



## **Research Report X**

### **Agri-Chain Analysis of Cotton Sub-Sector in Ethiopia**

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**Addis Abeba,  
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**Research Report IX**

### **Ethiopian Development Research Institute**

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## Foreword

This report presents results of a study conducted by EDRI on “**Agri-Chain Analysis of Cotton Sub-Sector in Ethiopia**”. It focuses on an analysis of cotton value chain in Ethiopia. The study has generated useful information on value addition for the cotton sub- sector and its products, notably from cotton to clothing, and edible oil processing. Based on secondary sources of data and supplementary data from field surveys on selected farms, the report provides an account of case studies in the sub-sector. The report includes an account of important component of the cotton handloom sub-sector which can become significant sources of employment and off-farm income for rural population.

Newai Gebreab  
Director, EDRI

# 1. Introduction

Cotton is one of the rare agricultural products where production and consumption is more or less global in extent. Cotton is growing including Ethiopia, in more than 70 countries, where many developed and developing countries depend on import of lint for their spinning/textile industry. During the last four decades, the global production and consumption of cotton has increased significantly from 9.8 million tons in 1960/61 to 18.5 million in 1998/99 reaching 21.1 million tons in 2001/02 (CBI, 2006).

The major cotton producers are located in the developed world, where USA is by far the largest producer, followed by China, India, Pakistan, Uzbekistan and West African countries. From the total world production, only 30% is exported annually as most producers are becoming major consumers of their own production and even import cotton due to their expanding spinning and textile industries. This has resulted in a major shift of trade flows away from the main exporting regions towards the leading producers and importers of cotton such as those in Asia (Marianne, 2004).

In Ethiopia too, there is an enormous potential for the production of cotton following its suitable agro-ecological zones and the availability of water. According to the Ministry of Agriculture, the suitable cotton production area is estimated to be 2,575,810 ha, which is equivalent with the fourth largest producer, Pakistan. Despite this huge potential, however, Ethiopia currently produces only 77000-84,000 MT of raw cotton annually from a total area of 42,371 (Agridev, 2003). The disparity between the existing potential and the actual practice is more obvious when we look at the share of Ethiopia in terms of international production and marketing of cotton with an average share of only 0.13% of the total cultivated land and 0.1% of the produced cotton for the year 1998-2000 (MoARD, 2004). In terms of international trade in lint cotton, the export share for Ethiopia is also a mere 0.1% with revenue of only 0.06% for the

same year. Various reasons could be pointed out for the poor performance of the country in cotton production and marketing. Limited availability of research and extension services together with inadequate supply of inputs and lack of capacity to supply quality products, existence of inadequate infrastructure and finance are among the few (Agrediv, 2003).

In spite of its poor performance, the cotton sub-sector still offers a unique opportunity for Ethiopia in terms of serving as a bedrock upon which the country can shift to high value added technological transformation following its strong backward and forward linkages with various sectors, and its provision of employment opportunities for the large number of the rural poor. It is against this background that the Government of Ethiopia wishes to take a deliberate effort and action to stimulate the growth and potential of this sub-sector in terms of making cotton one of the major commercial crops in the country. In connection to this, it is high time to closely analyze the performance of the sector and identify at which point of entry problems arise. Although previous studies have tried to pin point problems that are associated at the farm level, it is important to investigate further each point of the commodity chain at the production, processing, and distribution level. Furthermore, due to the increasing international demand for cotton lint, it is vital to study the governance pattern for the global cotton market so that Ethiopia can easily identify the entry point that would enable her to convert the existing comparative advantages into a competitive one.

Using commodity chain approach, this study tries to link local production and the international trade by assessing opportunities and challenges faced by the sector to sufficiently meet the domestic demand for cotton lint and enter the global market by enhancing its competitive position. Specifically, the value chain analysis attempts to map the flow of inputs, goods and services starting with seed cotton and move through all points of market channels including producers, ginners, spinning industry, and the garment industry until the final consumers are reached. The following specific issues are addressed:

- Analyzing the value added in each chain, that is map the pattern of income distribution and explain why these patterns are emerging. Such comprehensive focus on the different components of income distribution leads to the identification of the determinants of income distribution that would help to identify problems and constraints in each transfer point of the chain;
- Identifying which activities in the chain are able to sustain high income (critical success factors) and the nature and extent of barriers to entry along the chain. This implies addressing the determinants of competitiveness in the cotton chain;
- Identifying potential local producers or firms that can become international competitors, and seek for local lead firms that can effectively insert remaining domestic producers in the global production network; and
- Analyzing how the insertions in the global value chain and its dynamic processes that occur within the chain have affected the various stakeholders and their livelihood in order to have appropriate pro-poor implication.

The study relies much on secondary data that was obtained from various documents and publications available. This is also supported by intensive interviews with key informants, on-farm field visits to different sites and focus group discussions of various stakeholders. Major chain actors involved in cotton commodity sector have been characterized and mapped<sup>1</sup>.

In the following section, a theoretical framework for value chain analysis in general and agri-chains in particular is put forward. Section three attempts to address the overall situation of the cotton market in the global economy, which will then be followed by a discussion on cotton sector in

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<sup>1</sup> Mapping value chains having identified the value chain in question, the task is then to put numbers and value to the variables under investigation. In here the focus will be all value chain will gain from constructing a “tree” of input-output relationship which include most of the following primarily general accounting identity (gross output values), net output values, physical flows of services along the chain, flow of services, consultants and skills along the chain , employment, distinguishing between permanent, destination of sales, for example, to wholesalers and retailers and concentration of sales amongst major buyer.

Ethiopia in section four. In this section, intensive analysis of the sector is made by taking case studies of cotton producers and processors that are both state and privately owned. Section 5 presents the supply and linkages of cotton both with the domestic and the international market.

In the domestic market, it will try to uncover the linkages with textile mills, garment factories, handloom sectors, and the edible oil processing mills. In the international market, the sector's relationship with the dynamically changing trading networks will be revealed. The final section is conclusion and policy implication.

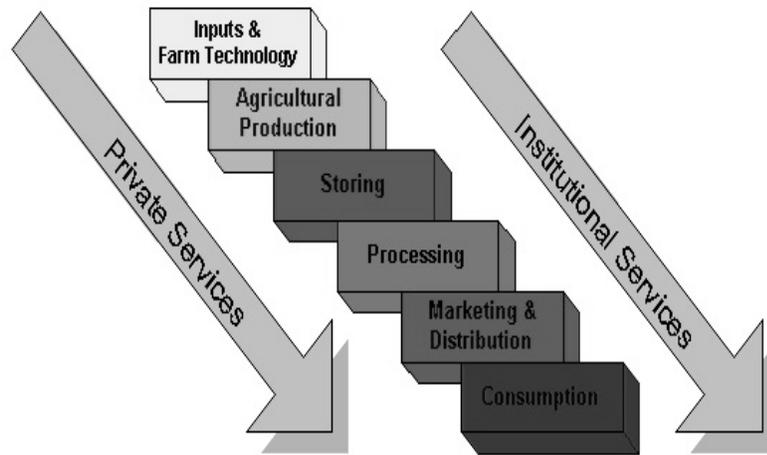
## **2. Theoretical Foundations of Value Chain**

In recent years, global agriculture has been transformed from primarily being supply driven towards meeting consumer demands for quality, safety, convenience, and choice (Regmi and Gelhar 2005). The rapid consolidation of global retail chains and the development of supermarkets in developing countries have accelerated these trends, as traditional distribution channels for commodities are being challenged by centralized, modern channels that place an emphasis on safe agricultural products with consistent quality and volumes (Weatherspoon and Reardon 2003). Supply chain management is becoming an increasingly important component in the delivery of high value agricultural products (HVP) in both developed and developing countries. The establishment of efficient supply chains necessitates the creation of relationships, networks, skills, and coordination mechanisms to manage the flow of products between intermediaries and ensure that quality specifications are met. Regarding agricultural products, the private sector has facilitated the establishment of these networks through vertical and horizontal linkages, sourcing largely from big farmers who may or may not contract out to smaller firms (Dolan and Humphrey 2000).

In agri-chains, producers are integrated with processors, traders, distributors, and possibly importers in external markets. This could be viewed as an alternative form of market organization, in contrast to the classic spot market exchange, where buyers and sellers are anonymous and markets clear at a uniform price, or in contrast to vertical coordination, where a single firm owns and conducts multiple activities itself within the chain. There are three important analytical components of value chains (Kaplinsky et al., 2001). These are:

- The organization of the value chain determines the distribution of profit, which arise with both differential productivity of factors and barriers to entry, and which are dynamic;
- Effectively functioning value chains involve some degree of “governance,” in which key actors control the division of labor and exclude subordinate actors from higher-value activities; and
- Agri-chains involve a number of interconnected steps (Fig. 1). These range from the origin of farm inputs and farm technology to the agricultural production process itself, harvesting, storage, processing, marketing, and distribution, all the way to the final consumption. Each step is supported by pertinent private services like credit and transport; and institutional services such as infrastructure, markets, grading, standard, and research.

Figure1. Simplified agri-chain components



The rapid growth in agricultural exports has been part of a fundamental and broad-reaching trend towards the globalization of the agri-chain system. Seasonality of demands, trade reform, and technical changes has altered the patterns of trade in agricultural products. This has resulted in a shift from homogenized commodities towards increasingly differentiated products in which the role of grades and standards has shifted from a technical instrument to reduce transaction costs in homogenous commodity markets to a strategic instrument of competition in differentiated product markets.

Agri-chains incorporating numerous actors associated with the marketing, distribution, finance, support, and retail of agricultural commodities has further increased the complexity of trade in agricultural products, despite the fact that in many cases they have become shorter, as buyers seek to increase efficiencies and reduce costs associated with intermediaries.

Supply chains could be seen as networks comprising both horizontal and vertical linkages (Lambert and Cooper 2000) and may transcend national boundaries (Kaplinsky and Morris 2001). Supply chains for non-processed agricultural commodities distinguish between modern markets, i.e., those that are exported to foreign retailers and traditional supply chains. In some cases, there will be overlap between traditional and modern supply chains, as modern supply chains may rely on traditional channels to obtain any shortfall of goods from their own channel. For instance, three types of “flows” can be distinguished within the supply chain: flows of materials, flows of services, and flows of information. Information flows communicate characteristics related to quality, safety, and consumer demand. Note that information flows are transmitted in both directions. Breakdowns in information between actors can lead to inefficiencies in the supply chain. Good supply chain management practices will implement coordination mechanisms to ensure that value is created and distributed “based on the locus of value generation” (King and Venturini 2005), while being cognizant of the demand-led drivers for the good or service.

Supply chains create value through integrated relationships in three ways. First, supply chains expand the scope of markets beyond which individual members could achieve on their own. Second, supply chains achieve economies of scale in terms of cost savings, leading to specialization and clustering, thus raising profits for chain actors. Finally, supply chains can better segment markets and offer a wider range of goods on the basis of such differentiation.

Agri-business development functioning through supply chains may serve for developing countries like Ethiopia to achieve multiple development goals simultaneously. Agri-business, as a process that produces, conditions, preserves, packages, and markets agricultural raw materials can contribute to economy-wide development, promoting the generation of employment opportunities, addresses food security problems, and becoming a catalyst for the economy as a whole. The benefits of

development will also reach the various actors in agri-chains in different ways. Against this background and framework, this study outlines and provides a schematic analysis of cotton sub-sector in Ethiopia using value chain approach (VCA).

### **3. Cotton as Industrial Commodity**

For the last five decades, the world cotton market has experienced dramatic changes which can be attributed to an increase in consumption of cotton where it doubled in this period, followed by the concentration of industrial processing of cotton fiber in developing countries due to shift of textile industries to these regions. Cotton production has also accelerated along with consumption, which resulted from gains in yield, increased cultivated areas and adoption of new technology that minimizes risk and cost, resulting in higher production (ICAC, 2004).

There are various reasons that led to accelerated increase in cotton consumption. One reason is related to boosted world demand for clothing that further led to increased cotton demand in the world. Clothing consumption, being a primary consumer good, is highly responsive to income, making demand extremely elastic for the short run change in income. As income grows however, clothing consumption grows more slowly than income on average. This makes clothing and hence cotton to be consumed relatively higher by developing countries than developed countries. Rising income together with falling clothing prices that is further derived from falling fiber prices has also resulted in increased consumption of fiber. Compared to other competing fiber types in the market, cotton is now gaining its market share due in part to shifting global price trends after losing its ground to polyester and other synthetic fibers for many years (Baffes, 2004).

