

Mapping Cotton value chain of Ethiopia

Neway Seboka

Ethiopian Textile Industry Development Institute, Textile Engineer, and Addis Abeba,
Ethiopia

(* Author for correspondence: contny@gmail.com)

Abstract: In this study paper the potential cotton crop production land of Ethiopia has been assessed, from more than 3 million hectare of land suitable for cotton production only 3.6% of it is utilized. Ethiopian textile factories are increasing in number and productivity although they are not supplied with enough amount of cotton fibre which is leading to importation from USA, India, Sudan, etc. So as to mitigate the challenges, this study analyses secondary data. The analysed secondary data includes: land capacity for cotton cultivation, cost of cotton production, cotton productivity, cotton seed value & ginning capacity, cotton marketing basics quality, etc. In Ethiopia, the cost of producing a kilogram of seed cotton is 0.12 US\$, which of course is much lower than countries like: Turkey, China, India & Pakistan, having cost of production per kg of 0.57, 0.36, 0.25 & 0.29 US\$ respectively. Thus, mapping of the value chains with incorporation of basic functions, actors/players & supporters is made. Four market channels are made with: input suppliers, small scale farmers, cooperative unions, medium commercialized farmers, large scale farmers, Ethiopian industry input supplier enterprise, textile/ginning factories, etc. Assessment of opportunities & constraints of the value chain is made at micro, meso & macro level of significance & possible solutions are also recommended both in production and marketing segments. For the value chain performance improvement, a model has been developed with the use of four strategies: process, product, functional & chain strategies.

Keywords: Cotton production, cotton value chain, mapping, marketing channels

1. INTRODUCTION

Cotton is a soft, staple fibre that grows in a form known as a boll around the seeds of the cotton plant, a shrub native to tropical and subtropical regions around the world, including the Americas, India and Africa. The fibre most often is spun into yarn or thread and used to make a soft, breathable textile, which is the most widely, used natural-fibre cloth in clothing today.

The cotton fibre grows as a hair by protrusion of a single epidermal cell on the cotton seed coat inside the boll (small protective capsule) which contains around forty seeds with each seed having 10000 to 20000 hairs. (National

cotton development strategy (2018-2032) and Road map, 2017).

Today, the world uses more cotton than any other fibre, and cotton is a leading cash crop. Cotton is a part of our daily lives from the time we dry our faces on a soft cotton towel in the morning until we slide between fresh cotton sheets at night. It has hundreds of uses, from blue jeans to shoe strings. Cotton is one of the best economically invaluable agricultural commodity in the world. Its product could be used for Textile, Garment, technical textile; oil industry as well it's by product would be used as feed. Besides to this, it creates job opportunities for those people who are engaged in cottage industries,

small farmers, large private cotton farms & state cotton farms and in textile industries. So the crop has high economic & social value throughout the world. (National cotton development strategy (2018-2032) and Road map, 2017)

Currently more than ninety countries are cultivating cotton in different part of the world. Among them China, USA, India, Pakistan, Uzbekistan, Turkey, & Brazil are the major producers; they contribute 83% of the world cotton production.

Ethiopia has good opportunities for cotton production like the existence of favorable environmental condition, the experience of the farmers on cotton farming, the presence of huge land which is suitable for the crop and other create conducive environmental condition to make good off cotton production. (National cotton development strategy (2018-2032) and Road map, 2017).

The recent study indicated that in Ethiopia about 3 million hectare of land is potentially suitable for cotton production. But when we come to its production & productivity it is negligible and our contribution to the world cotton commercial exchange is so small. Ethiopia's favorable climate, market opportunities in America, Middle East and Far East countries and Western European countries and at large the availability of cheap labor makes the country to have comparative advantages in agro-industries.

Textile and garment industries in Ethiopia are expanding as faster rate. Though the potentials are there, cotton production and

fiber quality is not catching up with the textile requirements.

Industrial economic sectors have value adding roles along the supply chain and use agricultural products as input. Industrial development plays paramount role in ensuring sustainable economic growth. Accordingly, one of the strategies of the Ethiopian Government to accelerate economic development and to improve the living standards of the people is by following the Industrial Development Strategy. So here by analyzing the comparative advantages Ethiopia has identified its strategic economic sectors (National cotton development strategy (2018-2032) and Road map, 2017). As the natural input (cotton) for the sub-sector is one of the agricultural products that the country is rich with and can use the comparative advantages, the strategic plan and the value chain map to be developed will act as a roadmap for the effective, competitive and sustainable operation in sourcing, processing and exporting of textile and apparel products in the country.

I. Overview of textile sub sector in Ethiopia

Ethiopia has a long history of traditional cotton cultivation practice and cottage textile industry. Traditionally yarn from cotton fiber supplied by small hold cotton farmers is home spun using age old spinning drop wheel. The yarn is then converted into fabrics using handlooms. This traditional cottage industry continues to grow even today's making an important contribution to satisfying people's requirement for textile and providing large scale employment to rural and urban households. The introduction

of modern integrated textile mills in Ethiopia is a recent phenomenon initiated by Italian during the Second World War. Dire Dawa Textile Mill was the first integrated textile mill established by foreign capital in 1930 E.C. This has marked the starting point of textile sub-sector in Ethiopia. During 1960's 5 large- scale integrated textile enterprises were established mainly by private capital. The socialist regime, which reigned from 1974 to 1991, nationalized private textile and apparel firms and at the same time established 4 more integrated textile mills (Hawassa, Kombolcha, Arba-Minch and Adey Abeba) to expand the sector to satisfy the domestic demand for regular textile and substituting imported products. (National cotton development strategy (2018-2032) and Road map, 2017).

