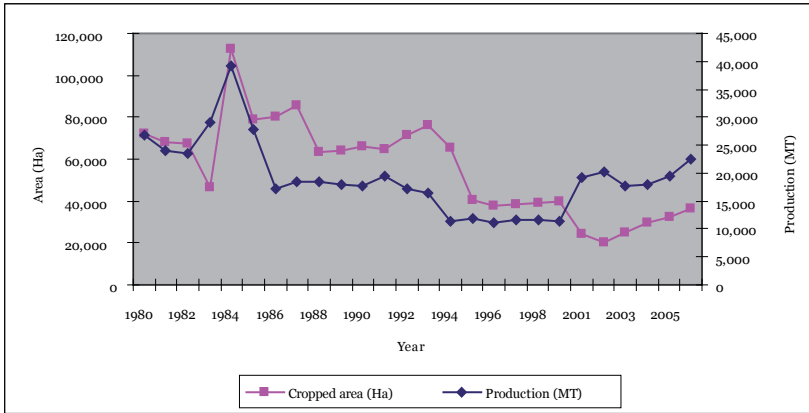
Source: Government of Kenya, 2007b

Cap 335, a budget allocation of Ksh 491 million over the years 2005/06 to 2006/07 for supporting the cotton production sector, and establishment of the Cotton Development Authority.

Although seed cotton yields have been increasing from 2003, the yields are still much lower than those realized by leading cotton producers (Annex Table 1). A country such as Kyrgyzstan has average yields which are four times higher than Kenya's, while Israel and Australia yields are almost three times that for Kenya (Global Development Solutions, 2004). Previous studies suggest those seed cotton yields in Kenya could be improved by as much as 120 per cent through improved agronomic practices and access to water.

There have been mixed findings with regard to profitability. Some previous studies suggest that cotton farming may be unprofitable, while more recent studies by EU (2004) and World Bank (2004) found it to be profitable albeit at marginal levels. The World Bank study estimated the cost of production for seed cotton to be US$0.26/kg (Ksh 17.40/ kg) compared to a market price of US$0.31/kg (Ksh 21.00). A recent KIPPRA field survey (2007) estimated the cost of production to be Ksh 12.00/kg against a producer price of Ksh 22.00/kg. This translates to a net income of only Ksh 6,200/ha at current low yields of 620kgs/ha. There are however many farmers who are able to achieve yields of more than 2500kg/ha, thus realizing net incomes of more than Ksh 25,000/ ha. The latter is a reasonably good income for farmers, especially in areas where no alternative high value crops can be cultivated.

The per-hectare yield rate is low compared to the rest of the world. Production costs associated with Kenyan seed cotton measured in kilograms is relatively competitive (Annex Table 2). However, staple length and quality of Kenyan cotton continues to remain low, thus leading to higher waste and poorer quality yarn. Staple length of Kenyan cotton is less than 25mm, while that from Uganda is about 28mm. Premium cotton has staple length of over 32mm (Global Development Solutions, 2004).

3.2   Ginneries/Lint Production

Ginneries are an integral part of the cotton industry and their location, capacity utilization and efficiency are critical to its growth and development. The major activities in the ginning sector include: drying/ cleaning, ginning, cleaning/packing, transportation and administrative costs. The highest value component at ginning stage is the cost of seed cotton which constitutes 86 per cent of the total value, while cleaning/ packaging accounts for 3.9 per cent and drying 3.1 per cent (Global Development Solutions, 2004).

There are about 24 ginneries in Kenya, 4 are owned by cooperative societies while the rest are privately owned. Due to limited supply of seed cotton, high cost of production, old machineries/equipment and weak institutional linkages, the ginners operate under very low capacity utilization of about 20,000 bales per annum against an installed capacity of 140,000 bales per annum (Government of Kenya, 2007a).

3.3   Yarn, Apparel and Fabric Manufacture

Cotton lint goes through spinning to produce yarn. The yarn is then weaved or knitted to produce different types of fabric. Spinning firms produce yarn, industrial yarn, and sewing thread, while integrated mills produce a wide range of products including yarn fabrics (woven and knitted), canvas, sweaters, and shawls among others.

The domestic textile and apparel sub-sector face competition from imported fabrics and clothing. The major competition is from second-hand clothes, synthetics and counterfeit products. The value of imported fabrics and second hand clothing far much outweigh export of yarn. For instance, during 2006, yarn exports were worth Ksh 712 million, against Ksh 5,250 million worth of yarn imports (Tables 3.1 and 3.2).

Table 3.1: Quantity of exports and imports of clothing and textiles

Year	Exports (tonnes)	Import (tonnes)	
	Textile yarn	Textile fibres and their waste	Second hand clothing
2002	2,192	19,261	67,064
2003	1,854	25,440	45,407
2004	1,380	26,938	48,330
2005	3,027	23,967	44,857
2006	3,560	23,961	50,268

Source: Government of Kenya, 2007

Table 3.2: Value of exports and imports of clothing and textile products

Year	Exports (million Ksh)	Imports (million Ksh)			
	Textile yarn	Textile fibres and their waste	VAT	Second hand clothing	VAT
2002	485	1,566	250.56	2,359	377.44
2003	394	1,845	295.2	2,242	358.72
2004	349	2,337	373.92	2,440	390.4
2005	606	2,169	347.04	2,173	347.68
2006	712	2,453	392.48	2,827	452.32

Source: Government of Kenya, 2007

About 60 per cent of the total yarn exports is destined to EAC and COMESA markets where Kenyan products enjoy preferential access. Tables 3.1 and 3.2 show Kenya's exports to COMESA and EAC countries.

3.4   Garments

After privatization of all textile mills in Kenya, the garment sector is principally driven by exports to the United States of America under the African Growth and Opportunity Act (AGOA) initiative. Currently, there are about 35 large scale garment manufacturers exporting to the US under AGOA of which 23 are located within the Export Processing Zone (EPZ), 7 enjoy Manufacture under Bond (MUB), while 5 others operate outside the EPZ and MUB. According to EPZ Authority (EPZA), textile firms within the zones employ about 29,000 workers (Export Processing Zone, 2006). On the other hand, the small and micro garment producers employ as many as over 230,000 workers. There has been a decline in Kenyan textile and apparel exports from Kenya to the US. For instance,

the total US imports of duty free textile and apparel items under AGOA was US\$244.7 million in 2008 compared to US\$257,846 million in 2006. During the same period, exports of textile and apparel items under the Generalised System of Preferences (GSP) were US\$50,000 and US\$31,000, respectively. Thus, textiles and apparels accounted for over 95 per cent of Kenya's exports into the US under the AGOA (Table 3.3).

3.5   Global Trade

The dynamics of the global cotton market has also been influenced by the Multi-Fibre Arrangement (MFA) quotas (1960 – 1994) and later the Agreement on Textiles and Clothing (ATC) (1995 – 2004) during the face-out of the MFA quotas. Nevertheless, world textile consumption has been growing at annual rates consistently higher than 3.8 per cent since 2002. The other major factors which influence textile fiber consumption are population, income and prices of textile fibers relative to other products.

World cotton trade expanded for five consecutive seasons, from 27 million bales in 2000/01 to a record 45 million bales in 2005/06 or 38 per cent of world production (International Cotton Advisory Committee, 2008a). Total imports however dropped to 38 million bales during 2007/08. The main driver of the cotton trade expansion has been China, which imports about 40 per cent of global cotton. Other major importers are East Asia, the EU and Pakistan. On the other hand, the largest exporters are the USA (38%), India (15%), Uzbekistan (10%) and Brazil (6%) (International Cotton Advisory Committee, 2008a). Most traded cotton lint is handled by trading companies which have key positions between producers (ginning companies) and spinning mills (Overseas Development Institute, 2004).