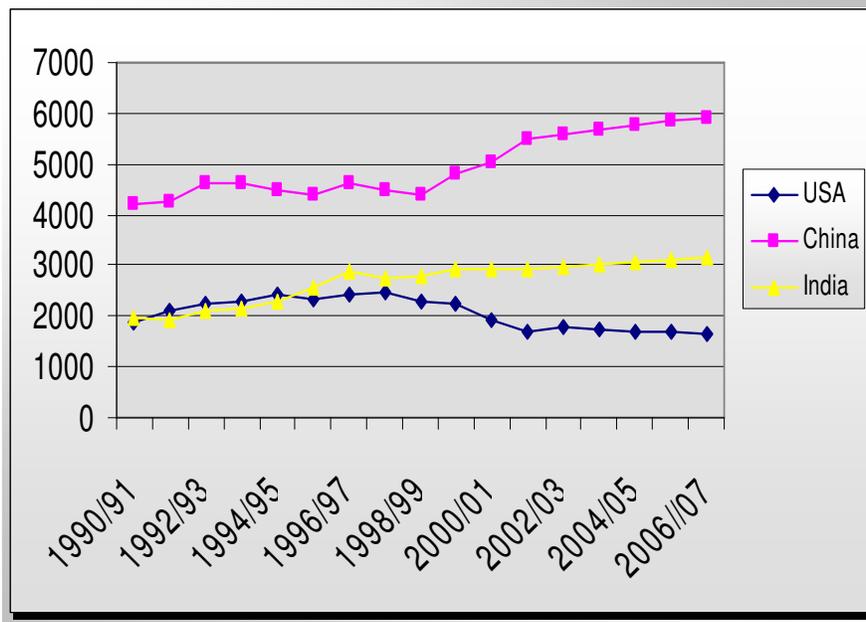
The relative price of cotton in relation to other textile fibers declined by 10% between 1998 and 2000, 22% in 2001, and 9% in 2002, stabilizing cotton share's of world fiber consumption over time. The declining cotton price can be seen from the supply side due to reduced production costs arising from technological improvements and supportive government policies that few countries follow. From the demand side the declining price is attributed to stagnant per capita consumption and fierce competition from synthetic products.

The gradual integration of textile trade in to WTO rules has also contributed to increased textile consumption resulting in higher demand for cotton fiber mostly by developing countries. Following the full integration of the quota categories in 1 January 2005, mill consumption of cotton has accelerated concentrating rapidly in developing countries at the expense of decline in cotton processing in the rest of the world, particularly in industrial countries.

China has become the dominant player in the international market in terms of affecting both consumption and production of cotton due to its significantly increasing textile industry. Following this, there has been a sharp increase in cotton mill use in China starting from 1998/99. During that period, mill consumption of cotton has increased by 130%, accounting for about 85% of the increase in global mill use. Although the share has decreased over time, China still has the largest share of almost 40% of the world mill use in 2005/06. However, the country was unable to support this increasing demand for cotton mainly from its domestic production. With depleted stock over time, China was forced to resort to imports of raw cotton from the rest of the world. In 2003/04 alone, the surge of cotton imports by China was recorded to be 1.9 million tons or 26% of the world imports. Industrial countries particularly USA has become major supplier of cotton to China following their increased cotton production and the accelerated erosion of the cotton textile sector in these countries leaving huge amount of exportable cotton. In 2003, the cotton textile sector in these countries declined by 11% falling to 2.5 million

tons of mill usage. This number is expected to decline in the coming years while mill consumption of cotton in developed countries has reached 17.8 million tons in 2003, and 19.7 million tons in 2005 (Fig 2).

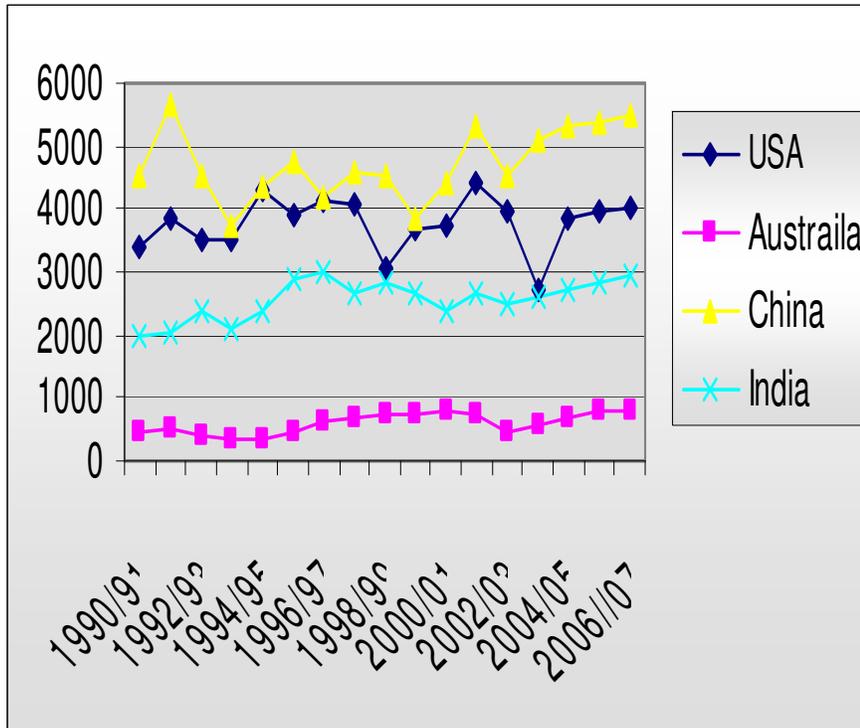
Figure 2. World consumption of cotton lint ('000 mt)



Source: Computed from Bulletin of the ICAC, 2004

Unlike the concentration in the global consumption of cotton mainly to developing countries with dominant textile industries, the production trend in raw cotton will remain to be widely dispersed throughout the world with industrial countries like USA and Australia remaining to be major producers and exporters of raw cotton to the international market (Fig 3).

Figure 3. World production of cotton lint ('000 mt)



Source: Computed from Bulletin of the ICAC, 2002

Following the increasing demand for raw cotton in the world, biotech cotton is giving the world textile industry a new image in terms of increasing the volume of production. This genetically engineered variety, which is adopted by major cotton producing countries like USA, Australia, and China, has already accounted for 21% of the world cotton area and about one-third of world production and trade. Even if the GE variety does not result in higher yields, the technology is highly risk and cost reducing by minimizing pesticide usage leading to larger area cultivation and greater production (Table 1). In terms of the production share of biotech cotton in exporting countries, it accounted for 34% of world exports in 2002/03 and 36% in 2003/04 and almost 50% in 2004/05. The large share of the export went to Asia and Oceania with an estimated 64% of the share in the same year.

Table 1. Coverage of GE cotton varieties

Country	Coverage (%)
China	60
Australia	30
USA	75
<b>World</b>	<b>50</b>

*Source: Various publications of ICAC*

Taking into account that Asia and Oceania covers the largest share (65%) of world export of cotton textile, it is evident that textile made from biotech cotton is also entering major markets in Europe, America and throughout the world. Even if biotech cotton is increasingly covering the international trade, there are no price differentials between the GE modified and the non-biotech cotton fiber, nor are there any evidences of consumers rejecting garments made from biotech cotton. This is an indication that markets do not identify biotech cotton content, but rather evaluate cotton properties based on quality characteristics (Bacerra, 2004).

Advanced irrigation managements, improved pesticide formulation, and application together with various farming systems also account for expanded cotton production in the world in addition to the newly adopted biotech technology.

### **3.1. Competitiveness and governance in global market**

The performance of trade in the cotton industry is an open network of transaction where cotton simply moves from the field to the mill either directly or indirectly through international trading companies. This has made cotton to have a relatively low level of drive-ness and/or lack any clear lead agent that would define the division of labor, the entry barriers and hence the governance pattern. This kind of an “arm-length” relationship among the various agents along the chain leads to the

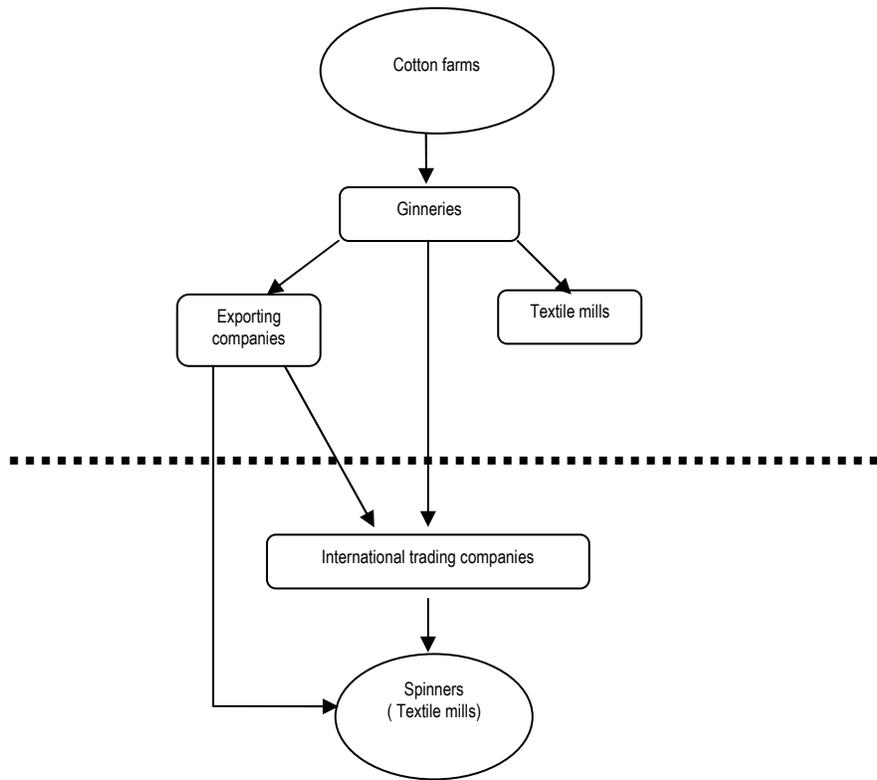
importance of contract based principles and trading networks that are set to regulate the fulfillment of the terms and conditions of each contracts.

Marianne (2003) mentioned two reasons as to why such kind of trading networks emerge for cotton while other internationally traded commodities like coffee and cacao tend to have a “buyer-driven” type of governance patterns. The first reason he mentioned relates to the fragmentation of both cotton production and consumption throughout the world. Cotton is one of the rare agricultural products where production and consumption is more or less global in extent. This specific feature of cotton would make it impossible for few agents to control the entire market functions by themselves. As noted by Marianne himself, “As both cotton producers and end-users are many and dispersed, it would be imposable for producers and consumers alike to oversee the entire marker and perform all trade functions themselves.” (pp 10)

This aspect has lead to the importance of international trading companies to become the key agents and act as intermediaries between producers (ginning companies) and immediate consumers usually the textile mills.

The second reason for the relatively low level of drive-ness and hence an arm-length relationship in the cotton chain is attributed to the above functions of international trading companies (Fig 3). Their ability to collect and present various blend of cotton that are of different national origins make them to play a significant role in the cotton chain in terms of fulfilling spinners preferences to obtain the right blend with higher yarn quality. Their flexibility in expanding the scope of some of their tasks according to spinners’ changing preferences has also made international trading companies the sloe agents in bridging producers and consumers. Consumers (spinners) in some countries are now asking for immediate delivery of raw cotton, which implies the need to hold large volumes of various national origins for a long time as stocks on the side of the international traders.

Figure 3. The global cotton market chain



Even if there is lack of any clear “lead agent” in the cotton chain that would exercise power in terms of setting various marketing rules, often sellers particularly exporting companies tend to decide the conditions of the contracts, and reflect their will in most transactions (Gillen,2004). This is because cotton exporters are few in number yet huge in size, while there are thousands of small importers (textile mills) dispersed throughout the world, giving the former much of the bargaining power during transactions.