Currently excluding the cotton sub sector, the Ethiopian textile industry is composed of two major components. On one hand the upstream segment, the textile mills, spinning, weaving, knitting, dyeing & finishing. On the other hand, the apparel segment which includes garments made out of woven & knitted fabrics. In the upstream segment there are approximately 51 both small & medium sizes industries. In the apparel segment there are approximately 85 industries in total 136 in numbers & employed approximately 28000 direct employments and an indirect employment to the tune of 112000 persons. Besides, there are thousands of people employed in hand loom weaving sector who are engaged in the production of traditional fabrics. (National cotton development strategy (2018-2032) and Road map, 2017)

There are total of 21 large scale mills in the country. Among them are also three modern spinning mills. The installed spinning capacity is 288480 ring spindles & 14448 rotors. The fabric manufacturing capacity consists of 1921 shuttle less looms, 167 shuttle looms in weaving and 785 circular knitting and 28 flat knitting machines. Also there are 85 garment factories for the production of woven and knitted apparels. Since 2009, there is a trend towards setting up new and most modern mills in the private sector and also the modernization of the state owned textile mills. (National cotton development strategy (2018-2032) and Road map, 2017).

Ethiopian economy is dominated by agriculture that accounts for over 50% of its GDP, 90% of its export earnings, and 88 % of the labor force. It also supplies food to the urban areas and raw materials to the manufacturing sector including varieties of crops such as: coffee, cotton, cereals, pulses and oil seeds. Ethiopia has immense potential for the production of cotton, which covers more than 3 million hectares that are suitable for cotton production but only about 100,000 Ha or some 3.5% of the potentially suitable area is under cotton cultivation. This shows we should do more. However, in recent few years, since the formulation of the Industry development strategy has been developed by the Democratic republic of Ethiopian; priority is given to this sector and more works are done to improve the value chain (National cotton development strategy (2018-2032) and Road map, 2017).

II. Enabling environment of cotton production in Ethiopia

Ethiopia being the most secured country in Africa has more than 3 million hectares of land suitable for cotton cultivation and having a strong cotton base, raw materials for the spinning industry can be readily available within the country.

- i. The Government offers low cost land on lease and rent basis for a period of 60 to 80 years for a new project. The Lease Rent varies from 0 to 3 USD/ M².
- ii. Land availability in Special Economic Zones (SEZ). Also land for Export Oriented Units is easily available. These are the following industrial zones where lands for a new project can be available. Addis Ababa, Dire Dawa, Kombolcha, Mekelle, Gondar, Hawassa, and Jimma.
- iii. Power is inexpensive and very much economical. It is US 5 CENTS/ KWH.
- iv. Low labor cost which is USD 50/month and also abundance manpower availability.
- v. The infrastructure available is good. Roads, Railways, Port, Energy, Telecommunication and Banking facilities are easily available (National cotton development strategy (2018-2032) and Road map, 2017).

III. Business Incentives

- I. Tax Holidays such as import duty and other tax exemptions for imported machineries, plant and equipment.
- II. In case of Construction, materials and spare parts worth 15% value of the imported investment capital.
- III. To hire International Expats Tax Free up to 2 yrs.

- IV. Reconciliation of VAT on local purchase if declared within 6 months during project period.
- V. 70% Bank Loan and 30 % Cash Equity for the new establishment. 60% bank loan and 40% cash Equity for the old machineries, equipment's or existing establishments.
- VI. Loan facilities available from Development Bank of Ethiopia at 8.5% interest rate and grace period for 5 yrs.
- VII. Income Tax Holidays for 2 to 5 years on period performance based. (National cotton development strategy (2018-2032) and Road map, 2017).

2. STATEMENT OF PROBLEM

- ✓ Lower annual raw-cotton yield/productivity of Ethiopia,
- ✓ Improper utilization of agricultural land for cotton crop cultivation,
- ✓ As a country, lack of detail statement on cotton value chain actors/players,
- ✓ No proper identification and explanation of opportunities and constraints at the transfer points of the chain,
- ✓ Lack of upgrading plan for improvement of the value chain with incorporation of all necessary components, based on the stated problems, this study will assess the details of the constraints, opportunities, reasons for under-utilization of agricultural lands and recommends the proper solutions so as to increase the yield along with competitive quality.

3. METHODOLOGY

3.1. Data collection

For this study, the data which are described and discussed in detail are collected from secondary sources.