Table 3.3: Kenya's exports to the US (US\$ `000)

Export scheme	2006	2007	2008
A: Textiles & apparels			
GSP	50	1,292	312
AGOA	257,896	45,685	44,744
Total	257,896	245,813	244,775
B: All sectors			
GSP	7,860	4,660	3,412
AGOA	265,051	250,352	252,243
Total	272,911	255,012	255,655

Source: http://www.agoa.info/ accessed in March, 2009

4. Opportunities and Challenges in the Cotton Sector

This section reviews opportunities and challenges facing the sector along the value chain. The review is based on three major studies (Global Development Solutions, 2004; European Union, 2004; and Ikiara and Ndirangu, 2003). The studies, combined with literature search and consultations with key stakeholders, have been used to identify key opportunities and challenges at each stage of the value chain.

4.1 Cotton Production

As previously indicated, cotton production in Kenya is characterised by a large number of smallholder farmers who employ poor farming techniques resulting in low average yields and poor fiber quality.

4.1.1 Major challenges

The study established the following as the key challenges facing the cotton sector at the production level.

(a)   Poor quality of seeds: It has been argued that the available cotton varieties (*Gossypium hirsutum*) are not suitable for manufacturing high quality fabrics due to their short staple length. The variety available for planting in the Eastern region of Kenya, HART 89M, also takes too long to mature (11 months). Liberalization of the cotton industry led to collapse of the system of certifying cotton seeds. Farmers purchase or are provided with untreated seeds from ginneries. In most instances, seeds supplied or sold by ginneries have either been stored for over 5 months or have moisture content above 10 per cent leading to the poor yield rates. In addition, since there are no systems in place to monitor the sale of seeds, varieties from different regions and ecological zones are sometimes mixed in a single bag. Lack of sufficient resources has also hampered research efforts by Kenya Agricultural Research Institute (KARI).

(b)   High cost of agrochemicals and fertilizers: Most farmers are unable to afford fertilizers and pesticides yet these are critical to increasing cotton yields. Few farmers are using fertilizers and majority cannot afford sufficient number of cotton sprays. Previous studies estimate that agrochemicals account for over 31 per cent of production

costs and could reach 45 per cent with recommended 6 to 8 sprays per season. The high cost of agrochemicals has mainly been attributed to:

Taxation of local formulation and packaging: Most of the concentrates and raw materials (solvents/emulsifiers/carriers) used for local formulation of pesticides attract a duty of 25 per cent and 16 per cent VAT. The nature of solvents and manufactured pesticides also requires use of special plastic packaging bottles (COEX/HDPE bottles), which are not manufactured locally. These bottles are classified in the same category as normal plastic bottles produced locally and thus attract a duty of 25 per cent and VAT of 16 per cent. The customs law favours importation of packaged agrochemicals.

Restrictive registration requirements for importation of new agrochemicals: Pest Control Products Board regulates importation of agrochemicals. While it is possible to temporarily register a chemical for one year, full registration is prohibitively complex, requiring a 3 year trial even for well known molecules in use in both developing and industrialized countries. The irony is that while human medicine goes through a 6 month trial period, agrochemicals must endure a 3 year trial (Global Development Solutions, 2004). The current registration process has also resulted into a situation where only one agent is granted approval to import every technical material. For instance, importation of Cypermethrin (insecticide used in cotton) has been registered under a single company and no other agent or technical material has been approved for importation resulting into uncompetitive market behaviour. In most countries, it is common to find multiple agents importing and distributing similar technical material.

Fertilizer costs: The high costs of fertilizers in Kenya and other African countries has mainly been attributed to small market sizes, unnecessary product differentiation, high transport and handling costs, poor dealer networks and high cost of finance.

High transport costs: It has been estimated that approximately 20 per cent of the price of agrochemicals comprises of transportation costs. This is a major challenge facing the whole of the agricultural sector and it is important that the government fast-tracks any efforts towards addressing it.

Poor quality of agrochemicals as a result of pirated and adulterated pesticides: Pest Product Control Board (PPCB) has insufficient capacity to inspect and audit the agrochemical dealers, distributors and stockists

in Kenya.

(d)   Lack of access to sufficient credit: Many financial institutions are reluctant to give credit to farmers due to the high risks associated with agricultural production. Without access to credit, farmers are unable to purchase necessary farm inputs hence low yields.

(e)   Low producer prices: This is mainly attributed to poor market linkages between farmers and ginneries, inefficiencies and low capacity utilization in the ginning and textile sectors. The ginning sector is therefore unable to pay high producer prices thus discouraging local cotton production.

4.1.2   Opportunities for increased cotton production

It is estimated that approximately 384,500ha of irrigated and rain fed land is available for cotton production in Kenya. However, currently only 10.4 per cent or 40,000ha are under cultivation (Cotton Development Secretariat, 2007). The Eastern Province has been estimated to have the highest potential (124,380ha) followed by Coast (103,100ha) and Nyanza (77,330ha) provinces. Overall, the country has the potential of producing 300,000 bales of lint, while the local demand is 200,000 bales per year (Cotton Development Secretariat, 2007). Local supply exceeding local demand implies that there will be opportunities for export of cotton seeds to the regional markets as well.

Furthermore, there has been an indication that increased funding to the industry, both through KARI and the Cotton Development Secretariat, has improved the production of certified seed, production and distribution of technical handbooks and establishment of demonstration plots. There is room for further improvement as many farmers still lack sufficient access to good quality seeds.

4.2   Cotton Ginning

The major activities in the ginning sector include: drying/cleaning, ginning, cleaning/packing, transportation and administrative costs.

4.2.1   Major challenges

(a)   Inadequate supply and poor seed cotton quality: The

ginning sector is underutilized due to inadequate supply of seed cotton. Most ginneries currently operate at between 20 per cent and 30 per cent capacity utilization. In addition, seed cotton is of low quality which affects the quality of the cotton lint and eventually the price offered by spinners. The poor prices discourage farmers from producing more cotton.

(b)   Old machineries and equipment: The ginners in Kenya use the old roller machines of 1930s, which are relatively expensive to operate and maintain. Majority of the machineries are old leading to high operational and maintenance costs as well as high energy consumption. On average, the ginneries realize low Ginning Out-Turn (GOT) of 33 per cent against a potential of 40-42 per cent. The remaining 63-64 per cent is cotton seeds, while waste accounts for about 3 to 4 per cent (Global Development Solutions, 2004). Consultations with some ginneries revealed that currently, there is only one supplier of spare parts leading to the high costs.

(c)   Lack of appropriate mechanisms for measurement of fibre quality: Cotton lint exhibits considerable variations in quality and tends to have multiple quality attributes, including seed variety, crop management and post-harvest handling. The wide variations in fibre quality result in variability in the value of cotton lint to processors (Larsen, 2003). Currently, the industry still relies on the traditional hand-classing method of cotton quality evaluation which inhibits international competitiveness of locally produced cotton lint and fabrics.

(d)   High cost of production: There are high operational and maintenance costs in the ginning sector. The level of energy consumption is high due to dilapidated state of the drying equipment and this is further aggravated by the high costs of electricity. Moreover, frequent power interruptions increases the costs when the ginning companies have to use off-grid sources of power. Electricity costs about Ksh7-14/kwh which is 2.75 to 4.75 times more than the price paid by manufacturers in South Africa and 1.5 to 2.7/kwh more of the price paid in China. In the ginning sector, electricity constitutes a cost of 2.1865 per cent of the combined total cost of cleaning, drying and packaging (Global Development Solutions, 2005).

(e)   Low labour productivity and under-utilized capacity: Productivity in the ginning industry is largely constrained by lack of sufficient technical and managerial skills. When the cotton sector was liberalized, technical institutional support with regard to training and technical services was phased out. Thus, inhouse trainings on machine

operation, maintenance and repair are *ad hoc* thereby compromising infactory labour productivity.

(f)   Weak institutional and commercial linkages: There are no mechanisms to strengthen the farmer-ginner linkages in terms of supplying raw cotton to ginners and cotton seeds to farmers. The cotton-

textile chain is thus clogged at the ginning stage with poor responsiveness of farmers to industry demands and ginners being unable to offer a better price because they are uncompetitive (Ikiara and Ndirangu, 2003). This also leads to wastages of cotton seed delivered by farmers, which accounts for about 50 per cent of seed cotton. With low levels of production, ginners give back the bulk of the seeds to farmers for planting and sell the balance to animal feed processors and vegetable oil processors at very low prices of Ksh6/kg.