### 3.2. Lint quality and competitiveness

As in the case of other marketable commodities, quality parameters are the main determinants of price in the global cotton market, and have become the major source of differentiation in end markets. This phenomenon has made quality management to be the most important competing ground that supplier countries have to match. This is further accelerated by increasing demand for quality and greater accuracy of assessment for fiber properties by textile mills.

Fiber quality is a combination of physical and biological properties of cotton that would determine its fiber length, fitness, maturity, strength, color and trash content. A set of interlinked factors starting from cotton cultivation on the field until it is processed in the ginneries, and packed and shipped to the final consumers determine fiber quality resulting in wide variety of lint. These varieties are the reasons for the differences in the end use, and hence the value attached to cotton lint.

Almost 30 years ago, lint qualities were commercially assessed based on a 'universally' set classification system that used to provide very limited information about the "industrial relevant characteristics of the fiber property" (Marianne,2003).The then existing subjective visual inspection of fiber quality has gradually developed in to a more accurate assessment mechanism by increasing the number of measured properties. Such objective measurement system that incorporates both the manually and mechanically operated instrument to measure the strength, micronaire, color and the trash content of cotton is known as High Volume Instrument (HVI).

HVI matches well with the recently developed high-speed technology of yarn spinning that makes detailed measurement of the strength of fiber rather more important. Furthermore, the classification system has become a source of increased competition among the textile mills in terms of

producing differentiated and more sophisticated products based on the various grading of the fiber quality.

### **3.3. Global market policies**

The cotton industry has been subjected to various policy interventions. One of the most significant interventions has been taxation or subsidy policies, which has a great impact both on production and on consumption of cotton throughout the world. Effective 1998 Brazil, China, Egypt, Greece, Mexico, Spain, Turkey, and USA have been consistently supporting cotton production (ICAC, 2004). This has greatly affected the international cotton price prospects and consequently the export share of low-income countries including many African nations.

The immediate effect of subsidies provided at the international level is to increase and maintain cotton production at otherwise unprofitable levels mostly in industrialized countries. The excess supply that is induced by domestic subsidies has a depressing effect on the world market price. The reduced price tends to make cotton competitive in the international market relative to other synthetic fiber types; however, studies show that it has income reducing impact on those countries that do not exercise such protective policies although the magnitude of the impact vary from one study to another due to the range of assumptions used.

It has been suggested by many that support by developed countries to their cotton producers should reduce substantially or eliminated altogether in order to have fair distribution of income in the world. This policy implication, however, is prone to many political, social, and economic issues, which are very sensitive and take time to unravel their effects. Rather, countries seem to prefer the second best alternative that is to give support to cotton production in a non-distorting manner. This type of support with minimal distortion effect is called 'decoupled support mechanism' and has regained popularity in recent years. The income transferring mechanism under decoupled support is based on past

productions and prices which are expected to have a small impact on current production decisions (Baffes, 2004).

The other policy issue that seems to have an impact on cotton industry is the phasing out of the Multi Fiber Agreement (MFA) in 2005. The gradual phasing out of MFA quota has been driving a shift in the world textile production, and more changes have already been seen after its elimination.

In the post MFA era, investment in textile production has grown significantly in Asian countries, particularly in China, India, and Pakistan. On the other hand, there has been an erosion of textile mills and garment factories in North America, the EU and in higher income East Asian countries. Concerning clothing consumption, it is likely to increase in USA and EU due to reduced prices following the total elimination of quotas. However, clothing prices in the rest of the world are expected to have an upward pressure due to a rising demand in USA and EU. This will equalize clothing price in the world, and the overall demand for clothing is not likely to change fundamentally. Following this, the removal of MFA is likely to have a very little impact on world cotton consumption; as household clothing demand are directly determined by consumption of cotton. “The impact of MFA liberalization on total world cotton consumption is likely to be small and spread out over the years preceding and following the December 2004 elimination of MFA quotas. The removal of these quotas is expected to affect the geography of textile production more than the level of worldwide consumption. Developed country consumers will, however, consume more cotton products, and developing country textile mills will consume more cotton fiber” (MacDonald et al., 2005)

The above point implies that after the phasing out of MFA, world cotton consumption will strongly be influenced by factors other than the removal of quotas.

## 4. The Cotton Sub-Sector

### 4.1. Production

Ethiopia is known to have immense potential for cultivation of cotton with a suitable land extending from the low to mild altitude areas. According to the MoARD, the suitable cotton production area is estimated to be 2,575,810 ha, which is equivalent with the fourth largest producer, Pakistan. Despite this huge potential, however, the annual area under cotton plantation covers merely 42,371 ha, with an annual production of less than 84,000 tons of cotton (MoARD, 2004).

Cotton grows in the lowlands with an altitude range of 300-1800 m above sea level, with an ideal temperature of 20<sup>0</sup>C-40<sup>0</sup>C. The main growing areas include the Awash Valley, Humera, Metema, Arbaminch, Wolayita, and Abobo areas with an optimal rainfall amount of 600-700 ml.

Following the diversity of regions where cotton is grown, the planting period also varies accordingly. In the Middle Awash and Rift Valley areas, cotton planting starts in early May and ends early June, while in the Lower Awash Valley, planting starts in late June and ends in mid August. For the Upper Awash, planting is carried out during late April until early May, whereas in Metema and Gambella it is planted during June until August (Agrediv, 2004). Cotton harvesting time also shows variation of similar nature. In the Lower Awash, harvesting begins early November and ends mid January, whereas for Middle Awash the harvesting time starts in late December and ends during end of November. In Humera, Metema, and Gambella, harvesting takes place starting mid November until end of January.

The ownership pattern for the cotton farming sector in Ethiopia is characterized as state-owned farm enterprises, big private commercial farms and smallholding peasant farms, where the private commercial

farms accounted for the major share of 43% of the total area cultivated, while the smallholder peasants represent 27% during 1996/97-2000/01. In terms of annual production, private commercial farms still offer the dominant share of 56% of total production, followed by the state farm enterprises (32%) and the smallholder peasant (12%).

Although the exact number of private ownership is not known, studies show that there has been an increase in the area planted due to the transfer of land to private commercial farms away from state enterprises. Currently, there are five state-owned farms, which account for 31% of the total cultivated area. These state farms are Tendaho, Middle Awash, Upper Awash, North Omo, and Abobo.

In spite of the low share that publicly owned farms have in total area cultivated and annual production level, they perform relatively better in terms of productivity by using better farming system than the privately owned and the small peasant farms. The average annual productivity for the state owned enterprises ranges from 20 to 30 q/ha on irrigated farms and 15 to 20 q/ha under rain fed agriculture. Privately owned farms that use irrigation systems also have a better productivity level than the small peasants, who predominantly rely on traditional and backward farming practices. In general, the productivity level of cotton production in Ethiopia is 1 metric ton (Table 2), which is relatively better than that of Nigeria and India but is very small compared to other major cotton producing countries like Syria, China, and Turkey that have a productivity level of 2.9-3.6 metric ton per ha ( MoARD, 2004).

Table 2. Productivity of cotton by various producers

Type of producer	Productivity (q/ha)	
	rain fed	irrigated
Small holders	5-10	-
Private commercial farms	15-20	20-30
State owned farms	15-20	20-30
Research Institutes	-	35-40

*Source: Werer Research Center*

The different farming techniques together with various inputs utilized and the overall management system in the production process would imply for the disparity in the productivity and quality of cotton produced by the various farms. The case studies undertaken for the three categories of producers in Afar and Arbaminch reveal this fact very well.

#### **4.1.1. Case 1: State -owned farm**

The publicly owned enterprise located in the Afar region constitutes three farms with a total are of 6800 ha, of which 84% is currently cultivated. Among the 19,500, ha of land covered by cotton under state ownership, the enterprise is the second largest proceeded by Tendaho with 7700 ha.

The farm since its long establishment has been providing lint cotton for textile factories and for export market, cotton oilseeds for oil factories and planting seeds to cotton farms. The enterprise has permanent employees of 906 labors of which 110 are professionals and 796 are non-professional. It also provides temporary employment opportunities for more than 5000 seasonal laborers during harvesting (Table 3).

Table 3. Average enterprise capacity

Products	Designed production (q)	Attained production (q)	Capacity Utilized (%)
Seed cotton	229915	197070	86
Lint cotton	78171	74886	96
Oil seed	147146	114301	78
Planting Seed	4000	2906	73

Source: Privatization and Public Enterprise Supervising Agency (PPSA)

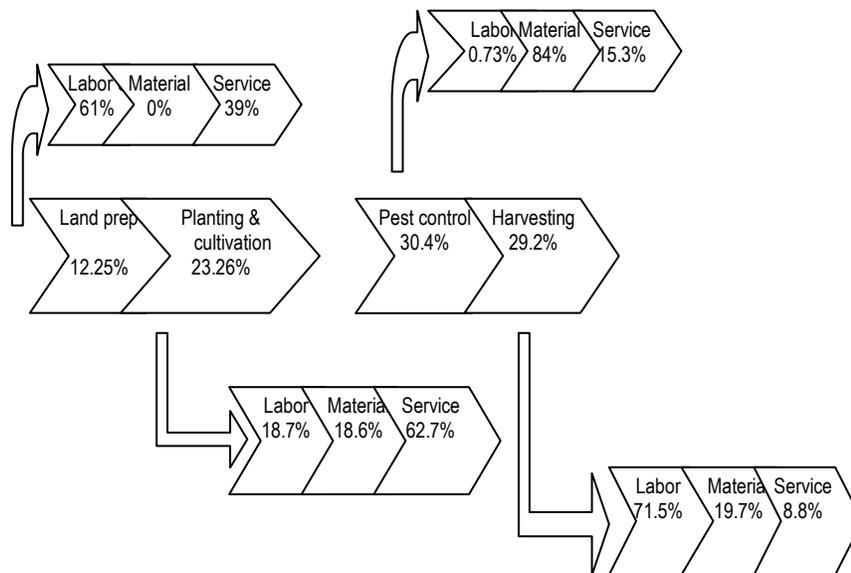
The enterprise uses modern and mechanized farming practices. According to interviews, average yield per ha is 26.5q, while their plan is to reach above 30q/ha which is the country's maximum average for irrigated cotton farms. The average cost is estimated to be 7476 birr/ha or 244 birr/q. Of the total production cost, 3502 birr/ha goes to direct costs while the rest constitute the indirect cost. Indirect costs, mainly overhead costs that include salary and other expenses for the supporting staff covers the larger share.

To see the prospects and problems faced by the enterprise, value chain analysis is undertaken by dividing the overall farming activity in to five categories namely; land preparation, planting and cultivation, weeding, pest control activity and harvesting. As depicted in figure 4, land preparation covers 12.25% of the total direct farm cost. Land preparation is a labor intensive activity in which labor covers 61% of cost. Some of the land preparation activities are also done with the help of machinery such as slashing, ridging, and leveling constituting 39% of the cost.

After the necessary preparation is made on the land, the next step is planting and cultivation. This is a capital-intensive activity where service mainly for machinery activities covers the highest cost of 62.7%. The major inputs that are used on the farm during cultivation are seed, irrigation and cultivation materials that together cost 167.9 birr per ha.

The two major seed types that have been used on the farm are Akala SJ2 and Delta Pine-90, which were released from Werer Research Center. Akala SJ2 was released in 1987 with an expected yield of 32.5 q/ha. Delta pi-90 was released during 1990 with a better-expected yield of 38.5 quintals per ha. The farm used to buy these seeds from the research center, but now it has been long since it starts preparing its own seeds, and even sells to other farms. The cost of seed per hectare is estimated to be 146.3 birr.

Figure 4. Value chain analysis from the State Farm



Source: data obtained from the State Farm

Pests remain to be a major problem on the farm, although they have managed to control it with the help of insecticides. The major pests that are observed on the cotton farm are the African bollworm, White fly, Aphids, and Red spider mite. The first two are major treats to the farm having an impact on the quality and yield of cotton product. For this, pest control activity covers the largest cost by taking a share of 30.4% of the total farming process. Among the pest control costs, insecticides cover

84% or 990 birr/ha. Cost of renting and oil for aircraft for spraying the chemical is also high with an estimated 180.4 birr/ha (Table 4).