3.2. Production and marketing practice of cotton

a) Capacity of Ethiopia for cotton cultivation

Ethiopia has enormous potential for the production of cotton. A recent study indicates that more than 3 million Ha of land suitable for cotton production, which is greater than that of Pakistan, the fourth largest producer of cotton in the world. Pakistan harvests about 4.5-5.7 million MT of cotton annually from a total cotton area of 2.9 million Ha. Out of the total 3 million Ha of land suitable for cotton production, 1.95million Ha or 65% is found in 38 high potential cotton producing areas and the remaining 1.05million Ha or 35% is in 79 medium potential districts. Annual cotton area planted in Ethiopia accounts for about 3.6% of the total area. Cotton is presently produced under both rain-fed and irrigated conditions by private commercial farms and smallholders (National cotton development strategy (2018-2032) and Road map, 2017).

The system of production and the technology employed in cotton production varies from producer to producer to indicate clear differences in production and productivity from different cotton producers in the country. In general, the country's average yield per hectare of raw cotton stands at 1.8-2.0 metric ton. Ethiopia grows relatively good raw cotton with a fiber length of 27-28 mm. Generally speaking; there is the potential to produce first class cotton in the country, if procedures ensuring stable standards of quality are put in place. There are eight major cotton growing regions from which the seed cotton is transported to

ginning factories in Ethiopia e.g., Afar, Tigray, Amhara, SNNPR, Gambella, Benshangul, Oromia and Somalia (National cotton development strategy (2018-2032) and Road map, 2017).

Generally, the country has capacity producing cotton in regions, Tigray-269130, Amhara-678710, SNNP-600930, Oromia-407420, Gambella-316450, Benshangul-303170, Afar 200000 and Somalia 225,000 hectare of land is suitable for cotton cultivation.(National cotton development strategy (2018-2032) and Road map, 2017).

b) World Average cost of production of cotton

The average of all countries that participated in cotton production is that, farmers spent US\$717 to produce one hectare of cotton. This does not include cost of land rent but includes all inputs and operations up to the harvesting of seed cotton. The average cost of producing a kilogram of seed cotton came to US\$0.34, which is varying year by year.

The addition of ginning, economic and fixed costs determine the total cost per hectare and per kilogram of lint. The gross cost (including land rent and without excluding seed value) per kilogram of lint in the world averaged US\$1.64 in 2013/14. The value of seed sold after ginning may be significantly lower or higher than the cost of ginning. Thus, a net cost has been calculated excluding land rent and seed value from the total cost. The net cost of producing lint per hectare came to US\$767/ha (National cotton development strategy (2018-2032) and Road map, 2017).

Table 1. Availability of land in each region

| S. no | Region | Regional districts | Suitable land for cotton (hectare) |
|--------------------------------------|------------------|--------------------|------------------------------------|
| 1. Large capacity land area | | | |
| 1.1 | Afar | 9 | 100,000 |
| 1.2 | Amhara | 5 | 544,031.80 |
| 1.3 | Tigray | 3 | 208,825.20 |
| 1.4 | S.N.N.P.R | 6 | 385,397.40 |
| 1.5 | Gambella | 3 | 262,850.20 |
| 1.6 | Benshangul | 3 | 79,931.80 |
| 1.7 | Oromia | 6 | 205,491.20 |
| 1.8 | Somalia | 3 | 100,000 |
| | Total | 38 | 1,886,527.60 |
| 2. Medium capacity land areas | | | |
| 2.1 | Afar | 5 | 100,000 |
| 2.2 | Amhara | 14 | 134,679.20 |
| 2.3 | Tigray | 6 | 60,303.60 |
| 2.4 | S.N.N.P.R | 17 | 215,531.95 |
| 2.5 | Gambella | 4 | 53,600.90 |
| 2.6 | Benshangul | 16 | 223,235.45 |
| 2.7 | Oromia | 12 | 201,930.05 |
| 2.8 | Somalia | 5 | 125,000 |
| | Total | 79 | 1,114,281.15 |
| | Grand sum | 117 | 3,000,808.75 |

Table 2. Cost of production of Cotton by Region (US\$)

| Region | Net cost/kg seed cotton (Land rent not included) | Net cost/kg Lint (Land rent & seed value not included) |
|---------------|--|--|
| North America | 0.29 | 1.43 |
| South America | 0.31 | 1.01 |
| Asia | 0.36 | 0.94 |
| West Africa | 0.35 | 1.32 |
| Other Africa | 0.32 | 0.80 |
| Australia | 0.19 | 1.23 |

c) Cost Structure

The four major inputs are: planting seed, irrigation water (if cotton is irrigated), insecticides and fertilizers. On average, farmers spent US\$69 per hectare to purchase planting seed. The cost of planting seed includes seed de-linting and treatment with fungicides, if any. The average cost of planting seed came to 9 US cents per kilogram of lint. The cost of irrigation is

US\$110 per hectare or 11 cents per kilogram of lint. Insecticides are used in almost every country, and the only exception seems to be Syria. The average cost of insect control is US\$101/ha or 14 cents/kg of lint. The cost of fertilizers is increasing, and in 2013/14 averaged about 23 cents/kg of lint. The cost of weed control operations, which comprised hoeing, inter-culturing and herbicides are 11 cents/kg of lint. The cost of harvesting averaged 14 cents per kilogram of lint. The

cost of ginning came to US\$0.11/kg of lint (National cotton development strategy (2018-2032) and Road map, 2017).