Finally, there are no commercial linkages between ginners and millers. The former are not guaranteed competitive prices for cotton lint. Apparently, collusion amongst textile millers results into manipulations of the price of lint at the expense of ginners and farmers.

Figure 4.1: By-products of seed cotton
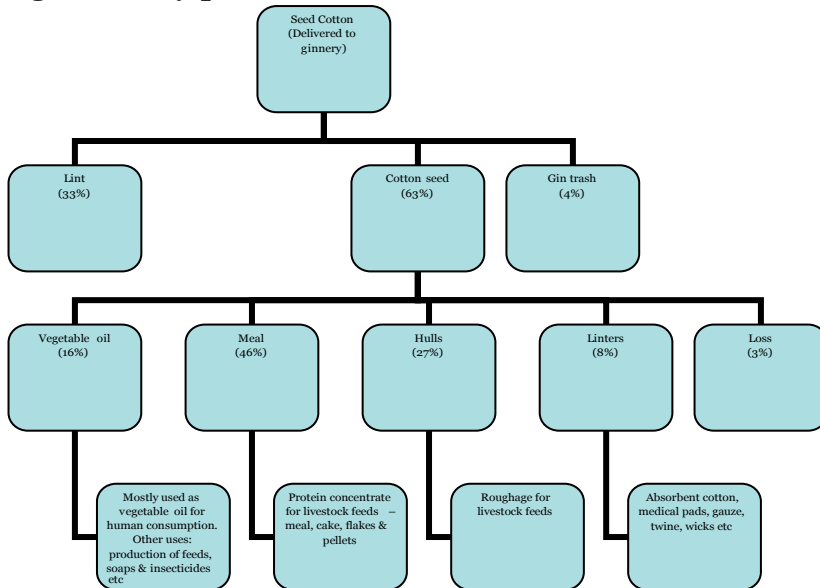
Source: Constructed from GDS, 2004 and NCPA, 2002

4.2.2   Opportunities for value added products

Presently, the major product from seed cotton in Kenya is cotton lint. However, available evidence shows that other key products are oil, meal, and hulls (Figure 4.1). Oil accounts for about 40-50 per cent of the total value of cotton seeds on average. Cotton seed meal is the second most valuable product accounting for over one-third of total product value, while the cotton seed hulls and linters account for the rest.

Crushing of the cotton seed can make a unique contribution to incomes of farmers and ginneries. In USA for instance, cotton seed oil is ranked third in volume behind soybean oil and corn oil (National Cottonseed Products Association, 2002). The seed therefore provides an important alternative source of income for ginneries and cotton farmers. With each kilogramme of fiber (lint), the cotton plant produces approximately 1.55 kg of cotton seed.

In Kenya, the additional value would increase farmers' incomes by between Ksh 1,000 and 4,000/ha. On the other hand, ginners could be able to raise income generated from cotton seed by more than 70 per cent through crushing the seed or exporting the seed. Currently, cotton seed is fetching a world market price of US$0.15/kg compared to US$0.09/kg (Ksh6/kg), paid by animal feed processors and vegetable oil processors.

The major constraint to value addition in this stage is the high cost of machineries for crushing the oil seed and the insufficient supply of seeds, which are after all given back to the farmers for planting.

4.3   Yarn, Apparel and Fabric Manufacture

These are produced from cotton lint by spinning machines. First, yarn is weaved or knitted to produce different types of fabric. Spinning firms produce yarn for clothing, industrial yarn, and sewing thread, while integrated mills produce a wide range of products including yarn fabrics (woven and knitted), canvas, sweaters and shawls among others.

4.3.1   Major challenges

(a)   Poor technology and operational structure: The apparel sector is largely constrained by technology gaps and inefficient operational infrastructure including unreliable power supplies and poor transport networks. Most processing equipments in the textile sector are

old and poorly maintained resulting in low quality textiles. As a result, a substantial portion of the production capacities for both spinning and weaving remain underutilized. For instance, currently there are about 35 textile mills in the country. If the mills were to operate at their installed capacity, they would be in a position to create an additional demand for cotton lint of 60,000 bales per year to meet the increasing demand.

(b) **Poor quality lint:** Most of the lint produced locally is of poor quality. Locally, combed cotton is of poor quality and delivery is also unreliable. Studies done indicate that 100kg of imported cotton fibre from India translates into 99kg of cotton fabric. Using the same process, the textile mills can only produce 60kg of cotton fabric from 100kg of Kenyan cotton fibre. The low transformation ratio of the Kenyan fabric is associated with fabric breakages and tears due to shortage and uneven cotton fibre length and quality. Furthermore, there are no commercial linkages between local ginners and spinners. There are delays in delivery of imported inputs due to poor infrastructure.

(c) **High energy costs:** Textile manufacturers face high production costs mainly due to high cost of electricity. The costs of fabric production is distributed in the value chain activities at this stage as follows: dyeing (27.7%), combing (25.0%), lint cotton (20.6%), weaving (16.6%) and twisting (10.1%) (Global Development Solutions, 2004 and European Union, 2004). The cost of dyeing is largely influenced by the high costs of electricity and imported chemicals. Overall, electricity accounts for about 27 per cent of the cost of production of a kilogram of yarn.

(d) **Shortage of technical and managerial skills:** The demand for technical and managerial skills currently exceeds supply. Training offered by mainstream institutions such as Moi University, Directorate of Industrial Training and Kenya Textile Training Institute do not meet industry requirements. This does not only lower productivity but it also affects long-term planning and investment potentials within the sector.

(e) **High dependence on imports of fabrics and accessories:** Increased importation of intermediate and second hand merchandise continue to pose challenges to the growth and development of the sector. Currently, the local manufacturers supply only 45 per cent of Kenya textile market requirements. In the EPZ factories, over 80 per cent of all fabric and other accessories are imported.

4.3.2 Potential for value added activities at the textile industry

Although the textile industry is relatively capital intensive in comparison to clothing industry, opportunities exist for use of simple machines for weaving and spinning garments at community and household levels. This can create jobs mostly for women who can develop hand woven items like kikoys, ciondos and tie and dye garments for sale both in domestic and external markets. The handlooms and related technologies can also be easily adopted and require relatively low levels of investments. According to the Cotton Development Secretariat, spinning and weaving cotton alone increases the value by more than 20 times, from an average price of Ksh24/kg to Ksh500/kg of a spinned product. Thus, supporting provision of handlooms and other related simple equipment to SMEs in cotton growing areas will further create demand for cotton and stimulate further economic activities.

4.4 Garments

Currently, there are about 35 large scale garment manufacturers exporting to the US under AGOA of which 23 are located within the Export Processing Zone (EPZ), 7 enjoy Manufacture under Bond (MUB), while 5 others operate outside the EPZ and MUB. The textile firms within the zones employ about 29,000 workers (Export Processing Zone Authority, 2006).

4.4.1 Major challenges

(a)   Weak commercial/institutional linkages and vertical integration: The weak regulatory framework has enhanced segmentation of production whereby the textile manufacturing sector has formed around the small scale (*jua kali*) and formal sectors with distinct production scales, marketing modes, production costs and technology/product quality. In that regard, there is no institutional infrastructure to help small and micro garment manufacturers organize themselves into economic groups, as well as link such groups into a larger export oriented supply chain. Further, producers outside the EPZs and MUB do not enjoy similar fiscal incentives, they thus invest less in modern equipment and manufacturing practices.

In addition, there are no commercial linkages between textile firms within and without EPZ. Therefore, EPZ companies continue sourcing

fabrics from Asia and other external sources thereby breaking the domestic cotton value chain. This does not only suppress demand for local cotton but also the associated value added activities which would otherwise enhance incomes and employment opportunities.

(b)   Lack of appropriate incentives for investments in textile mills: Capital investments in textile mills are substantially high between US$10 to US$30 million. Over the years, EPZ has not been able to attract investors in textile mills due to poor infrastructure, lack of venture capital and high interest rates. At the same time, most EPZ clothing companies adopted short-term investment strategies, specifically focusing on the AGOA privileges. This affected the demand for long term capital investment in textile mills due to uncertainties of long term market demand.