Table 4. Cost structure for pest control

Cost	Birr/ha
<b>Labor cost</b>	
Chemical Mixer	2.29
Flag men	6.36
<b>Material cost</b>	
Insecticide	990.1
<b>Service cost</b>	
Aircraft spraying	180.4
Total	1179.15

Harvesting which is mainly done by hand usually for two rounds is the second largest cost of the farming activity. Pickers often came from the Southern part of the country covering the largest cost of almost 730 birr per ha. It is estimated that for one harvesting season, up to 5000 seasonal workers are employed. The transportation cost to bring and return them back together with the ration that is allocated during their stay on the farm make up part of the total cost. A picker is paid on state farms 25-30 cents per kilogram with an estimated productivity of 25 kilos per day. Apart from pickers, harvesting and bagging materials costs approximately 76 birr per ha (Table 5).

Table 5. Input costs on the farm

Item	Birr/ ha
Seed	146.33
Irrigation material	15.38
Cultivation material	6.27
Insecticides	990.1
Harvesting material	46.1
Bagging material	30.14
Ploy Sheet	140.0
Labor cost	1465.72
Service cost	597.87
Total direct cost	3437.91
Indirect cost	3974
<b>Total farming cost</b>	<b>7411.91</b>

#### 4.1.1.1 Major problems faced by the farm

*Lack of improved seeds:* As mentioned above, the farm uses two seed types, which were released, from the research center almost 20 years ago. Interviews indicate that the yield capacity of these seed types is decreasing as the seeds lose their genetic potential from time to time. Now the farm is shifting away from Acala Sj2 towards Delta Pi-90, which has a relatively better yield.

There was an attempt to introduce another seed called *Gedera* that was imported from Israel in 2005. Because adaptation trial was not made prior to its cultivation, the seed variety resulted in huge loss for the farm. During the same year the farm incurred a loss of 13527000 birr where the capacity utilization of the farm decreased by almost 17% from the previous year mainly due to low yield (PPSA). Lack of improved seed variety has constrained the farm's capacity from reaching the desired yield and quality levels. Although there are many reasons for this problem, the fact that the farm does not get enough technical and/or

advisory support from various institutions, particularly from agricultural research centers is the major one.

*Irrigation water shortage:* Water shortage for irrigation arises from various reasons. Limited capacity of the canal that was built some 30 years ago is the major one. The canal was originally built to irrigate limited areas of land, but as the total area under cultivation both by the enterprise and by other farms in the nearby area increases, the capacity of the canal to reach the entire land has been declining from time to time. The other reason is related with the prolonged canal maintenance time taken by the Awash Water Authority. Because the authority does not finish the maintenance according to schedule, water will not be released to the farms during the appropriate irrigation time. During times of heavy flooding from the Awash River, the canal will also be closed completely as it will be filled with soil sediment, creating water shortage for irrigation.

To solve the water shortage problem, the authority once tried to open another way-out for the canal, but it did not succeed, as there were major problems in its design.

*Labor shortage:* Shortage of labor particularly during harvesting time is becoming a major problem to the farm. The vast majority of pickers are brought from the Southern part of the county, and labor sourcing was not a problem for a long time until recently. The low wage paid to pickers (25cents per kg) compared to the surrounding private farms is one of the reasons for shortage of labor which results in labor shifting away from the state farm towards other farms who offer a relatively better price. Apart from the disincentive created by low wage rate, alternative job opportunities created in areas where the laborers came from is the major reason that created labor shortage not only to the enterprise, but also to other cotton farms in the area.

Shortage of labor has a lot of implication on the farming operation. One has to do with loss of cotton quality as the plant has to stay on the ground beyond the intended time losing its moisture content and exposed to dust and other dirt materials. Delayed picking will also expose the cotton plant to be fed by cattle, camels, and goats. Due to increased problems faced by shortage of labor, the farm is planning to move towards mechanized harvesting although it is costly and results in lower quality of cotton compared to hand picking.

*Pest:* The common pest types that affect the fiber yield and quality are the African Bollworm (ABW), aphids, jassids and white fly. Particularly the ABW has a significant effect on yield and quality of lint, causing an average cotton yield loss of 48% or 720 kg/ha (Mohamed et al 2004), cited in Gezahegn, 2005). The most widely used method for controlling pest by the farm is the application of insecticides using aircraft spraying which cost approximately 990 birr per ha.

One problem associated with insecticide usage is the resistance development by the insects that subsequently fails to control the pest. The other problem arises due to the delayed availability of insecticides, as they are usually imported through various agents of chemicals in the country. Health hazards associated with the use of chemicals that have high level of toxicity is also a major problem. The most frequently used chemical on the farm is thiodon, which contains a dangerous chemical called endosulfan with high level of toxicity. Although there are no records of injuries or death caused by this chemical in Ethiopia, there has been a record of dozens of death in cotton farms associated with the use of this chemical, such as in India, Malaysia, and Sudan (Global Development Solution, 2006).

#### 4.1.2. Case 2: Private commercial farm

The privately owned commercial cotton farm was established in 1995 with 850 ha of land and with a capital of 12.9 million birr. Now the farm has expanded its land holding to 3000 ha and its capital has reached to 35.9 million birr. The farm has 500 permanent employees and up to 3000 seasonal laborers during times of harvesting.

The farming system is semi-mechanized with well-designed plots, canal structure and gravity furrow irrigation. The farming process for the privately owned cotton farm is the same as the state owned farm. Land preparation, weeding, and harvesting are labor-intensive activities, while planting, cultivation, and pest control activities are done with the help of machinery. The enterprise has a capacity of producing up to 84,000 quintals of seed cotton, with an average yield of 27-28 q/ha. From the total production, 38% is lint cotton and the rest 59% is cottonseed, and 3% is used as planting seed.

The total cost of farming is estimated to be 5000 birr per ha or 230.92 birr per quintal. Just like the publicly owned cotton farm, overhead expenses covers the largest share, costing up to 81.16 birr /q or 2272.48 birr/ha. The farming cost structure of the enterprise is more or less the same with that of the state farm, except for indirect costs which is lower than the state farm by about 1442.8 birr/ha. Among the major cost to the farm is labor for harvesting, insecticides, and water pumps (Table 6).

The major seed types used by the farm are the common Acala S<sub>j</sub>2 and Delta Pine-90, which used to be obtained from the state farm, but now the enterprise is able to prepare its own seeds.

Table 6. Cost structure of r the private farm

Item	Cost (birr/q)	Cost ( birr/ha)
Direct labor	53.12	1487.36
Direct materialt	51.21	1433.88
Direct service	36.19	1013.32
<b>Total direct cost</b>	<b>140.52</b>	<b>3934.56</b>
Farm overhead	81.16	2272.48
General and administrative expense	9.24	258.72
<b>Total cost on the farm</b>	<b>230.92</b>	<b>6465.76</b>

Almost all of the problems associated with the farming activities of the state farm like lack of improved seeds, shortage of irrigation water, shortage of labor and pest are also faced by the private commercial farm.

#### 4.1.3. Case 3: Smallholder farms

In the Afar Region, cotton farms possessed by smallholder peasants range from 2 to 100 ha of land, with an average yield of 20-25 q/ha. They usually work in close relationship with big privately owned commercial farms, which provide them with various inputs and equipments needed for the farming activity. They often take farming inputs and equipments on credit basis, which is offered based on an implicit agreement that the small farms would sell their final harvest to big investors who gave out the credit. Due to lack of any credit association, such kind of arrangement has remained to be the only alternative that the small farms have in the area.

In addition to the implicit contractual agreement made with big commercial farms, the smallholders who most of the times are people from other regions of the country would also need to make an agreement with the native tribes who own the land. This agreement is based on a fixed amount of payment to a particular tribe, which usually ranges from 30 to 45% of the net profit. Because of these multiple arrangements, the

peasants may sometimes end up with a negative balance, where a debt for the next harvesting season will accrue.

According to interviews, the average cost of cotton farming ranges between 4000 and 5000 birr/ha. Those farmers who possess a relatively larger hectares of land use mechanized farming techniques such as tractors which they rent at an average price of 290 birr/ha, disk at 130 birr/ha, ridge at 130 birr/ha and slasher at 30 birr/ha. The common seed type used by the farms is Delta pine-90, which is also sourced from the big investors at an average price of 7.25 birr/kg. During harvesting season, they obtain labor from the local area that costs 25 cents per kg, the same price that the state farm offers. However, in recent years, as labor shortage was a major problem for all farm types in the area, the small holders were forced to pay up to 30 cents/kg. Of the total farming cost, pesticide takes the largest share.

#### **4.1.3.1. Major problems faced by smallholders**

Apart from the common problems that arise due to the lack of improved seeds, shortage of irrigation water, labor shortage and pest, smallholder farms also face the following problems.

*Lack of finance:* There are no credit associations to provide peasants with the necessary finance for farming activities. This has limited the small holders' chance of looking for alternative input price offers in other markets, forcing them to rely on prices provided by big private commercial farms as in the case of the Afar region. This has also forced the small holders to sell the raw cotton without it being processed /ginned, an activity that usually adds value to cotton.

*Lack of market information:* Information regarding the existing domestic and/or international market is almost non-existent with the small holders. This has made them to become price takers, with no-negotiation power for the selling price of cotton.

*Problems related with land ownership:* As mentioned above, most of the peasants came from other parts of the region and pay a certain amount of their net profit to tribe members who own the land. The tribes have full power to disseminate the farmer upon failure of paying the specified amount, or if they obtain a better offer from another farmer who wish to expand his land. This uncertainty over land has been a major disincentive to smallholder farmers to invest their time, power, and money fully.

According to interviews and visits to various smallholder cotton farms in and around Arbaminch, the situation is a bit worse than the case in Afar region due to inter-related factors. In spite of the long existing tradition of cotton farming, in this area that was once called the Cotton Belt in Ethiopia, the area is loosing its originality due to obstacles faced by the farms starting from the very small land holdings they got. The average land holding of a household in that area is estimated to be one fourth of a hectare in which they use it for not only the production of cotton but also other cash crops like Banana and food crops like cassava, tef, sweat potato, and others. Because cotton harvesting requires a lot of investment and intensive care through out its cultivation period, there is a trend to shift from cotton to other less time and money consuming cash crops.