d) Inter-country Comparisons

Although there were not many differences among regions, the cost of producing a kilogram of seed cotton varies greatly among countries within regions. The cost of producing a kilogram of seed cotton was as low as 12 cents/kg in Ethiopia and 14 cents/kg in Tanzania and high as 76 cents/kg in Nigeria. The cost of producing a kilogram of seed cotton was over 55 cents/kg in Israel, Mexico, Myanmar, Sudan and Turkey. The data from 12 major cotton producing countries representing various regions and production systems indicated that it was most expensive to produce seed cotton in Turkey followed by Syria, 57 cents/kg and 53 cents/kg respectively. It cost 36 cents, 25 cents and 29 cents to produce a kilogram of seed cotton in China, India and Pakistan, respectively. The net cost (total cost, less land rent and income from seed sold after ginning) of producing a kilogram of lint also showed differences among countries. It was most expensive to produce a kilogram of lint in Bulgaria.

The cost of producing a kilogram of lint was over two US\$ dollars in Bulgaria and Israel (Pima). The net cost per kilogram of lint in the USA was US\$1.42/kg, US\$1.52/kg in China (Mainland) and US\$1.63 in Turkey (GAP). The net cost/kg was only US\$0.67 in Pakistan. Assuming the ginning cost in India equivalent to the cost in Pakistan, the net cost in the North region of India equated to US\$0.50/kg of lint. Net cost per kilogram of

lint was lower in India due to recent increment in yields.

e) Seed Value after Ginning

Cotton is grown primarily for lint, but seed also has a value. The ICAC survey on cost of production showed that on average a cotton grower makes US\$237/ha from selling seed after ginning. A kilogram of seed fetched 18 US cents per kg, which is a good income for the grower. The data by region showed that cotton seed has a higher value in Other Africa and Asia where a kilogram was sold at 22 cents/kg and 20 cents/kg respectively. A kilogram of cotton seed after ginning was sold at 13 cents in North America (average of Mexico and USA) and 10 cents/kg in South America (average of Argentina, Brazil and Colombia). A kilogram of cotton is cost more than 25 cents/kg in Ethiopia. Farmers may not be selling seed directly but they share the benefit if it is sold at a higher price. Cottonseed prices are the lowest in West African countries where a kilogram of seed is sold at 7 cents/kg (National cotton development strategy (2018-2032) and Road map, 2017).

f) Ethiopian Cotton Yield/productivity/

Australia (2281 kg/ha), Israel (1796), Mexico (1643), Brazil and china have high cotton yield per hectare (index mundi). Cotton is one of least exploited agricultural commodity in Ethiopia. Currently the crop produced is around 100,000ha of land by small holders, private sectors. Out of the total cotton land size, about 49,000 hectares is under semi-production system and they are located in

Awash valleys, North Omo, Gambella (Abobo), Humera and Metema and south Omo (Birale). When it comes to the private sectors, the actual cultivated area under cotton is estimated to be nearly 26,000 hectares of which nearly 50% of it is irrigated. out of the estimated total output of raw cotton which is 1.23million quintals, the share of private farm is not more than 25%, where by the productivity of irrigated and rain fed farms is 24 and 10 qt/ha respectively, and this is found to be very low comparing with countries like Tunisia, Egypt, Angola, Mali and others. On average, a sample of cotton seed yields 16% oil, 27% hull, 46% cottonseed meal, and 8% linters and there is always some trash, which is estimated at 3%. Cotton seed oil makes about one fifth of total food oil production in the world. Cotton seed oil ranks second among the five major oil seeds, which are soybean, cotton seed, peanut, sunflower and rape seed oil.

In some countries like India and Pakistan where soybean yields are not very high, cotton seed is the main source of vegetable oil. Linters, meal and hull have their own multiple uses. Gossypol contents in the seed are injurious for non-ruminants and have limited the use of cotton seed. Now, biotechnology applications have developed a genotype that has gossypols in all plant parts except seed. The technology is not commercially available yet, but the technology has already been patented. It is a great opportunity for West African countries to enhance the use of cotton seed and secure additional income for cotton growers.

g) Cotton production and ginning capacity of Ethiopia

Ethiopia has a long history in cotton production and cottage industry. But the sector has gone by their way up to industry development strategy. Starting from that the sector gets priority and selected as a strategic sector to transform agricultural lead to industrial lead industrialization. Table 3 shows the seed and lint cotton amount as well the exported lint and the imported lint cotton of six consecutive years.

Table 3 shows, yearly production of cotton varies from year to year, and yearly ginning factory capacity increases. Due to this, the ginning capacity utilization varies year to year. Starting from 2004/05, lint cotton is fully used by local textile factories. Thus, annual demand for lint cotton during the period 2001/02--2006/07 is estimated to be about 69,098.8- 212,623 metric tons. On the other hand, total annual supply including domestic supply and net import (in lint equivalent) was 58,144.0 –82,435.2 metric tons. This indicates that the country faced substantial deficit in most of those past 5 years. And to fulfill this gap most factories import cotton, mostly from USA and India.