(c)   High dependence on imported raw materials: The sub sector is highly dependent on imported material. Currently, fabrics and most accessories used in the export processing zones are imported mainly from Asia. On average, the export oriented apparel sector requires about 70 million square meters of assorted fabrics, mainly denim, twill, cotton knits and polyesters for clothing destined for US market. This is usually imported at an average annual cost of Ksh 7.7 billion by EPZ companies, while the accessories are imported at an annual cost of Ksh 3.3 billion (Export Processing Zone Authority, 2005 and 2006). The volume of imported inputs provides a tremendous opportunity for import substitution, with a captive market in Kenya.

(d)   Increased importation of new and second hand clothes: The importation of high volumes of under declared fabric and dominance of second hand garments has caused detrimental effects in the textile sector and the economy at large. Importers of under declared fabric paid 11.5 times less than what should actually be paid, hence by 2003, between Ksh7.8 and 13.2 billion per annum was being foregone in public sector revenue (European Union, 2004). On the other hand, in 2005, Kenya imported second hand textile clothing worth about Ksh 2.6 billion. These imports have the tendency to choke the demand for local textile products, which in turn suppress investments in the ginning sector. Cheap imported new textile products, mainly from Asia, pose a serious challenge to the domestic cotton industry. For instance, a t-shirt in China is about 7 times cheaper compared to Kenya. On the other hand, there is an additional 2.5 per cent surcharge on EPZ textile products offloaded into the domestic

market. The latter raises the prices of locally produced textile products and discourages their use altogether.

(e)   Inadequate and high turnover of skilled manpower: The garment industry also faces high turnover of skilled manpower in specific areas such as design, machinery maintenance and marketing. Individual companies have no incentives to invest in training as a result, the formal segment of the apparel and garment sector employs casual labour on year around basis.

(f)   High cost of production: The formal sector garment experiences escalating labour costs due to labour union activities. Besides, there is relatively low labour productivity (approximately 20-25 t-shirts/person/day) compared to China where there are 45,000 manufacturers producing on average 310 pieces of garment per second. Like the rest of the manufacturing industries, the garment sector faces high costs of transport, electricity and fuel.

4.4.2   Potential value addition activities

The clothing industry is labour intensive and it offers entry level jobs for both skilled and unskilled labour. It also has high value added segments in fashion designs, research and development. The fashion industry uses human capital intensively.

4.5   External Markets

The major export destinations for cotton products are the EAC and COMESA for yarn (about 60%), while the garment sector is principally driven by exports to the United States of America under the African Growth and Opportunity Act (AGOA) initiative.

4.5.1   Major challenges

(a)   Cotton subsidies: The international trade in cotton is highly distorted going by subsidies levels to the sector. For instance, the share of world cotton production receiving direct government assistance, including direct government subsidies and border protection, increased from an average of 54 per cent estimated between 1997/98 and 2004/05, to an estimated 57 per cent in 2007/08 (International Cotton Advisory Committee, 2008b). Government support is greatest in US, China and

EU. Cotton subsidies encourage overproduction which in turn depresses world prices, and damages developing countries which rely on exports for a substantial portion of foreign exchange earnings.

(b)   Low diversification of export markets: Kenya's textile and garment export market base is extremely narrow. The sub-sector is highly dependent on the AGOA privileges. In 2006, the USA market accounted for about 79 per cent of Kenya's total textile exports. Other markets include: Europe (8%), EAC/COMESA (7%) and others (6%). The high dependence on specific markets makes the industry highly vulnerable to market fluctuations and external disruptions. For instance, the expiry of the multi-fibre agreement in 2005 substantially eroded existing preferences to AGOA beneficiary countries, including Kenya in the US market.

(c)   Supply elasticity problems: Although the global demand for cotton is projected to increase with an increase in population and a reduction of border restrictions, the supply elasticity for cotton in Kenya is very low compared to West and Central African counterparts. This can be largely attributed to lack of an integrated production and distribution system for cotton.

4.5.2   Opportunities

The bilateral and regional preferential trade arrangements which Kenya is currently involved in present ample opportunities for expansion of the export base for cotton products. Besides, the gradual reduction of tariffs at the multilateral level and increase in world population provide opportunities for increasing exports.

5. Domestic Production versus Importation of Textiles

The debate on importation of second hand and relatively cheaper clothes has been very contentious and was characterized by policy proposals and reversals even before implementation. The industry lobby against the banning of second hand clothes or high duty rates is well organized. Additionally, the tariff rates/bands specified in the Common External Tariff of the EAC Customs Union limit the scope for flexibility in the use of tariffs as a policy measure. The forthcoming EU–EAC Economic Partnership Agreement will further reduce the existing policy space. The proposals contained in this report take these issues into consideration and propose alternative options for consideration. This section simulates the impact of various policy options and incentives on income, revenue, employment, capacity utilization, welfare and output aimed at improving the performance of the sector. The proposals are based on standard analytical technique using highly disaggregated trade data (6 digit HS) to permit the isolation of second hand clothes in textile imports.[1]

5.1 Policy Simulations and Key Assumptions

The following assumptions are made in carrying out the simulations:

i) The impacts of the proposed policy measures for increasing domestic production and reducing competition from imports are complementary to each other.

ii) The cut backs on the quantity of imports arising from increased tariffs or domestic taxes will be taken up by domestic production.

iii) Labour value is used as a proxy of consumer welfare.

iv) Import demand elasticities used for second hand clothing are for the year 2004 (Kee *et al.*, 2005).

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[1] The policy simulations are based on a partial equilibrium approach. For details on this approach, see Milner *et al.*, 2002.

5.2   Partial Equilibrium Analysis

5.2.1   Effects of duty and VAT exemption on intermediate inputs

In the current cotton production technology, intermediates inputs account for 41.5 per cent of gross output, while value added share account for 58.5 per cent (of which 29%, 6.1% and 23.4% are labour, capital and land, respectively) as shown in Table 5.1. Within intermediate inputs, chemicals (including pesticides) account for 41 per cent of the costs of production. Most of the chemicals are imported and the domestic costs, particularly of pesticides, are raised by the 25 per cent duty and 16 per cent VAT levied on some solvents and packaging materials.

To reduce the cost of intermediates, the proposal is to remove the import duty and VAT on inputs used for local formulation of chemicals. Simulations of this proposal show that zero rating VAT on pesticides and packing materials, translates to a 20 per cent reduction in the cost of chemicals and 6 per cent increase in value added. These gains are expected to accrue to capital in the sector increasing overall profitability and capital share in value added.

5.2.2   Tariff measures on second hand clothes

The overall objective of the policy measures is to cut back on the imports of textiles as an incentive for domestic production. Three policy options are simulated to cut back the demand of second hand imported clothes increasing the tariff rate from:

    (i)   50 per cent to 62.5 per cent (25% increase)

    (ii) 50 per cent to 75 per cent (50% increase)

    (iii) 50 per cent to 100 per cent (100% increase)

Table 5.1: Value in cotton textile industry in Kenya

| Production technology	Share (%)
Intermediates	41.5
Value added	58.5
Labour	29
Capital	6.1
Land	23.4

Source: KIPPRA computations

The proposal to increase tariffs in the short term is motivated by the assumption that the cut back in imports will be replaced by domestic production. The other assumption is that all constraints to increase domestic production are eliminated and an appropriate incentive structure for increased cotton production is implemented.

5.2.3   Revenue implications of tariff measures

The revenue implications from the policy simulations are presented in Figure 5.1 and demonstrate a laffer curve effect. Revenues increase with increase in tariffs at a duty rate of 62.5 per cent but start declining after the 75 per cent duty rate. If the policy motivation is to maximize revenues, in this case it is not, the 62.5 per cent would appear to be the revenue maximizing rate. However, since this is not the motivation, higher tariff rates can also be explored.