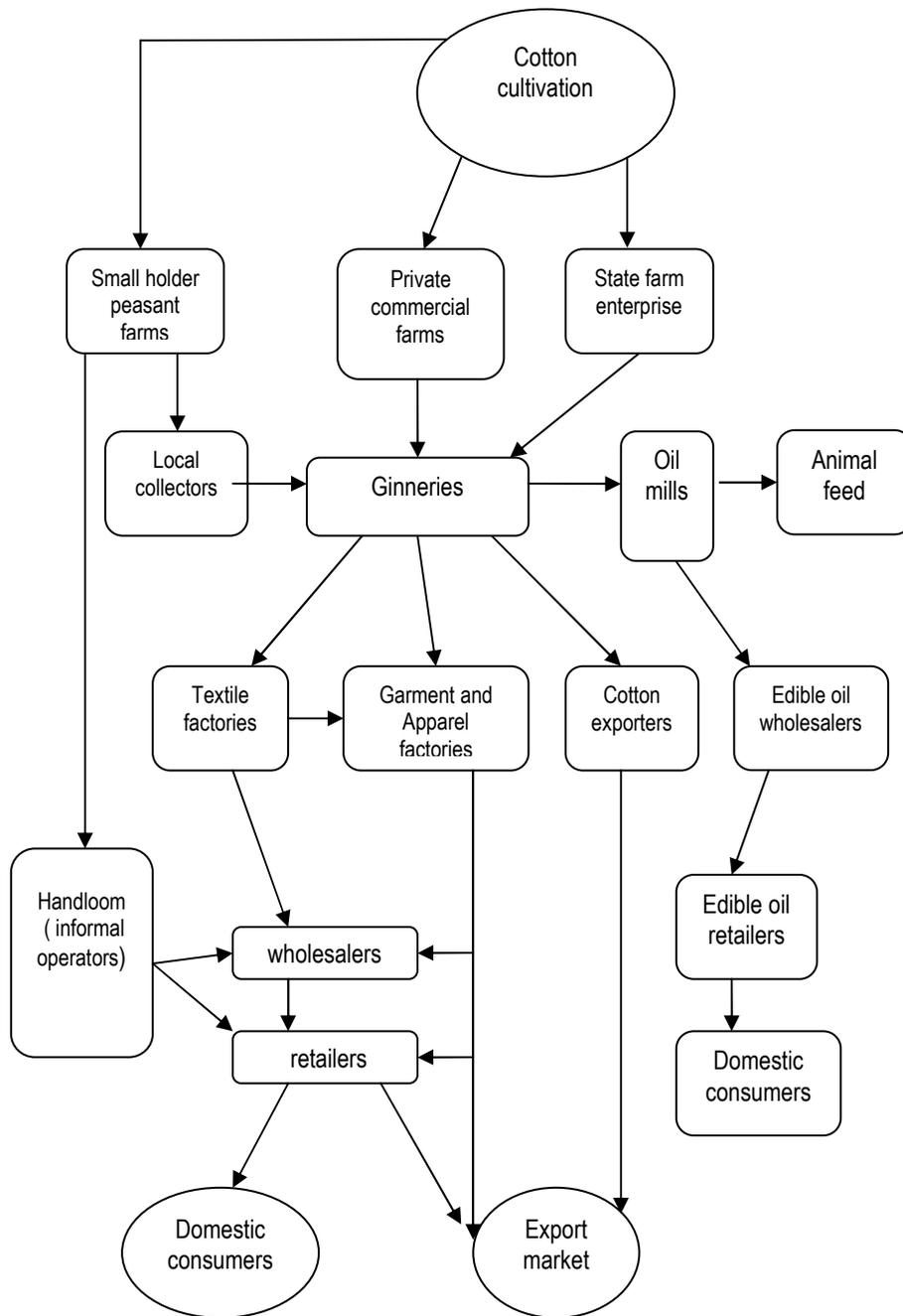
The small holders are aware of the fact that successful cultivation of cotton would result in higher yield and return at the end of the day than other cash crops cultivated in that area, but because of lack of finance and technical assistance provided to them, they prefer to cultivate other crops with lower but less riskier returns like banana. One other factor for the small holders to abandon cotton farming has to do with lack of market access for their produce. They lack information regarding where to sell and at what price. Often the local collectors would go around the house of every farmer and collect cotton at a very low price of 300 birr/q. The capacity of the local collectors to absorb the total cotton produced in the area is also limited resulting in large amount of cotton to be wasted without even reaching the local market. This shows that markets are highly disintegrated leaving little room for incentive to farmers.

Smallholder farms in Humbo Wereda, which is found around Arbaminch, have started to form trade unions that would collect the final cotton harvest and take it to the market. It is a good establish this Union to alleviate the market problem of farmers. Nevertheless, apart from that, huge technical assistance in terms of improving the productivity and yield of cotton together with forming a strong linkage with the domestic and international market is yet to be focused and developed.

## **4.2. Processing**

The raw cotton harvested by various farmers makes its way to various ginneries either directly by the cotton farms if they own the ginner or through local collectors. Ginners are pivotal in the cotton chain as the lint output from them links the cotton sector with the textile and garment factories both in the domestic and international market, while the cottonseeds will go to edible oil mills and as oil cake residues for animal feed (Fig 6).

Figure 6. The flow chart for the cotton sub-Sector in Ethiopia



Currently, there are 4 state-owned and 7 private ginneries in the country (Table 7), with an estimated ginning capacity of 200,000 MT of raw

cotton, but are operating under capacity due to the low production of cotton in the country (Agridev, 2004). While all the cotton produced by state farms and private commercial farms go to the ginneries, only 20% of the smallholder production is ginned. This is mainly because handlooms are the main buyers of raw cotton directly from smallholder peasant farms.

Table 7. Distribution, number, and operation of private and state-owned ginneries

<b>Private</b>		
<b>Location</b>	<b>No of ginneries</b>	<b>Operation</b>
Addis Ababa	4	Offer ginnery service to private commercial farms and lint cotton exporters in Awash valley and other cotton producing regions.
Gonder	2	Provide service to private commercial farms and cotton traders operating at Methema and its surroundings.
Humera	1	Owned by a cotton producing share company
<b>State-owned</b>		
Middle Awash State Enterprise	1	Provide service to state owned farms, and small holders around the area
Tendaho State Enterprise	1	Provide service to state owned farms
South Omo State Enterprise	1	Provide service to state owned farms
Abobo State Enterprise	1	Provide service to state owned farms

Most of the lint cotton processed by public and private ginneries is soled to domestic textile mills for further processing and production of textile fibers. Textile mills receive 80% of the cotton lint provided by ginneries, where only 20% goes to the export market that is very low compared to eastern and southern Africa average. The share of local lint cotton alone is 65% in the total raw material consumption of the textile and garment factories in the country (ILO, 2005).

The other main by product of the ginneries apart form lint cotton in cottonseed. The cottonseed that is separated from the lint is

predominantly used and soled in the domestic market that goes to edible oil mills and as oil cake residue for animal feed.

#### **4.2.1. Integrated value chain analysis for ginneries**

##### **4.2.1.1. Case 1: State-owned ginnery**

The ginnery owned by the state cotton farm was established in 1982 with a ginning capacity of 200,000-250,000 quintals of raw cotton annually. The ginnery that is located in the nearby vicinity of the farm also provides ginning service to other smallholder cotton farms.

The ginning process starts on the field, where the quality labeler classifies cotton into different categories. There are usually two grades given to cotton that are further classified into 5 to 6 types of grades based on the neatness, dirt content and the staple length of cotton. This grading procedure is essential to the ginning process, as those with the same or closely related quality types are supposed to be ginned together.

The ginning process is classified into ginning and pressing, i.e., putting the ginned cotton in to layers. The main inputs that are used for the ginning process are sulfuric acid and cottonseed, which together covers 25.12 % of the material cost. The technology used by the ginnery is saw ginning. According to the informant from the area, the ginning machines are old costing the factory up to 1.5 to 2 million birr for maintenance and buying of spare parts every year. This has made maintenance and spare part the highest cost incurred by the factory followed by cost of electricity.

Once the cotton is ginned and separated in to lint cotton, cotton oil seeds and planting seeds, the next step is bailing and packing to make it ready for market. The common packing material used by the factory is Hasian cloth that is made from *kacha*. The packaging and bagging material alone covers 10.9 birr per quintal. There is now a plan by the factory to move towards packaging materials that are made from cotton, as the Hasian

cloth made from *kacha* is creating a problem on the final lint quality .In general, the ginning operation costs approximately 29.79 birr/q without including indirect costs (Table 8).

Table 8. Ginning cost breakdown

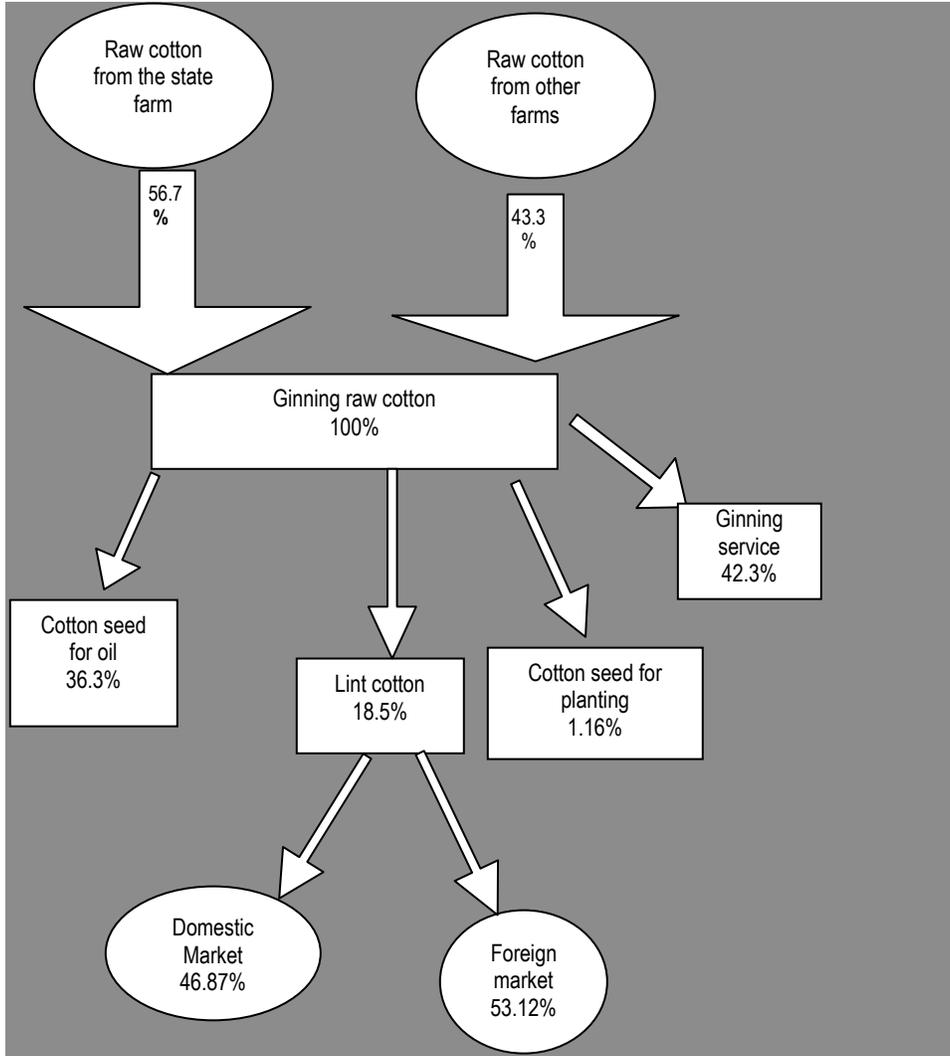
Item	Birr/q
Labor	3.44
Material	14.65
• sulfuric acid	0.60
• seed	3.08
• packing and bagging material	10.9
Service cost	11.7
• electricity	4.0
• maintenance	7.7
Total ginning cost	29.79

### **Value chain analysis**

For the year 2004 in which this analysis is made, the factory received 258,955 q of seed to be ginned. Of these, almost 57% came from the state farm, while the rest 43% came from other farms looking for ginning services. The factory gave out ginning services for about 5 to 6 farms every year, with an average ginning price of approximately 40 birr/q. The factory often sets the price for the ginning service after it calculates its costs, where the profit margin usually lies between 2-3 birr/q. From the total ginned raw cotton in the factory, 42.3% of the produce is handed back to the farms, which will then sell it either to domestic or foreign market.

Almost 36% of the ginned raw cotton is soled to domestic oil mills in the form of cottonseed for oil. Cottonseed is the major sales component by the factory. Oil processing mills like Adama and Modjo factories are the major buyers of oilseeds from the factory (Fig 7).

Figure 7. Value chain analysis of the ginning process



The oilseed is usually soled through auction after it is announced through media. The average price of oilseed is 150 birr/q. Due to the existence of huge demand for cotton oilseeds, there is no marketing problem, as the oil mills themselves contact the factory to buy the seed. There is even a practice of giving out cotton oilseed to processing mills with good reputation, before the final auction is issued. This is a kind of pre-commitment setup between the oil mills and the ginning factory based on

an agreement that the oil mills will pay the final winning price of the coming auction.

Lint cotton, which is the major production of the ginning process, covers almost 19 % of the factory's sale. Just like cotton oilseed, the lint cotton is marketed through auction process. The auction is usually held for each grade or specific quality of the lint cotton. While the domestic buyers, mainly the textile factories, obtain information about the tender directly from the local media, those buyers from other countries accesses the market either through agents and/or through direct contact with the producer.

Of the total lint cotton sold, 47% goes to the domestic market while the rest is exported. According to interviews, there is no major difference in the price of lint cotton in domestic and foreign markets. The starting price for the auction is usually set according to the existing international price of lint cotton, which is accessed through internet browsing. This shows that there is no clear indication of market information system flows for cotton, which needs to be further considered.

Although the price offer is relatively the same both for the domestic and export market (850-900 birr/q), the enterprise prefers to sell to foreign customers, because they usually buy in bulk where the payment procedure is often cash on hand basis, and because selling to the export market generated foreign exchange earnings (Table 9). Unlike market for cotton oilseed, there is no advance commitment with customers, as much of the marketing process including the price depends much on the final fiber quality, which is determined by lots of factors starting from situation on the farm.