Currently, there are 21 ginneries operating in the country. Out of these, 2 of them are not functional and the rest are functional. From the ginning factories 9 have their own farm and the rest are service providers. All the factories are private limited companies. Currently, the ginning capacity is estimated at 133,067Mt of raw cotton. Unfortunately, these ginneries are currently operating under-capacity because of the low production of

cotton in the country. The total raw cotton production of the country in those past five years was limited to a maximum of about 79,452 metric tons while the processing capacity of ginneries remains at about 133,067 metric tons. Thus, the capacity utilization of the ginneries is lower. To utilize the excess capacity of ginneries currently idled, the raw cotton production of the country has to be doubled. This can be

achieved either by doubling the presently cultivated cotton area or intensifying the use of improved cultural practices and agricultural technologies to increase the yield per hectare twice as much in all cotton producers of the country. The ginneries supply about 5% of the cottonseed to commercial farmers and 95% to oil mills for crushing to produce edible oil and oil cake.

Table 3. Yearly cotton production, import, export and ginning capacity from 2001/02-2006/07 E.C

| Descriptions | Unit | Yearly cotton production and ginned cotton | | | | | |
|--------------------------|------|--|---------|---------|---------|---------|---------|
| | | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
| Raw cotton | | 123,900 | 148,870 | 214,730 | 121,620 | 94,590 | 168,513 |
| Lint cotton | | 45,845 | 55,081 | 79,452 | 45,000 | 34,000 | 62,350 |
| Lint cotton exported | Ton | 14,815 | 19,758 | 36,874 | 5000 | 0 | 0 |
| Lint cotton imported | | 98 | 336 | 692 | 1300 | 16,000 | 7000 |
| Ginning capacity | | 59,540 | 97,502 | 96,304 | 96,304 | 96,340 | 133,067 |
| Capacity utilization (%) | | 77 | 56 | 83 | 47 | 35 | 40 |

As we analyse from Table 4, cotton production up to 2004 Ethiopian calendar is above the capacity of the spinning and integrated textile factories but starting from 2004/5 cotton production of the country declines. This is because of the decrement of lint cotton price and increasing of values of

competitive cereals. The cotton cultivation practice of the country also doesn't lead and regulated by any of the government institution. In order to fulfil the gap, the government ban lint cotton export and promote cultivation of cotton throughout the country.

Table 4. Yearly cotton demand of textile factories

| S.no | Type | Unit | Yearly expected demand | | | | | |
|------|------------------------|------|------------------------|---------|---------|---------|---------|---------|
| | | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| 1 | Seed cotton | | 87,356 | 131,178 | 160,372 | 233,664 | 297,727 | 367,778 |
| 2 | Lint cotton | | 32,323 | 48,536 | 59,338 | 86,456 | 110,159 | 136,078 |
| 3 | Actual lint production | | 45,845 | 55,081 | 79,452 | 45,000 | 34,000 | 62,350 |
| 4 | Capacity utilization % | Ton | 140 | 113 | 133 | 52 | 31 | 46 |

h) World Cotton production and consumption

Cotton is a major fiber that everyone is using it. It is the king of textile manufacturing sector. Cotton is cultivated by more than 90 countries around the world. Major producers are: China, India, USA, Pakistan, Brazil, Uzbekistan, Australia, turkey, Turkmenistan and Major Cotton importing countries are:

China, Turkey, Bangladesh, Vietnam, Indonesia, Pakistan, Thailand, South Korea, and Malaysia. Ethiopia ranks 30 from the world and 12 from Africa. Even the country has a potential greater than Pakistan which is 4th cotton producer of the world (National cotton development strategy (2018-2032) and Road map, 2017).

Table 5. World-wide cotton supply and distribution

| | Unit | Years | | |
|---------------|-----------------|---------|---------|---------|
| | | 2013/14 | 2014/15 | 2015/16 |
| Production | In Million tons | 26.30 | 26.34 | 23.89 |
| Consumption | | 23.48 | 24.05 | 24.47 |
| Imports | | 8.74 | 7.47 | 7.71 |
| Exports | | 8.89 | 7.47 | 7.71 |
| Ending stocks | | 19.52 | 21.81 | 21.23 |

i) Cotton marketing basics quality

One of the most important aspects of producing a profitable cotton crop is lint quality. In fact, the marketing component of cotton production begins with lint quality. Premiums and discounts associated with several quality factors can have a significant impact on the price, producers receiving for cotton. Together, these quality factors determine the grade. The components of

cotton grade determinations include: leaf grade, fibre length, length uniformity, strength, micronaire, trash and color. Except for leaf grade, all cotton quality factors are determined by High Volume Instrument (HVI) systems. Leaf grade is determined by trash analyser. Cotton as a commodity is merchandized by Liverpool markets of Cot look. Table 6 shows cotton quality for marketing in Cot look market. (www.intracen.org/The-Cotlook-A-Index/).