However, if the proposed tariff increases counter WTO and other bilateral trade agreements, the alternative option is to introduce an excise tax on imported second hand clothes to achieve the same results. The estimated excise tax rates are presented in Table 5.2 which represents either a duty increase option or a combination of duty and excise tax to achieve the desired results. The results show that increasing the tariff to 62.5 per cent is equivalent to introducing an excise duty of 8 per cent on imported clothes, while retaining the current tariff rate at 50 per cent. Increasing the tariff to 75 per cent is equivalent to retaining the current tariff and levying an excise of 17 per cent on imports of second hand textiles.

Figure 5.1: Tariff effects on revenue
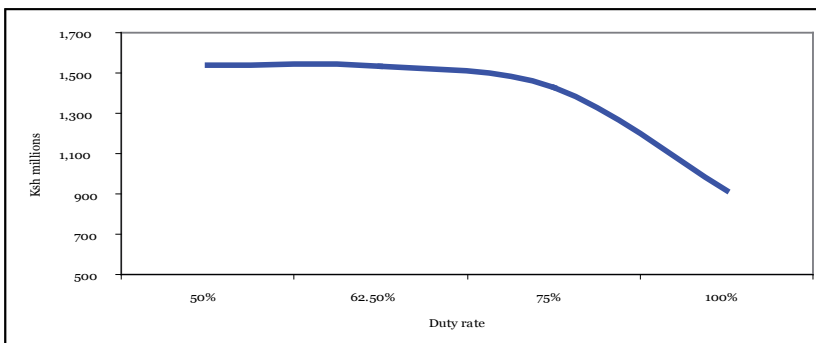
Source: KIPPRA computations

Table 5.2: Scenarios for import duty and excise tax (%)

| Option 1 (tariff only)	Option 2 (tariff + excise tax)	
Import duty	Import duty	Excise tax
50	50	0
62.5	50	8
75	50	17
100	50	33

Source: KIPPRA computations

5.2.4   Impact of tariff measures on domestic production and capacity utilization

As indicated in earlier sections of this study, capacity utilization in the textile industry is estimated at about 24 per cent. The value added from the sector was estimated at Ksh 2.3 billion (European Union, 2004) which converts to a value added of about Ksh 9 billion at 100 per cent capacity utilization. In a situation where decline in imports translates to increase in domestic production, the simulations demonstrate that increasing the duty to 62.5 per cent, increases the value added from the industry by about 15 per cent. Increasing duty to 75 per cent will increase the value added by 30 per cent, while increasing duty to 100 per cent will increase value added by 60 per cent.

Capacity utilization will also increase as duty increases. An increase of duty to 62.5 per cent translates to increases in capacity utilization to 28 per cent, increase of duty to 75 per cent increases capacity to 31 per cent, while increasing duty to 100 per cent increases capacity to 38 per

Figure 5.2: Tariff effects and capacity utilization in Kenya
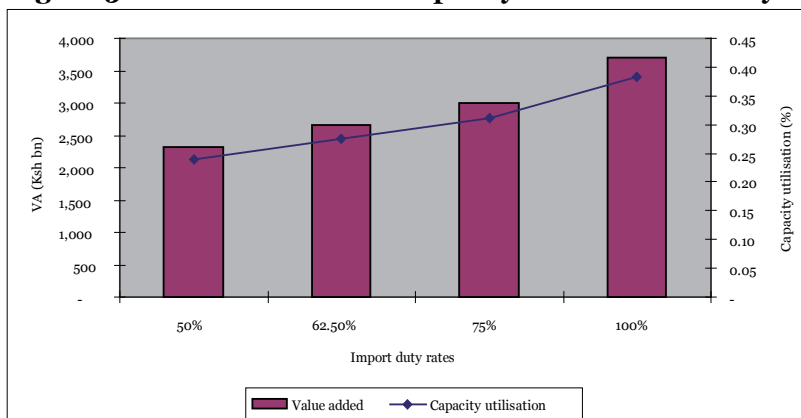
Source: Simulation results

cent (Figure 5.2). The analysis shows that while there is potential for significant improvement in capacity utilization, controlling the imports of second hand textile products will not meet 100 per cent capacity utilization. Full capacity utilization requires additional policy measures, focusing on the whole value chain and a proper management of textile imports, especially from the larger and more competitive producers such as China.

5.2.5   Impact of taxation measures on new textile products

Tariff measures on second hand clothes alone do not lead to optimal capacity utilization within the textile manufacturing sector. Other complementary measures are required including addressing supply side constraints, regulatory measures and optimal control of imported new textile products originating from outside preferential trading blocks. In that regard, Table 5.3 indicates the scenarios for imposing excise duties on imported textiles given the limited flexibility within the multilateral trading framework.

The results show that a combination of a 5 per cent excise duty on new imported textile products and increment of import duty on second hand clothes to 62.5 per cent will increase capacity utilization to 33 per cent. On the other hand, a rate of 75 per cent will increase capacity utilization to 37 per cent, while a 100 per cent tariff will increase capacity utilization to 44 per cent as indicated in Table 5.3. Thus, very high tariffs and excise duty may not fully offset the deficit in capacity utilization after all, hence the need to address other supply constraints. Both measures also lead to high value addition.

Table 5.3: Simulating an increase in excise duty on new imported clothes

Duty on old clothes (%)	Duty or excise on second hand clothes					Additional duty on new clothes from ROW	
	Excise tax(%)	Capacity utilization (%)	Gains in value added Ksh million	Required CU	Excise tax (%)	Capacity utilization (%)	Gains in value added Ksh million
Base 50	0	24			0	24	
62.5	8	28	346	30	5	33	875
75	17	31	693	37	5	37	1,222
100	33	38	1,386	50%	5	44	1,915

Source: Simulation results

Table 5.4: Tax implications on revenue generation

Items	Duty rate (%)	Revenue (Ksh)
Imports of second hand clothes	10 15	300 million 467 million
Imports of new clothes from ROW	5	500 million

5.2.6   Tax implications on revenue

With commitments in regional economic agreements and the demand for more openness under the WTO negotiations, increasing import duty may not be an easy option. In that regard, an alternative option is the introduction of a specific duty, the proceeds of which may go to the proposed cotton development fund/levy. Different duties will be applied to both new and second hand clothes. A specific duty on second hand clothes on all imports and a levy on new textile imports from non-preferential trading partners, may be an option. Table 5.4 shows the amount of revenue which can be collected using various duty proposals. For instance, a 10 per cent and 15 per cent duty on second hand clothes will contribute about Ksh300 and Ksh467 million respectively, while a 5 per cent duty on new clothes from the rest of the world will contribute to about Ksh500 million. The levy will be applied for 5 years to allow domestic supply response.

5.3   CGE Model and Policy Simulations

5.3.1   Background

The policy interventions proposed in section 4.2 are based on partial equilibrium analysis. This section estimates the economy wide impact of the proposed fiscal policy measures. The impacts are estimated using a general equilibrium approach to take into account the multiplier impacts of an increase in tariff in the entire economy.

The policy simulations are based on the KIPPRA-IFPRI CGE model. The model is calibrated on the 2003 Social Accounting Matrix for Kenya described in Kiringai *et al.* (2007). The SAM is highly disaggregated and constitutes 53 sectors, 39 factors of production, 12 labour categories and 2 household categories (rural and urban) by income deciles. The high level of sector desegregation therefore allows experiments of various policy options.

However, the SAM aggregates the entire textile sector into one sector and does not allow the isolation of second hand clothes, or specific HS sectors, as in the partial equilibrium analysis. The policy shock is therefore applied to the entire textile sector. The CGE model is dynamic and is run for a 10 year period to take into account changes in investment, which is not possible in a static model.

5.3.2 Policy impacts and transmission mechanism

An increase in tariffs translates into an increase in the price of imported textiles relative to the domestic substitutes. Consumers therefore shift consumption from imported textiles to domestically produced substitutes. Driven by increases in domestic demand, domestic production increases to meet the import deficit. To satisfy increased demand, producers will require additional factors of production, that is labour and capital. The additional demand for factors of production is met through a shift of resources from other sectors (less profitable) of the economy into the textile sector. In an economy where there is unemployment, it is possible for excess labour to be absorbed without increases in the wage rate but in a situation where the economy is operating at full employment, this shift would translate into an increase in wage (rental) rates of the factors of production.