Table 9. Sales by product type

Product	2003	2004	2005*
Lint cotton (q)	67784	45671	22797
▪ Local	-	21406	22797
▪ Export	69182	24265	-
▪ Birr (000)	59622	52511	21136
Oilseed (q)	81618	89595	49998
Birr(000)	8199	12157	6905
Planting seed(q)	2068	2862	825
Birr(000)	1079	2252	643
Ginning service (q)	92799	108660	83015
Birr(000)	3091	3818	2741

Source: PPSA

\*The year in which the new seed type, Gedera, was used that resulted in lower yield

### **Major problems**

Delayed ginning operation due to prolonged time taken to source spare parts from abroad to maintain the ginning machines is one of the problems that the factory faces. Electricity interruption is also a major problem, which results in almost 20% of the idle time of the factory. Shortage of qualified laborers and laboratory equipments that are essential for the grading procedure are also creating difficulty in the ginning process.

Limited information regarding the international market is a major marketing problem. Interviews indicate that there is no assistance provided by the government in terms of helping the factory look for various market accesses. In addition, lost market opportunities of attractive price offers from newly emerging customers are making the factory uncompetitive, as it has to wait for the tender time to sell anything.

#### 4.2.1.2. Case 2: Private ginnery

One of the unique features of the privately owned enterprise that distinguish it from the state owned farm is its close relationship with small holder farms who own from 2 to 100 ha of land in the area. The enterprise provides the smallholders with all the necessary farming equipments starting from seed, machinery for cultivation, insecticide, and even transport services on credit basis. All these services are provided based on an agreement that the peasant will sell the final cotton produce to the enterprise. The credit is usually balanced from the final selling price of cotton by the small holders at the farm gate. The average selling price of the raw cotton by the small holders to big commercial farms like is 300 birr/q.

Because the small holders lack market information and other sources of finance, this kind of arrangement is the best alternative they have in the area. This kind of marketing arrangement has increased the bulk of raw cotton to be ginned by the enterprise that usually collects about 40,000 quintals of raw cotton from the smallholder farms alone.

After collecting the raw cotton that is both produced on the farm and sourced from the small holders, it will then be transported to the ginnery, which is located in Addis Abeba. Of the total 124,000 q of raw cotton collected, 68% came from the enterprise's farm while the rest 32% is sourced from out-growers. The ginnery has a capacity of ginning 20 bells or 4000 kg/hour, and the factory has utilized 75% of this capacity until now. The machines used for ginning are relatively new compared to the state owned ginnery, and there is consistent and timely preventive maintenance every year.

In general, ginning operation costs the factory almost 18.02 birr/q excluding overhead and administrative costs, which is very low compared to the ginnery owned by the state farm that costs almost 30 birr/q. This disparity seems to arise from the existence of relatively new machineries in the privately owned ginnery, which has reduced its maintenance, costs

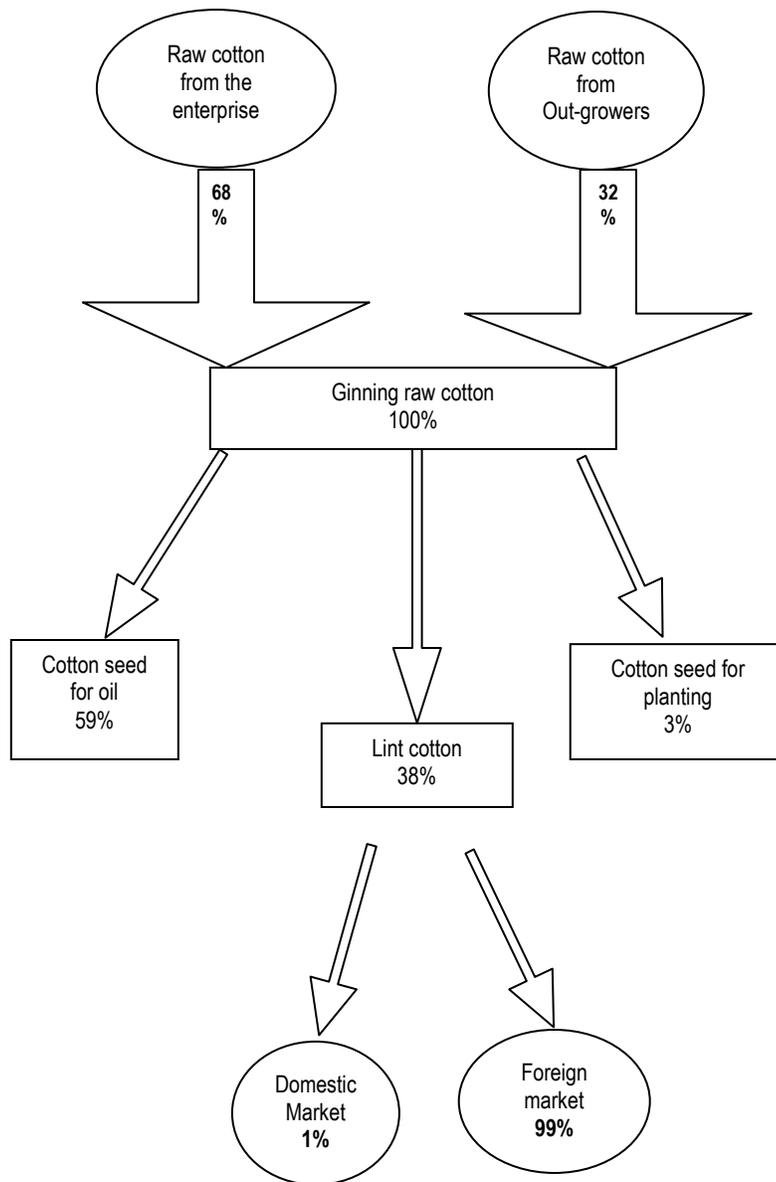
by large. Furthermore, the ability of the factory to utilize 75% of its capacity has increased its productivity reducing its costs relative to the state owned ginnery (Table 10).

Table 10. Cost breakdown for the ginning factory

Items	Cost ( birr/q)
Direct labor	6
Direct material	7
Direct service	4.02
<b>Total direct cost</b>	<b>18.02</b>
Overhead cost for supporting staff	24.70
Administrative cost	1.76
<b>Total ginning cost</b>	<b>26.45</b>

According to figure 8, from the overall ginning process, 38% of the product is lint cotton, 59% is cottonseed while the remaining 3% is seed for planting. The cottonseed is soled to domestic oil processing mills with an average price of 150 birr/q, which is similar to the state farm. The planting seed is usually soled to the out-growers on credit basis, and is used by the enterprise for the next planting season. Planting seeds are usually soled at a price of 87 birr /q.

Figure 8. Value chain for the ginning process



More than 95% of the lint cotton produced used to be marketed to local textile mills. Starting from 2003, the enterprise had diverted its marketing direction towards foreign market, where 99% of the lint cotton has been exported to far-east countries. The local customers are the various textile

mills like Almeda, Arbaminch, Hawassa, and others. Major customers in the export markets are companies like Plexix Export Limited of UK, Rain Heart of Switzerland, Dunavant S.A of America, and Gujarat of India. While the first three are retailers, which further sell the lint cotton to various textile mills in the world, the Indian company is a final consumer.

Unlike the state farm that sells its lint cotton under long auction procedures, the selling process of the enterprise is direct for the domestic textile mills, and direct and/or indirect through wholesalers and retailers for foreign customers. The selling price of lint cotton is determined based on the existing international market. The main source of marketing information is the internet particularly the website of 'The International Cotton Advisory Committee' that displays existing world cotton prices for each grade type. With regard to information gathering, there is no problem with the enterprise, and there is a well-established customer basis in the international market.

The average selling price both for the domestic and international market lies between 850 and 900 birr/q. whoever offers the highest price according to the existing international cotton market will be able to buy lint cotton without any preconditions. Nevertheless, just like the state farm, the enterprise prefers to sell to foreign customers who usually buy in bulk and are reliable customers.

Although there are no long-term contractual agreements between the enterprise and foreign customers, there is a practice of selling on short-term basis. The contracts are usually based on quality, quantity, price, and even method of shipment. These contracts are usually of short-term nature because it is risky both for the enterprise and for the buyers to commit themselves for longer time as the international cotton price fluctuates frequently.

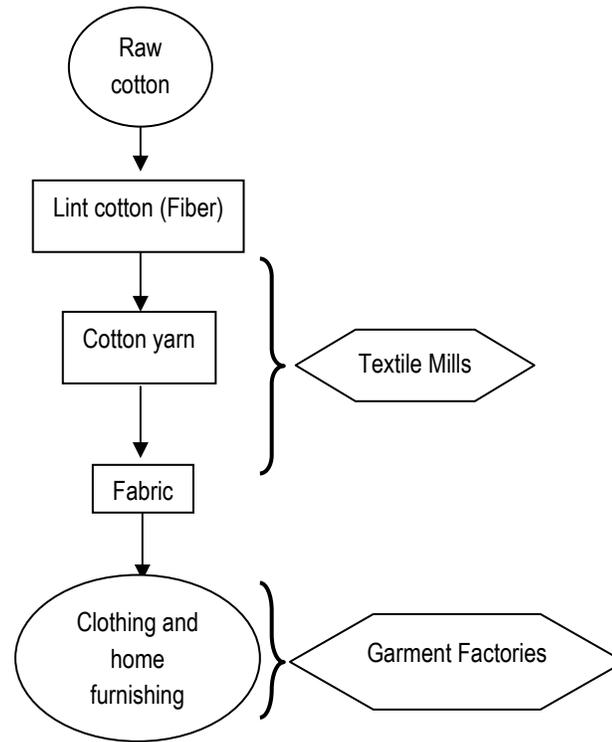
## **5. Supply and Linkages with Domestic and International Markets**

The following section will have a detailed discussion about the linkages of the cotton sub-sector both with the domestic and with the international market. In the domestic market, it will try to uncover the linkages with textile mills, garment factories, the handloom sub-sector, and the edible oil processing mills. In the international market, the sector's relationship with the dynamically changing trading networks will be revealed.

### **5.1. From cotton to clothing**

The first step of the cotton to clothing chain is the conversion of raw cotton in to lint cotton through ginning processes. The lint finer will be spun in to yarn which can be either woven or knitted in to fabric. Fabric is then dyed, printed, and finished using softeners, wrinkle-resistance resins or other processes. The finishing part of the chain usually accounts for a substantial part of the value added in fabric production. Clothing is then produced from the finished fabric that has been cut and sewn by various garment factories (Fig 9).

Figure 9. From cotton to clothing



Yarn and fabric production is often vertically integrated in Ethiopia, that is, a single firm usually state textile enterprise controls both processes. Of the total textile factories that the country possesses, five are spinning mills with integrated lint fiber-yarn-textile (fabric) setups and two spinning mills only with the production of spindles. The rest are engaged in the production of specific products like thread and blanket by sourcing the raw materials from other textile mills. Most of the gray fabrics and yarn from the integrated mills are exported to Europe particularly to Belgium, UK, Italy, Turkey, and Germany without it being further processed.

Textile and clothing production, on the other hand, are not typically integrated within one firm. In the country, the clothing production sub-sector comprises of 4 publicly owned and more than 25 privately owned garment factories that are engaged in the making of various uniforms and

work wears, knit wear products like sport wears, under wears and polo shirts, and various clothing and hospital products. Few garment factories are also engaged in textile making.

Domestically produced raw and lint cotton are the major raw materials consumed by textile factories, although other synthetic fibers and acrylic yarn are used to a limited extent. The share of local lint cotton alone is 65% of the total raw material consumption of the textile factories in the country (ILO, 2005). Almost 80% of lint cotton produced locally is absorbed by the textile mills for further processing to produce fabrics both for the domestic and for the export market. The domestically produced cotton is sufficient in fully satisfying the demands of the textile mills, making import of either raw and/or lint cotton negligible (Table 11).