Table 6. Cot look cotton market quality index

| Fibre property | Cot look index | Index mundi | African upland cotton | Lint for ring spun yarn |
|------------------------|----------------|-------------|-----------------------|-------------------------|
| Color | 31 (MID) | 41 (SLM) | 41-11 (SLM to GM) | 21-11 (SM to GM) |
| Staple length | 27.8mm | 34 (27mm) | 27-30.2mm | 28.6mm |
| Micronaire | 3.5-4.9 | - | 3.5-4.5 | 3.8-4.2 |
| Fibre strength (g/tex) | 25-30 | - | 27-32 | Greater or equal to 30 |
| Leaf grade | 3 | 4 | | |

In Ethiopia, until now there is no common rule for cotton marketing. The producers and textile factories are doing their marketing through agreement but not by quality premium and price discount. Currently, the government established Ethiopian Industry

Input Development Enterprise (EIIDE) for checking and controlling the marketing system of the value chain. The table below shows the price premium and discount of cotton market in Ethiopia.

Table 7. Quality standards of Ethiopian cotton for price determination

| S.no | Grading parameters | Weight | | | Grade | | |
|------------------|------------------------|--------|-----|-----|------------------|-----------------|-------------------|
| | | A | B | C | A | B | C |
| 1 | Staple length | 21 | 18 | 15 | 28.5mm and above | 27mm-28.4mm | 25mm-26.9mm |
| 2 | Micronaire | 16 | 13 | 9 | 3.5-4.2 | 4.3-4.9 | 3.2-3.4 and 5-5.2 |
| 3 | Strength | 16 | 13 | 11 | ≥29g/tex | 26-28.9g/tex | 25-25.9g/tex |
| 4 | Stickiness (honey dew) | 11 | 9 | 6 | 0-10 | 11-20 | 21-32 |
| 5 | Short fibre content | 6 | 3.5 | 2.5 | ≤10% | 11%-12% | 13%-14% |
| 6 | Trash content | 10 | 8 | 4 | Less than 3.5% | 3.5%-4.5% | 4.6%-5.0% |
| 7 | Moisture content | - | - | - | ≤8% | ≤8% | ≤8% |
| 8 | Maturity Ratio | 5 | 4 | 3 | ≥85% | 81-84% | 75-80% |
| 9 | Uniformity ratio | 5 | 4 | 3 | ≥83% | 81-82% | 76-80% |
| 10 | Color | 5 | 4 | 3 | 11-1 up to 21-4 | 31-1 up to 31-4 | 41-1 up to 51-4 |
| 11 | Contamination | 5 | 3.5 | 2.5 | ≤5 grams/bale | 5-10 grams/bale | 10-15 grams/bale |
| Total sum | | 100 | 80 | 59 | PREMIUM | BASE | DISCOUNT |

4. RESULTS & DISCUSSION

So, from the analysed data we can see that the cost of production for a kg of seed cotton is 0.12US \$, much lower than countries like: Turkey, China, India & Pakistan, with cost of production of 0.57, 0.36, 0.25 & 0.29 US \$ respectively. Although we are producing the crop at a lower cost, the yield/productivity is almost insignificant. After analysis of the above stated secondary data, the cotton value chain has been mapped. It shows all the

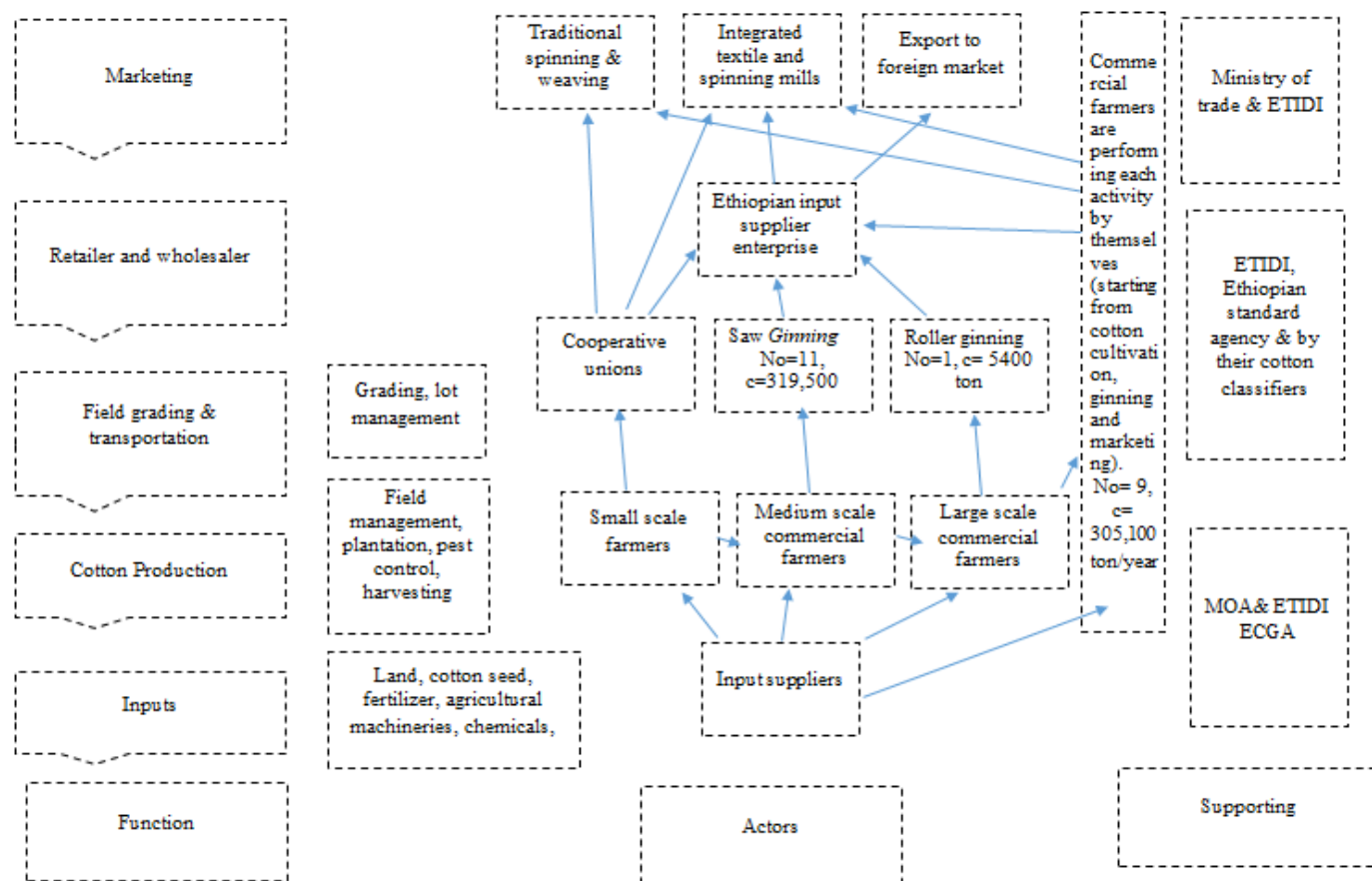
necessary functions, actors & enablers. Based on the mapping also, four market channels/routes have been developed for maximization of profit and cost reduction.