Figure 5.3: Circular flow of income
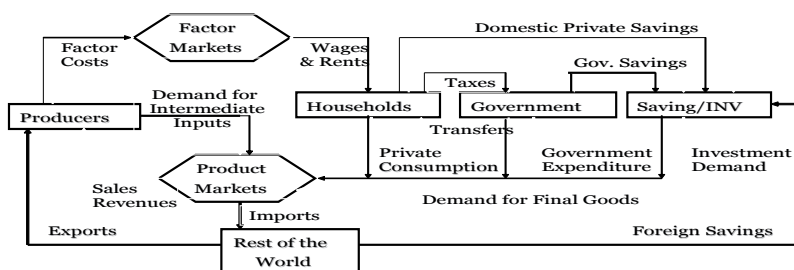
Source: Adapted from IFPRI, 2003

Table 5.5: Base case and proposed tariffs on textiles

Trading block	Base	New
EU	5	5
ESA	7	8
Rest of the World	19	22

Source: KIPPRA simulations

Capital is fixed in the short and medium term and additional investments are met through new investments. The additional demand for labour translates into increases in household incomes as more labour is absorbed into the expanding sectors. In the case of textiles, the industries are based in the urban centers and it is urban households that are likely to benefit from the increased demand for labour, and increased incomes. Increases in household incomes translate into additional demand for other goods in the economy, spurring growth and expansion in other sectors as well. The circular flow is presented in Figure 5.3.

5.3.3   Impacts of proposed tariff changes on applied tariffs

In this simulation, we shock the CGE model with a 15 per cent increase in tariffs. Trade data in the CGE model is disaggregated into three regions: EU, ESA and the rest of the world (ROW). This disaggregation permits the differential treatment of imports from different regions, based on existing trade agreements. The tariffs used in the model are simple average and

Table 5.6: Macroeconomic impact of tariff increase on textile imports

	Base (2003)[2] Ksh billion	Base	(15% increase in textile tariffs)	Deviations from base line
Absorption	1,267.65	10.16	10.19	0.034
Private consumption	868.02	10.30	10.31	0.011
Investment	179.23	-8.42	-8.24	0.188
Exports	281.39	11.90	11.91	0.003
Imports	-406.88	8.23	8.23	0.002
Real GDP	1,142.16	11.27	11.31	0.039
Tax revenue	131.76	9.21	9.20	-0.003
GDP at factor cost	1,010.40	11.54	11.58	0.043

Source: KIPPRA simulations

[2] The 2003 baseline is based on the 2003 SAM. The figures are real GDP in million shillings

not trade weighted average. As is evident from Table 5.5, imported textiles from different regions have different tariffs. The proposed 15 per cent increase in import tariffs translates into an increase from 19 per cent to 22 per cent for the ROW imports, 7 per cent to 8 per cent for ESA imports and the increase is insignificant for imports from EU.

However, within the CGE model, it is not possible to isolate second hand textile imports, hence the simulations are applied to the entire textile sector, biasing the results upwards.

5.3.4   Macro economic effects of proposed tariff measures

The results presented in Table 5.6 give the broad direction and sign (increase or decrease) as a result of the policy simulation and are presented as deviations from the baseline simulation. For instance, domestic absorption increases by 10.16 per cent in the base line scenario and by 10.19 per cent in the proposed simulation giving a deviation of 0.03 per cent from the baseline growth path.

The results also indicate real GDP increase by 0.04 per cent from the baseline. The increase is driven by increases in investment and private consumption which increases by 0.19 per cent and 0.01 per cent, respectively. Exports too increase by a small margin of 0.01 per cent. There is a decline in textile imports, which is nonetheless off set by increases in capital goods and intermediates, most of which are duty free and overall the change in imports is insignificant. As can be observed from Table 9, the proposed changes translate into a marginal decline in government tax revenue.

One of the advantages of using a CGE approach is that it captures the complex interaction of a tariff increase in one sector and the other sectors of the economy can be seen in Annex Table 5. The gains from additional protection for the textile sector are evident; the sector achieves an additional growth of 2 per cent compared to the baseline. However, the overall outcome in GDP must be interpreted in the context of the textile sector share in total GDP which was 0.6 per cent in 2003 and which explains the minimal change in GDP and the other macroeconomic variables.

5.3.5   **Welfare impacts**

The transmission mechanism of a policy change from production to household welfare is complex and can only be captured within a general equilibrium framework. The changes in welfare in rural and urban households are presented in Figures 5.4 and 5.5, respectively. The figures show that there is no change in rural household welfare but there is a marginal welfare improvement for low income urban households (Annex Table 6).

Figure 5.4: Changes in household (rural) welfare
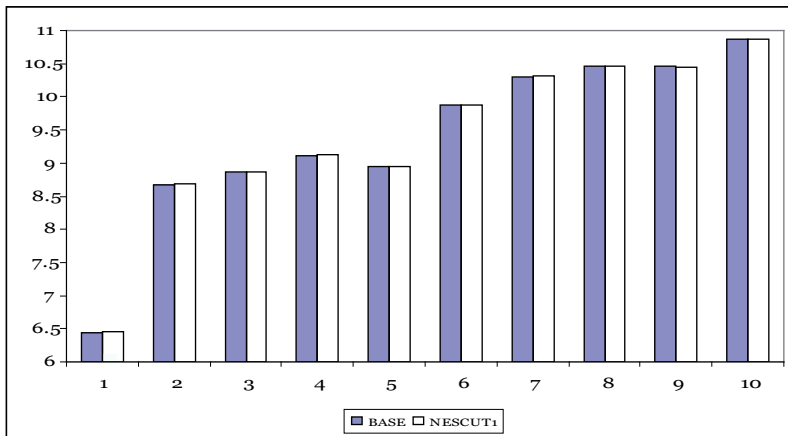
Source: KIPPRA simulations

Figure 5.5: Changes in household (urban) welfare
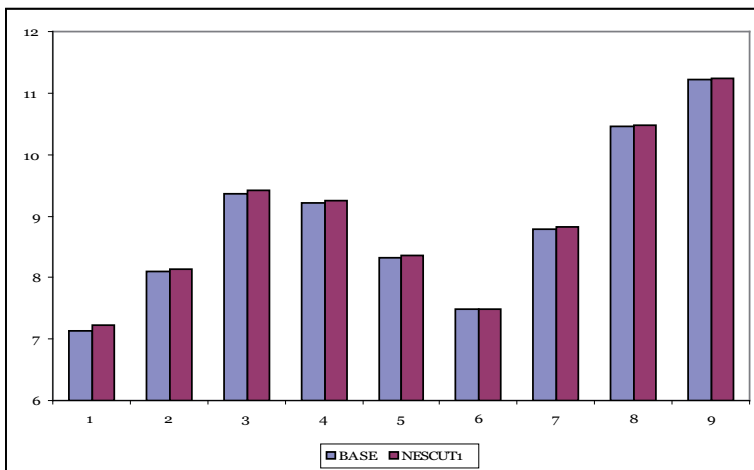
Source: KIPPRA simulations

6. Conclusions and Recommendations

6.1 Conclusions

The cotton and textile industry has been critical to the economic development of many countries in the world. The sector plays an important role in protecting and raising the incomes of cotton stakeholders thereby contributing to poverty reduction in both rural and urban areas. However, the domestic cotton sector faces a myriad of constraints and challenges. Apart from production and trade distortions brought about by leading cotton producers/exporters, liberalization of the sector without precautionary measures and specifically lack of incentives, poor infrastructure, old machineries and equipment have led to reduced and uncompetitive production of cotton and textile products in Kenya. As a result, only about 10 per cent of land suitable for cotton growing is currently under cultivation, leading to very low capacity utilization of existing ginneries.