Table 11. Market outlet for lint cotton (1996/97-2000/01)

Year	Total lint cotton output (t)	Supply to domestic market		Supply to export market	
		Volume (t)	%	Volume (t)	%
1996/97	30742	25746	83.7	4997	16.3
1997/98	29402	28219	95.9	1182	4.1
1998/99	29370	24335	82.8	5035	17.2
1000/2000	28633	20959	73.2	7674	26.8
2000/01	31101	25046	80.5	6055	18.5
Average	29850	24861	83.1	4989	16.9

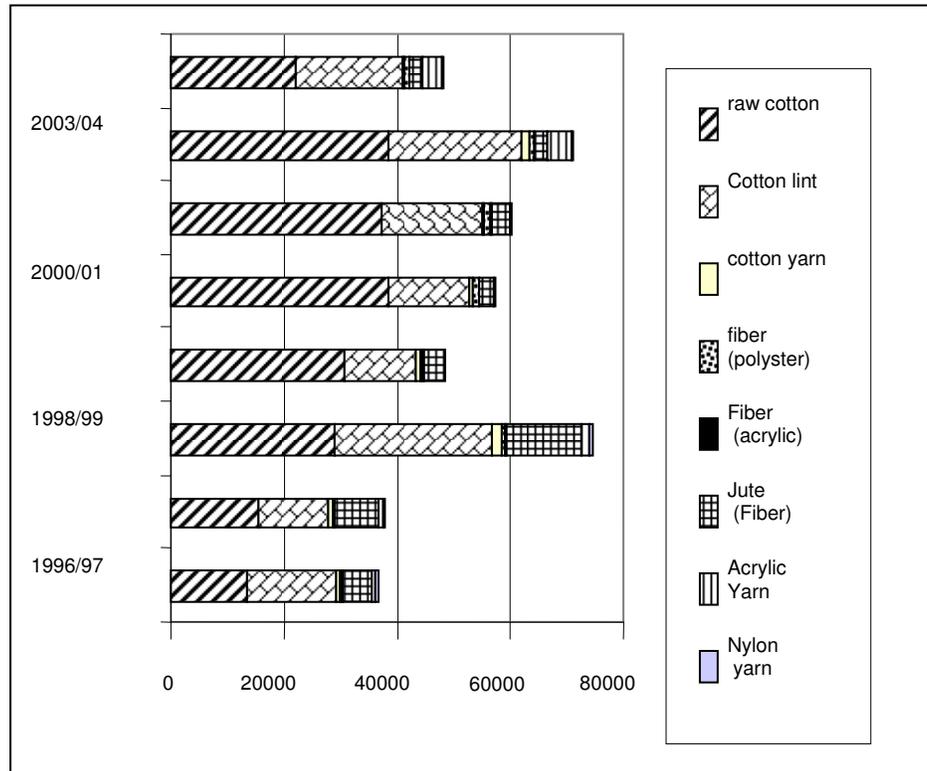
Source: CSA, annual report (2003)

The large cotton mills that consume local lint cotton as primary inputs for manufacturing textile fibers are mostly state-owned or those leased by the private sector from the government on fixed contractual agreements (Fig.10). The major sub-components of the cotton mills include:

- integrated mills (Akaki, Hawassa, Kombolcha, Bahir Dar, Dire Dawa, Almeda and Ethio-Japan Nylon Textile factories);
- Spinning mills (Adie Ababa and Edget Yarn Factory);
- Spinning and weaving (Arbaminch Textile Factory);

- Integrated Blanket Factory (Debre Berhan Blanket Factory); and Woven blanket factory

Figure 10. Major raw materials consumed by textile mills



Source: Computed using data from CSA (2003)

Despite this seemingly close relationship between the cotton and textile sector, most of the textile factories in the country are largely underperforming unable to maximize the benefits of procuring raw material from their close vicinity. The annual lint cotton consumption of the existing textile mills is estimated to be 42,860 mt, which can be fully met from domestic supply, but their actual consumption does not exceed 30,000 mt (Agredive, 2004). This is further elaborated when we look at the limited actual value of production as a percentage of yearly capacity for the various textile factories in the country (Table 12). The old and

obsolete machineries that exist in most of the textile mills together with lack of industrial capacity and base, lack of relatively skilled and trained labor and proper production management are the major factors contributing to this inefficiency. Because of the mills' limited processing capacity, the domestic supply of lint cotton is by far in excess of its actual utilization creating a lot of wastage.

Table 12. Actual value of production of textile mills as % of yearly capacity

Industrial group	1998/1999	1999/2000	2000/2001
Manufacture of textiles	32.58	43.51	53.49
Spinning, weaving and finishing of textiles	31.23	42.93	54.31
Cordage, rope, twine and netting	60.22	53.41	45.66
Knitting mills	32.29	16.37	31.48

Source: CSA (, 2003)

Garment factories that are predominantly owned by private companies perform relatively better than the textile mills. In 2005, there were 25 garment factories oriented to the export market of USA and EU following the preferential treatments granted by these countries. The flow of export to these countries has increased enormously for the past three years, especially to the EU where the value obtained from export of garment and clothing textiles increased by 28% in 2004 and 144% in 2005. To the USA, although the growth rate seems to decline from the 2004 growth rate of 92% down to 7% in 2005, the rate is expected to increase in the coming years.

In spite of the growing export trend for garment and clothing textiles to the international market, there is a weak linkage between the cotton-textile sector and the clothing sector where exports of cotton related garments are out-weighted by garments made from synthetic fibers (Table 13). Although the reason for this weak linkage calls for a detailed study between the sub-sectors, some of the obvious reasons are the poor quality of textile fabrics made in the country and high cost of production due to inefficiencies experienced by the various textile mills resulting in high price for fabrics. In addition, lack of flexibility on the part of the

textile mills to meet the demands of small and medium garment factories in terms of the right size, width, and color has made the working relationship between the two sectors very loose.

Table 13. Export trend of textile and garment (2003-2005)

	To EU	To USA
2003	1.58 million Curtains 1.14 T-shirts, Jerseys, baby garments 0.04 W/G trousers 0.02 Other 0.38	1.76 million M/B Knit Shirts (non-cotton) 0.59 Trouser, Shorts (non-cotton) 0.39 Synthetic Socks 0.29 M/B cotton Shirts 0.18 Other cotton Apparel 0.06 Other 0.25
2004	2.03 million	3.38 million
2005	4.95 million Curtains 1.90 T-shirts, Jerseys, baby garments 0.05 Bed Linen 0.47 W/G Tracksuits, Cotton 1.29 Other 1.24	3.61 million M/B Knit Shirts (non-cotton) 1.26 Trouser, Shorts (non-cotton) 0.49 Synthetic Socks 0.29 M/B cotton Shirts 0.12 Other cotton Apparel 0.10 Other 1.35

Source: *Global Development Solution, 2006*

The inefficiency of textile mills to meet the demands of garment factories has made the latter to rely more on imports of cheaper lint equivalent textile and textile articles, particularly from Asia, which accounted for 33,159mt in 1996/97-2000/01 (Agredive, 2003). Following the expanding international market for clothing and the existing weak linkage between the textile mills and the garment factories, the trend for imports of cotton equivalent fabrics will continue to increase.

### 5.1.1. Value addition along the cotton-clothing chain

The computation of the value addition at each point of the marketing chain starting from raw cotton until the making of fabric is based on primary data obtained from various stakeholders. Values at the textile and garment chain are obtained from the country's average under the

assumption that all textile mills are public and all garment factories are private. Furthermore, knit polo shirt from medium shade fabric is taken as a proxy for the garment sector because this type of knit shirt is a dominant product in Ethiopian exporters. For convenience, it is also assumed that the production at one sector is very absorbed as an input in the other sector. As shown in table 14, the ginnery-sourcing price of raw cotton is about 2.78 birr/kg on average. The ginneries require approximately 1.52 kg of raw cotton to produce 1kg of lint cotton with an average lint extraction rate of 38% in which most ginneries perform. With this conversion rate, the actual price of raw cotton to make 1kg of lint will be 4.23 birr. The lint cotton will then be soled at an average price of 8.5 birr/ kg before vat.

Table 14. Value addition along the cotton-clothing chain

Description	Unit
Ginnery sourcing price of raw cotton/kg	2.78 birr
The required quantity of raw cotton to produce 1 Kg of lint cotton. <sup>1</sup>	1.52 kg
price of raw cotton to make 1Kg of lint (1x2)	4.23 birr
Average Selling price of lint cotton/kg	8.5 birr
The required quantity of lint cotton to produce 1 Kg of yarn	1.49 kg
Factory lint price to make 1kg of yarn (4 x 5)	12.7 birr
Factory yarn Price/kg	18.81 birr
Required Yarn to make 1Kg of fabric <sup>2</sup>	1.03 kg
Factory yarn price to make 1kg of fabric (7 x 8)	19.37 birr
Selling price of garment fabric/kg including markups, excise duty and VAT financing <sup>3</sup>	35.75 birr

<sup>1</sup>- the lint extraction rate is taken at 38%

<sup>2</sup> it is calculated at 3% wastage rate

<sup>3</sup> for the purpose of this analysis, a knit polo shirt from medium shade fabric is used as a proxy for the garment sector.

The lint cotton will make its way to textile factories for further processing. Accordingly, textile mills require approximately 1.49 kg of lint cotton to make 1 kg of yarn. The actual price of lint cotton the factories have to pay in order to make one kg of yarn will then become 12.7 birr. The factories sell one kg of yarn at an estimated price of almost 19 birr.

The next step is converting yarn into fabrics. This requires approximately 1.03 kg of yarn is required to make on kg of fabric at the country's average wastage rate of 3% (Table 15). The factory yarn price to make one kg of fabric, in this case knit polo shirt is 19.4 birr that will then be soled in the market at a price of 35.75 birr on average before VAT.

Table 17. Added margin at each processing stage of the cotton-clothing chain

Item	Price (birr)	Marketing margin
Raw cotton price for 1kg of lint	4.23	-
Factory lint price for 1kg of yarn	12.70	8.47
Factory yarn price for 1kg of fabric	19.37	15.14
Price of garment fabrics/ kg	35.75	31.52

When one goes from the first marketing chain to the next, the marketing margin increases, with the last part of the chain that involves the conversion of yarn into garment fabrics taking the highest share. On the other hand, the conversion of raw cotton in to lint cotton takes the lowest share in the value addition process.

## 5.2. From cotton to handloom

Ethiopia with its diverse ethnic background and natural resources endowment is the home of rich heritages of crafts skills in general and hand weaving in particular, resulting in widely spread employment creation next to agriculture. According to the survey conducted by CSA on cottage/handicraft manufacturing industries during 2003, the number of hand-weaving establishment was estimated to be 221,848 with almost 55% of them existing in the rural areas. Weaving is a male dominated activity in the county covering almost 60% of the overall employment creation.



In addition to its huge employment creation, the handloom sub-sector also have strategic importance in the economic development of the country with respect to its strong linkage with the agricultural sector through raw material sourcing of lint cotton and the existence of growing demand both in the domestic and international market for handloom household and furnishing textile products. Its strategic importance and competence on the world market can also be seen from the organic based manual processing, which results in increased demand compared to manufactured clothes.

The main products of the handloom sector can be divided in to semi-finished fabrics and finished products. While the semi-finished handlooms are usually channeled to the domestic garment factories for further processing, the finished products are divided in to traditional clothes like *netela*, *gabi*, *kemis*, *kuta*, soled mainly in the domestic market and for Ethiopians living abroad, and home furnishing textiles, which are destined to the international market. There is much prospect to diversify the products from hand looming if supported with skill training and design. Institutional support as the one initiated by UNIDO through clustering approach might be needed to expand further this activity given its current potential.

The production of hand-woven fabrics in Ethiopia is dominated by the use of cotton that is processed in to yarn. Although in some cases wool, silk and synthetic fabrics are used, cotton is by far the most important raw material in the industry. For those, usually mothers, who are engaged in hand weaving for the making of traditional clothes like *Gabi*, the main source of cotton is the smallholder cotton farms that are found dispersed throughout the country. Since the handlooms themselves are disorganized most functioning in their home, the raw material sourcing by the sector is not that managed often resulting in fluctuation.

The other source of cotton yarn for weavers is the domestic textile mills. Adey Abeba Yarn Factory and Dire Dawa Textile Factory are only two

textile mills that specialize in yarn making mainly. Although other textile mills also produce yarn, it is often for their own consumption for further processing in to fabrics. The very limited processing units that are engaged in the production and marketing of yarn together with their under-capacity performance has therefore created a major problem in the overall production of the handloom sector. This is further aggravated by shortage of good quality dyed cotton yarn in the domestic market unable to meet the demands of the handlooms with the appropriate amount and color.