In this paper the different possible opportunities & constraints have been discussed in detail at macro, meso & micro level of influences on the value chain. Accordingly, solutions are also recommended/ suggested for all the

constraints. The recommendations are categorized under production & marketing. Below is a cotton value chain map showing the main functions, actors &

supporting/enabling organizations for the functioning of traditional & modern integrated textile factories. Each function is also described in detail.

4.1. Cotton value chain map (adapted from Brent. 2005; Kaplinsky et al., 2002; Linda, 2003)



Functions:

Input: the major inputs in the cotton value chain are cotton seed, fertilizers, etc. there are around 9 enterprises which produce cotton seed. Much of the smallholders' farmers use their own seed. Research center such as Worer in Afar also has its own basic seed which now being distributed through producers and unions. Some integrated textile companies like Else Addis also supply

some cotton seed. The major fertilizers such as Urea and Dap are supplied through Unions including (x, y z).

Production: There are around 40,000 small holder cotton producers in Ethiopia with an average land holding size of 75 ha. The 40% of Small holder farmers are located largely in the SNNPR, Benshangul Gumuz and Gambella. They source their seed from local traders and their unions; they apply some

fertilizers to improve the productivity, the inputs cost per kg is around 12.50 birr. Almost all smallholder producers' use rained agriculture. During the non-rainy season, they produce other crops on their land. They sell their seed cotton mostly to their cooperatives and local graders. Small holder farming employs 50% women. Meanwhile there are around 2000 medium scale commercial farms, with annual production of X tons per year on average landholding size of 25,000 Ha. They use better technologies than small holder farmers such as proper application of fertilizers, low post harvest loss, improved seed etc. There are around 80 large commercial farmers with total land size of 43,610 ha, with an average productivity from about 17 Qt/ha to 25 Qt/ha. and they produce 70% of the cotton grown in the country. (National cotton development strategy (2018-2032) and Road map, 2017).

Collection & transportation: for packing and transportation, cooperative unions are responsible. There are around 6 unions in the country with large membership that supports smallholder farmers in provision of information, technology and market to optimize their benefits. Most of them have their own aggregation stores.

Wholesaling: Ethiopian Industry Input development Enterprise will be playing the leading role in the future. It is a recently organized institution run by government to procure major strategic inputs such as cotton from unions; commercial farms as well as import from abroad in case of shortage. EIIDE is expected to supply to major integrated textile mills.

Retailing: in this function, there are small traders who supply to primary markets at district level to traditional weavers and hand-made cotton products.

Consumption: there are around 19 ginneries that are currently operational of which 16 are saw-gins with a total daily capacity of 1933 MT, and three are roller gins producing 213 MT per day. There are also 971 small, 143 medium and 50 large-scale enterprises with 1.6% contribution to GDP and USD 98 million in annual export earnings. There are also around 20,000 traditional weavers in the country of which at least 50% are estimated to be women (National cotton development strategy (2018-2032) and Road map, 2017).

4.2. Market Channels of the Cotton value chain

Market channels and relationship between actors: Based on the value chain mapping 4 market channels have been developed & listed below:

1. Input suppliers - small scale farmers - textile factories
2. Input suppliers - small scale farmers-cooperative unions - Ethiopian industry input supplier enterprise - textile factories/Ginneries
3. Input suppliers - medium commercialized farmers - Ethiopian industry input supplier enterprise - textile factories/ginneries
4. Input suppliers - large scale commercial farmers - textile factories/export market/

As we decrease the value chain length, we maximize profit, decrease raw material cost & carrying cost of the factory as well the producer, and increases customer satisfaction

as well. Till now, in Ethiopian scenario, there is no proper means of handling the value chain of cotton, so with the use of the

discussed market channels, the value chain can be corrected.