The low supply and highly priced domestically produced textiles have heightened the influx of cheaper imported products notably, second hand clothes and fabrics thereby driving the industry further to near collapse. However, since the global and domestic demand for textiles is ever on the rise, there is room to revitalize the domestic cotton industry. This will however require providing incentives to farmers and potential investors in the sector to facilitate increased production and value addition initiatives. At the same time, appropriate fiscal measures should be put in place to limit the importation of textiles products, particularly from Kenya's non-preferential trading partners.

Finally, intensive marketing and promotion of domestically produced cotton and textile products is necessary in local and external markets to enhance market consolidation and expansion.

6.2 Recommendations

The recommendations are divided into general and specific recommendations on cotton production, manufacturing and design and markets.

6.2.1 General recommendations

(a) Increased funding

Cotton development requires increased funding and investment from cotton production to apparel manufacturing and markets. Additional financial resources are required for research, provision and subsidization of farm inputs, upgrading of machineries and equipment, training in machine operations and fashion designs and marketing and promotions. These may be in the forms of direct government expenditures, venture capitals and negotiated credit schemes which should be readily available at the various levels of the value chain. Availability of funds will both encourage and facilitate value addition activities across the cotton value chain.

(b) Improving physical infrastructure

There is an urgent need to reduce the cost of production by improving the status of physical infrastructure including roads, water and energy supply. The construction or repair of road networks in cotton growing areas will reduce transportation costs, while irrigation development will expand acreage of cotton fields and enhance production. On the other hand, reduced costs of energy will greatly enhance competitiveness of domestically produced fabrics and apparels. The latter will however require a review of the current energy pricing policy vis-a-vis existing contractual obligations between KPLC and energy generating companies.

(c) Investment capital for upgrading machineries and adoption of new technologies

Currently, the cotton industry uses old equipment and machinery whose maintenance and operational costs are high. The government should design an appropriate leasing product, particularly for SMEs, to facilitate upgrading technology in the ginning and textile milling industries. One option that can be used for upgrading technology in the ginnery (and textile) sector is leasing. Leasing has been used in Russia and India as a means of technology transfer and as a model for channelling credit particularly to Small and Medium Enterprises (SMEs) at a significantly low cost. However, despite the reintroduction of the instrument in Kenya in 2002 (Income tax (leasing) rules), the product uptake has been rather slow and is mainly used to finance investment in motor vehicles. International experience has demonstrated that if well designed with appropriate incentives, leasing has the potential to spur investment in targeted sectors and promote the use of appropriate technology. This can

be achieved either through public-private partnership or a sinking fund endowment by the government to an identified leasing service provider (e.g. Kenya Industrial Estates). This requires appropriate incentives such as high capital allowance on the leased equipment and review of existing legal framework to allow for both financing and operations. This is expected to enhance productivity in the ginning and textile sectors and make them more efficient and competitive. The investments would also create additional employment opportunities.

Budgetary implications

- Under a public-private partnership, the budgetary implications would be foregone revenue through the incentives offered to the provider (e.g. the capital allowance on the corporate income tax).

- In the second alternative where the government provides a sinking fund to the leasing agent, the estimated budgetary cost would be about Ksh 1 billion for the ginning sector (for 20 ginneries) and another Ksh 1 billion for SMEs engaged in textile industries.

(d) Restriction or gradual elimination of second hand clothes and imported fabrics

There is need to further discourage importation and use of second hand clothes as measures to address competitiveness of the local textile industry. Other than tariff measures, it may be necessary to review the exemption of worn clothes worth less than US$5,000 from pre-shipment inspection as a means of enhancing surveillance on under declared imports and strict enforcement of standards regulations.

(e) Adoption of an integrated approach to cotton development

An inter-ministerial/institutional committee representative of all stakeholders in the entire cotton industry should be put in place to oversee the cotton sector revitalization programme. This will facilitate strengthening of institutional linkages and organizational structures in the cotton industry. The Cotton Development Authority should play a coordinating role in the proposed committee.

6.2.2   Specific recommendations

(a)   Cotton growing and production

Cotton research: The Kenya Agricultural Research Institute (KARI) should aggressively research for suitable cotton varieties which are early maturing, good quality (particularly in terms of staple length), high yielding and resistant to pests and diseases. Arrangements should also be made for bulking of current varieties or other identified varieties by individual companies or irrigation schemes so as to quickly avail certified seeds to cotton farmers. One suitable target for contracted seed production is Bura irrigation scheme which reportedly resumed crop production by January 2008. In the past, majority of farmers in the scheme were known to realize seed cotton yields of more than 3 tonnes/ha. With right price incentives and having the entire scheme (2,500ha) under production, the scheme can produce sufficient seed for cotton production in the country.

Provision of credit facilities: There is need to expand the provision of credit facilities for procurement of farm inputs. Based on unit costs of production, it is estimated that the current 40,000ha under production would require an initial capital injection of Ksh610 million to facilitate provision of credit facilities for:

Item	Ksh
1. Purchase of certified cotton seed	13,000,000
2. Purchase of fertilizers	260,000,000
3. Purchase of pesticides	337,000,000
Total	**610,000,000**

This can be generated from an established special development fund which is estimated to generate about Ksh800 million. An appropriate credit should be established under Cotton Development Authority, to be administered in collaboration with Cotton Ginneries Association, individual ginneries and Cooperative Societies. Such a scheme should facilitate bulk purchasing of fertilizers and pesticides to lower costs. Use of improved quality seeds, fertilizers and pesticides is expected to enable increase of seed cotton yields from current 620kg/ha to over 2,000kg/ha, hence more than tripling production of seed cotton. This will not only translate to higher farm incomes but facilitate commercial engagement in production of by-products from cotton seed namely livestock meals, refined oils, cakes and soaps among others.

Reduction of cost of fertilizers: The government should strive to reduce the cost of fertilizers and pesticides by:

(i)   Developing and implementing the 3-tiered fertilizer cost reduction programme proposed under Vision 2030, that is bulk purchasing through organized farmer groups/credit facilities (immediate), incentives for domestic blending (medium-term) and strategic sourcing of raw materials and domestic production.

(ii)   Allowing duty free importation of solvents and packaging materials (particularly HS Code 34.02.90 and 39.23.30 - COEX bottles) used directly in formulating agrochemicals. The revised EAC tariff line (East Africa Community, 2007) which has placed these products into import duty bracket should be reviewed. There is also need to review the legislative framework relating to registration of new chemicals with a view to substantially reduce the trial period required for registration of new chemicals and allow multiple agencies in importation and distribution of similar technical materials.

(b)   Ginning and manufacturing sector

Upgrading and/or replacement of machinery and equipment: There is need to either upgrade or replace machinery and equipment in all ginneries in order to improve productivity and quality of lint. This can be done through an appropriate leasing facility scheme. An initial fund/capital of Ksh2 billion is recommended to spur investment and adoption of modern technologies in these areas. There is however need to identify an appropriate service provider such as the Kenya Industrial Estates (KIE) to administer the scheme.

Development and commercialization of simple, reliable and affordable equipments: There is need to consider manufacturing mini-ginneries for use at household or community levels. This can be useful especially in areas where ginneries are far away from cotton farms. This would facilitate value addition, that is ginning at small scale and lint can then be sent to ginners for packaging into cotton bales. Some of these equipments have already been developed by KIRDI and there is need to commercialize and popularize them at community levels in cotton growing areas.

Improvements in quality: There is need to assist ginners and spinners with instrument based quality evaluation systems for measuring fiber length, micronaire, strength, trash content and colour. This will not only encourage production of better quality seed cotton by farmers, but

also improve pricing in tandem with international marketing practices.

Enhancement of technical and managerial skills: There is need to undertake a training needs assessment in all textile training institutions. This should be facilitated so as to expand opportunities for textile related trainings including machine operation, maintenance and repairs through use of modern and appropriate training equipments. This requires enhanced collaboration among training institutions offering certificate, diploma and degree courses in textile related programmes. There is further need to embrace skills development through regional programmes like the proposed COMESA Regional Model Manufacturing and Textile Training Centre (RMMTC) in Nairobi.