Appropriate quantity of yarn and the right color fitting the dynamically changing seasonal demand in the international market has a more sounding impact on those handloom companies that work on order based contractual agreements creating a problem with timely processing and delivery. The problem has therefore made the handlooms to resort to imported yarns, which are not 100% cotton and are of poor quality too.

In spite of sufficient local cotton supply and the existing cluster of handlooms in different parts of the country with their long-lived knowledge and tradition of weaving, the sector is unable to develop to the level it is envisaged to reach due to different reasons. Although analyzing the overall performance and competitiveness of the sector is beyond the scope of this paper, one obvious weakness is related to the unreliable supply of good quality dyed yarn, due to operation of yarn producing firms at a minimum capacity and their limit to the production of few varieties of yarns, which result at times into shortage.

The sub-sector being at its initial stages of development, increasing support in terms of value addition is necessary in the area of quality, certification, and trademarks. The current attempt to integrate cotton weaving with silk yarn within the cluster development program by UNIDO is also a good start in adding value to handloom household and furnishing textiles.

## 5.3. From cotton to the edible oil

### 5.3.1. Oil processing mills

The cottonseed that is separated from the lint is predominantly used and soled in the domestic market that goes to edible oil mills and as oil cake residue for animal feed. Normally, cottonseed contains about 16% of edible oil, which is consumed in that form or in making margarine and similar products (Table 16). After the extraction of oil, cotton seed cake or meal is left and this is used almost entirely as a feed for livestock, but can also be used as manure.

Table 16. Raw Products Obtained From Seed Cotton

Product	Approximate of seed cotton	Percentage of seed
Lint	36-38	-
Linters	6	-
Oil	10	16
Cake (Meal)	29	46
Hulls	15	23
Other components (Moisture manufacturing losses)	2-4	6
<b>Total</b>	<b>100</b>	<b>100</b>

Source: *Handbook of cotton growth in Ethiopia, IAR.1969*

Oil processing mills have remained to be the main marketing destination for cottonseeds. Such industries that are both publicly and privately owned procure the raw material for their processing either through negotiation with producers, especially state farms, and domestic competitive bidding (Tessema, 2001). However, most of the raw material is purchased through the second means mainly through tenders, with very few oil mills establishing direct contact with ginneries. This shows that, backward linkage through the preparation of cottonseeds on a contractual basis is almost unknown to the edible oil producers (Tessema, 2001). This is mainly because the production of cottonseed is dependent on the

amount of harvested cotton, which further depends on many factors making it difficult to enter in pre-production commitments.

The amount of oilseeds required by various large scale and medium oil processing mills is estimated to be 125,000 tons of oilseeds per year under conditions of optimal operation, nevertheless the actual consumption of oilseeds is restricted at an average 30,000 tons. Cottonseed takes the largest share of the total oilseeds used by the mills, because while other oilseed types like sesame, noug, safflower, and linseed are channeled to the export market, cottonseed is mainly consumed domestically (Table 17). This has made the various oil mills to use large amount of cottonseeds as a raw material for edible oil production since they do not obtain other forms of oilseeds sufficiently. The data obtained for the year 2003/04 show that almost 68% of the total oilseed consumed by the oil processing mills came mainly from cotton sees while the rest 32% came from other seed types.

Table 17. Proportion of oilseed consumed by oil processing mills (2003/04)

Type	Volume (ton)	%
Cottonseed	20739	68.2
Rapeseed	4156	13.7
Palm seed	118	0.38
Groundnuts	1385	4.55
Sesame	326	1.07
Safflower	64	0.21
Noug	3402	11.2
Linseed	218	0.72
Total	30408	100

Source: CSA, 2003

In addition to edible oil and crude oil production, the oil processing mills also produce about 20,000 metric tons of oilcake annually, which is mostly soled in the domestic market to dairy and cattle fattening farms (Table 18). Only Addis Modjo is known to export the oilcake of

cottonseed after the solvent extraction. In addition, few oil-processing mills are also engaged in the production of margarine and shortening, and soap stock.

Table 18. Edible oil and oil cake production

	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Edible oil (t)	5,321	8,679	6,579	6,637	8,329	7,993	8,027	6,931
Oil cake (t)	16,797	26,618	22,574	38,968	13,484	75,201	14,149	18,958

Source: CSA

### 5.3.1.1. Value addition along cottonseed- oil chain

The average selling price of cottonseed is 150 birr/q. About 8kg of cottonseed is required to make one liter of oil. The selling price of cottonseed to make one liter of oil would then become 12 birr. The mills usually sell one liter of oil by birr 13-14 to the wholesale market, which then be soled by birr 15-16 on the retail market. The added margin at each processing stage is as depicted in the table 19.

Table 19. Price versus marketing margin along the cottonseed-edible oil chain

Description	Price (birr)	Marketing margin
Oil mill cotton seed price /kg	1.50	---
Oil mill cotton seed price for 1 liter oil	11.94	10.44
Current average wholesale price for edible oil	13.00	11.5
Current average retail price for edible oil	15.00	13.5

## 5.4. From production to export

Export of cotton from Ethiopia is not significant and it is difficult to find a separate time series data as it is usually accounted under the category of 'other exports' to indicate its limited contribution to the total export share. Based on the recent data obtained from Customs Authority, only 17811 mt of raw cotton were exported in the past five years (Table 20). This figure is very small when compared to the standards of other major

exporting countries and even that of the eastern and southern African nations. The trend for cotton export is also fluctuating, exhibiting a negative growth rate both in its volume and in value.

Table 20. Volume and value of cotton export

Period	Volume (mt)	Gr rate (%)	Value ('000 birr)	Gr rate (%)
2001/02	8965	-	34244	-
2002/03	5239	-41	46802	37
2003/04	1548	-70	31600	-32
2004/05	1249	-19	29262	-7.3
2005/06	810.3	-35	19119	-34

Source: Ethiopian Customs Authority

The major export outlets for Ethiopian's cotton are France, Belgium, Italy, and Germany being the leading importers of lint cotton from Ethiopia. In Africa, it is only Djibouti that actively trades with Ethiopia relative to other countries like Egypt and Sudan. These five countries alone cover almost 77% of the total lint cotton export from Ethiopia for the period 2002/03-2005/06. Other countries like Egypt, Turkey, Oman, Switzerland, and UAE have become major importers of lint cotton from Ethiopia starting from 2000/01 (Table 21).

Table 21. Export of cotton by major importing countries

Year	France		German		Italy		Belgium		Djibouti	
	Vol.	Value	Vol.	Value	Vol.	Value	Vol.	Value	Vol.	Value
2002/03	7.1	239	77.3	1379	1612	10547	2273	28905	26	436
2003/04	0	0	232	5238	483	10169	549	11225	341	451
2004/05	127	4539	155	3413	477	11858	268	5504	16	71
2005/06	25	761	126	2882	268	7143	238	5543	12	51

Source: Ethiopian Customs Authority

The cotton sector in Ethiopia in terms of its role in the export market is at its infancy. It is only very recently that even the biggest lint cotton producing companies like the Middle Awash State Farm Enterprise and

Amibara private farm enterprise started penetrating the international market. Ethiopia has ample potential of cotton production that would suffice both the domestic demand and the export market. However, little has been done to utilize this potential leaving the marketing channel to be restricted much domestically.

In spite of the comparative advantage Ethiopia has in terms of cotton production in Eastern and South African nations, there is a weak linkage with the neighboring countries too. Following various preferential trade agreements granted to African nations, most of Eastern and Southern African countries have increased their production and export of textile and textile articles to the rest of the world. However, because of the limited and fluctuating supply of lint cotton from Ethiopia they tend to resort to imports of cotton from other nations that are located far away. In addition to lack of sustainable and timely resource supply, the poor quality of lint cotton originating from Ethiopia has been a disadvantage to this sector.

Apart from African nations, the export route of lint cotton is concentrated to few developed European countries that are believed to have decreasing demand for lint cotton following the global shift of textile mills away from industrialized countries toward developing nations such as those in Asia. Ethiopia's export of lint cotton to Asia is very limited while there is huge demand in China and India that Ethiopia could benefit a lot.

Generally, various factors could be discussed for the poor performance of the export market for lint cotton in Ethiopia. One of the obvious reasons is limited level of actual production of cotton compared to its potential. Still with the current level of production, Ethiopia would have surplus cotton to be channeled to the export market given that the domestic cotton use is efficient where there is no wastage. Other factors like lack of market information on the part of cotton lint exporters could be another reason. According to interviews, most of the lint cotton exporting companies are at their initial stage, and have a lot to learn about the overall marketing

functions in the world. The major source of marketing information that these companies have is the internet and most have not established a firm customer base with foreign traders except for very few. Others who do not have access to the internet will have to rely on agents to look for markets. Overall, there is no marketing system for these companies to be able to search markets and negotiate with international companies. Furthermore, the small holder farms are almost totally left out of the export marketing system and their linkage with the overall supply chain usually ends at the farm gate where they sell their produce either to big commercial farms and/or other agents that would take the cotton for further processing.

Apart from limited market information, there is no doubt that the poor quality of lint cotton presented by the exporting companies is one of the reasons for the export market's limited performance. Cotton is a very sensitive crop in which its quality is prone to depletion at any stage of the marketing chain. Its quality is threatened while it is standing on the farm, during its harvesting, when it is stored until processed, when processed and while being shipped to the market. With quality of cotton becoming one of the competing and differentiating grounds of the global lint market, Ethiopia needs to work harder on this area across the whole supply chain.

## **6. Conclusion and Policy Implication**

The overall analysis for the cotton sub-sector in Ethiopia highlights the following facts:

- Ethiopia has ample potential for the production of cotton that would suffice both the domestic and international market;
- In spite of this potential, very limited proportion is being currently produced which is channeled almost entirely to the domestic market;

- One obvious reason for the small share of production is the very limited involvement of the small holder peasants who have the knowledge and the capability to become productive producers, but are unable to do so due to various reasons like lack of finance, limited land holdings and marketing problems just to mention the few;
- The domestic textile mills, being the biggest market destination for the cotton sector are unable to maximize the benefits of procuring their basic raw material from their close vicinity because they are inefficient. Due to this inefficiency, the domestic supply of cotton is usually in excess of demand creating a lot of wastages;
- The textile mills' inefficiency also affects the handloom sector and garment factories due to the mills inability to provide the appropriate size, color, and quality of yarn and textile materials respectively. This has led both the handlooms and the garment factories to rely more on imports at an increasing trend;
- The export market for lint cotton is at its infancy and is yet to develop the appropriate market information, marketing destinations, and quality standards in relation to the dynamically changing global requirements.

Having seen these facts, the appropriate policy implication would then be to try to develop the existing potential by identifying problem spots at each marketing chain starting from the farm.

At the farm level, the obvious problems mentioned are lack of improved seeds, lack of finance, and lack of technical assistance. For this, appropriate working grounds should be created so that the cotton farms would work in close relationship with agricultural research centers in terms of identifying improved seed, and appropriate farming techniques. In addition, credit facilities to the wider smallholder cotton producing population should be provided so that they can put their knowledge in to work. Furthermore, government should assist them in forming trade unions and other forms of associations to promote their marketing accesses.

The next stage that needs a lot of work on part of both the private sector and the government is in terms of improving the efficiency and productivity of the textile mills. Textile mills are pivotal in creating the backward and forward linkages in the cotton sector. As long as these factories are unable to maximize their capacity and perform efficiently, the overall marketing chain will always be in jeopardy as they are the largest marketing destination for cotton and providers of raw material for other sub-sectors; handlooms and garment factories. The weakest chain in the process ultimately deters the development of the cotton sector.

With regard to the export market, much needs to be done to develop the appropriate international networks in relation to market searching and value addition by improving the quality of lint.

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## Acronyms

HVP	High Value Products
VCA	Value Chain Approach
GE	Genetically Engineered
HVI	High Volume Instrument
ICAC	International Cotton Advisory Committee
MFA	Multi Fiber Agreement
ABW	African Bollworm
WTO	World Trade Organization
MoARD	Ministry of Agriculture and Rural Development
EU	European Union
PPSA	Privatization and Public Enterprise Supervising Agency
CSA	Central Statistical Authority