Improving labour productivity: There is need to enhance skills development in fashion and design in order to attract the fast changing consumer taste in the clothing sector. In addition, labour productivity can be enhanced through adjustments in working hours and adoption of shifts in order to attain optimal capacity utilization.

(c) Promotions and market development

Consolidation of domestic market: Consolidation of domestic market can be done through either restrictions on imported second hand and new clothes and greater promotion of locally produced textile products.

Restrictions on imported second hand clothes: Currently, second hand clothes attract a duty of 50 per cent, while new clothes attract a duty of 25 per cent. It is recommended that a 10 per cent and 5 per cent levy be introduced on imported second hand and new clothes to facilitate not only restriction of imports, but also generation of revenue to finance development of the cotton sector. Further, there is need to strengthen and control the influx of under declared imports and sub-standard second-hand textile products reviewing the exemption of worn clothes worth less than US\$5,000 from pre-shipment inspection as a means of enhancing surveillance on under declared imports and strict enforcement of standards regulations. An estimated Ksh6.7 billion could be realized from would be undeclared and under declared imports.

Enhanced domestic promotion and local demand: Promotion of domestically produced textile and garment products can be done through greater involvement of the private sector including local media houses and leading corporate companies in promoting and marketing

activities. They can for example promote and market the national dress which can subsequently increase demand for domestic textile products by about Ksh10.8 billion, assuming 70 per cent and 30 per cent of wage and informal sector employees respectively, buy the dress.

Enhanced promotions and exploitation of emerging markets: There is need to strengthen export marketing initiatives through enhanced market research and intelligence, external product promotions and exhibitions, market development programmes and export credit facilities particularly in respect to COMESA, EAC, ACP-EU and AGOA where Kenya already enjoys preferential market access. For instance, the total extra COMESA textile product imports during the years 2005 and 2006 were about Ksh59.8 billion and Ksh79 billion, respectively. Kenyan embassies should be facilitated to spearhead promotion activities as part of their performance contracts.

6.3   Scope for Further Research

Notwithstanding the above recommendations, the scope for further research in Kenya's cotton industry include:

(i)   Factors affecting the demand and supply of local and imported textile products in Kenya.

(ii) Implications of applying subsidies and countervailing measures on cotton products in Kenya.

(iii) The impacts of poor infrastructure on export-oriented textile and apparel sector in Kenya.

(iv) Factors affecting utilization of market access preferences by Kenya in the EU market.

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Annexes

Annex Table 1: Cotton yield benchmark

Country	Yield (kg/ha)	Country	Yield (kg/ha)
Kyrgyzstan	2,450	United States	745
Israel	1,700	World average	589
Australia	1,600	Kenya	572 (600)
China	1,270	Pakistan	500
Cambodia	1,200	India	315
Mexico	1,000	Africa average	300 - 379

Source: Global Development Solutions, 2004

Annex Table 2: Cotton farming cost and yield comparison

	Yield (t/ha)	Cost/ha ($)	Cost/kg ($)
Kyrgyzstan	2.45	394	0.16
Kenya	0.572	184	0.32
Cambodia	1.2	415	0.35
China	1.27	752	0.59

Source: Global Development Solutions, 2004

Annex Table 3: Principal domestic exports to COMESA in 2005

Country	Textile yarn (Ksh '000)	Fabrics, woven or made yarn (Ksh '000)	Made up articles yarn (Ksh '000)
Angola		-	-
Burundi	8,615	6,835	15,037
Comoros	-	1,447	200
Congo D.R.	60,500	-	93,771
Egypt	-	-	51
Eritrea	12,211	-	11,904
Ethiopia	-	419	40,397
Malawi	10,65	-	60,275
Mauritius	-	297	-
Rwanda	5,986	108	42,834
Sudan	175	5,218	593,526
Uganda	93,052	11,551	402,658
Zambia	13,765	-	52,852
Zimbabwe	39	-	1,983
Total	**205,000**	**25,875**	**1,315,488**

Source: Statistical Abstract, 2006

Annex Table 4: Principal domestic exports to EAC in 2005

Country	Textile yarn (Ksh '000)	Fabrics, woven or made (Ksh '000)	Made up articles (Ksh '000)
Burundi	8,615	6,835	15,037
Rwanda	5,986	108	42,834
Uganda	93,052	11,551	402,658
Tanzania	49,121	2,422	278,168
Total	**156,774**	**20,916**	**738,697**

Source: Statistical Abstract, 2006

Annex Table 5: Sector changes in value added

	Initial	Base	NESCUT1	Deviations from base
Maize	35.69	10.98	11.00	0.02
Wheat	0.42	8.85	8.91	0.06
Rice	1.83	12.01	12.03	0.02
Barley	0.57	10.36	10.39	0.03
Cotton	0.31	10.81	10.84	0.03
Other grains	0.05	9.30	9.33	0.02
Sugar	2.00	11.46	11.47	0.01
Coffee	6.94	12.87	12.83	-0.04
Tea	39.54	13.08	13.06	-0.03
Roots and tubers	14.13	11.30	11.33	0.03
Oils	23.47	10.48	10.52	0.04
Fruits	17.07	10.72	10.76	0.03
Vegetables	26.69	12.19	12.22	0.04
Cut flowers	18.64	11.01	10.92	-0.09
Other crops	10.38	11.32	11.34	0.02
Beef	14.78	11.15	11.17	0.02
Dairy	18.68	10.73	10.75	0.02
Poultry	15.29	11.40	11.42	0.03
Goat	5.32	11.84	11.86	0.02
Livestock	3.78	11.03	11.06	0.03
Meat	11.91	11.76	11.78	0.02
Milling	8.89	10.24	10.27	0.03
Bakery	4.79	11.41	11.43	0.02
Beverages	12.86	10.81	10.83	0.02
Manufactured food	0.86	12.04	11.99	-0.05
Textiles	5.61	14.36	16.32	1.96
Footwear	4.81	9.79	9.52	-0.27
Wood	2.86	7.80	7.47	-0.33
Printing	5.45	11.02	10.93	-0.09
Petroleum	3.43	7.44	7.49	0.04
Chemicals	7.30	10.72	10.69	-0.04
Machinery	8.35	11.62	11.67	0.05
Non metals	22.42	2.87	2.98	0.11
Other manufacturers	30.86	9.39	9.44	0.06
Water	14.18	13.10	13.30	0.20
Electricity	13.42	10.63	10.68	0.05
Construction	53.06	-6.61	-6.43	0.18
Trade	73.08	9.84	9.88	0.05
Hotels	10.06	13.51	13.54	0.03
Transport	73.43	11.09	11.11	0.02
Communication	29.29	10.22	10.27	0.04
Financial services	66.24	8.80	8.85	0.05
Restaurants	50.60	10.69	10.75	0.05
Other services	73.26	11.44	11.47	0.03
Maize	35.69	10.98	11.00	0.02
Wheat	0.42	8.85	8.91	0.06
Rice	1.83	12.01	12.03	0.02

Source: KIPPRA computations

Annex Table 6: Changes in household welfare

	Initial 92003	Base	NESCUT1	Deviations from base (%)
				0.0
h10	15.28	0.54	0.54	0.0
h11	18.47	0.72	0.72	0.0
h12	22.99	0.74	0.74	0.0
h13	29.18	0.76	0.76	0.0
h14	32.88	0.75	0.75	0.0
h15	38.57	0.82	0.82	0.0
h16	44.62	0.86	0.86	0.0
h17	45.73	0.87	0.87	0.0
h18	49.05	0.87	0.87	0.0
h19	66.72	0.91	0.91	0.0
h21	0.4	0.6	0.6	0.0
h22	1.04	0.67	0.68	1.0
h23	1.79	0.78	0.78	0.0
h24	3.76	0.77	0.77	0.0
h25	7.84	0.69	0.7	1.0
h26	19.05	0.62	0.62	0.0
h27	56.05	0.73	0.74	1.0
h28	77.32	0.87	0.87	0.0
h29	337.28	0.94	0.94	0.0

Source: KIPPRA computations

Key: h10 to h19 refer to rural households

h21 to h29 refer to urban households