Table 8. Summary of value chain actors in the Cotton value chain

| | Cotton seed producers | Input suppliers | Small scale producers | unions | Medium commercial farmers | Large commercial producers | traders | ginneries | Wholesellers |
|-----------------------|--------------------------------|-----------------|----------------------------------|-------------------|---------------------------|----------------------------|----------------------|-------------------|-------------------|
| Land size in Ha. | - | - | 30000 | - | 25000 | 43610 | - | - | - |
| Number of Enterprises | 9 | n/a | 40000 | n/a | | 80 | - | 21 | - |
| Number of Employees | 25 | n/a | Self-employed | n/a | .2000 n/a | n/a | - | - | - |
| Avg. Labor cost/month | 1500-2000 | 1000-1500 | Dependin g on their profit | 1000-1500 | 1000-3000 | 1000-5000 | - | 1500-6000 | - |
| % Women employee | 10 | 10 | 50 | 20 | 50 | 70 | - | 70 | - |
| Input cost | - | - | 12.5/kg lint | n/a | 11.7/kg | 11.5/kg | - | - | - |
| Volume sold | | | | | | | | | |
| Unit price | 45/kg of seed, 4500/quintal | n/a | 16/kg raw cotton | 50/kg lint cotton | 18/kg raw cotton | 19/kg raw cotton | 45/kg of seed cotton | 50/kg lint cotton | 50/kg lint cotton |

4.3. Opportunity and constraints of cotton value chain of Ethiopia

The cotton plantation, harvesting, production practice of Ethiopia has many challenges. Among them: poor agricultural practice, unskilled man power, lack of finance, lack of support and co-operative organization, lack of market information, low research and development practices of cotton, etc. The opportunity and constraint of the value chain are discussed in Table 9. The constraints are listed out according to their influence on the value chain.

Currently, the key constraint is lack of adequate cotton supply to textile companies which is leading to importation from other countries. On one hand, commercial farms are having huge amount of seed cotton, on the other hand they are complaining about lack of market.

Table 9. Opportunity and constraints of the cotton value chain

| | Constraints | Opportunities |
|--------------|--|--|
| Macro | <ul style="list-style-type: none"> ➤ Lack of Market information ➤ Lack of Finance ➤ Lack of contractual production, marketing and standards ➤ Lack of infrastructure ➤ Limited research works | <ul style="list-style-type: none"> ➤ The government settles the institution that leads the sector (Ethiopian Textile Industry Development Institute) ➤ Minimum production cost |
| Meso | <ul style="list-style-type: none"> ➤ Shortage of inputs (cotton seed, fertilizers, pesticides, etc) ➤ Shortage of improved seed varieties, ➤ Bureaucratic procedures followed by the institutions | <ul style="list-style-type: none"> ➤ Government incentives belonging to the sector, ➤ Benchmarking programs for the sector following international standards, ➤ Country's better peace and stability, ➤ Availability of cheap and easily trainable manpower, ➤ Availability of land and good weather suitable for cotton cultivation. |
| Micro | <ul style="list-style-type: none"> ➤ Inadequacy of support through service Co-operatives ➤ Poor agricultural practices ➤ Limited irrigation practices ➤ Absence of extension services | |

4.4. Recommended solutions for minimizing the constraints

Ethiopia is endowed with vast areas suitable for cotton production. Many farmers also have traditional experience in cotton production. Considering the prevailing potential and experience, the following recommendations are suggested to improve cotton production and marketing in the country. The recommendations are listed separately in categories of production and marketing.

4.4.1. Production related recommendations:

a. *Production increase through area expansion*

According to a recent report of the ministry of Agriculture, there are many cotton producing areas in the country. These areas could be grouped into two. The first group

consists of areas identified in 38 wereda of 8 regions, which have a high potential. They include irrigated farms currently operated by state farms, private investors and small farmers, those areas in Gambella and Somali Regions, where irrigation infrastructures have been laid, and rain-fed farms of high potential currently run by investors and small farmers. The second group consists of farms in 79 wereda in 8 regions. They are farms of medium potential. They are mainly rain-fed farms currently operated by private investors and small farmers, but have the potential for irrigation development through river diversions and construction of small dams. The Government, thus, must encourage local and foreign investors in order to develop and utilize the above-mentioned potential for expansion.

b. *Application of Improved Agricultural Technologies*

The use of improved agricultural technologies such as improved seed, artificial fertilizers; pesticides, appropriate machinery supplies are crucial to increase production and productivity and to improve the quality of lint cotton. The use of improved seeds should include:

- ✓ Developing and expanding hybrid seeds,
- ✓ Introduction and adoption of highly productive and long fiber varieties.
- ✓ Involvement of the Ethiopian Seed Enterprise as well as similar other agencies in the multiplication and dissemination of high quality seeds.

As regards to other technologies, the focus should be on the use of chemical fertilizers, pesticides and as well as appropriate machinery and implements required for such activities. Service Co-operatives and other organizations responsible for the supply of inputs must play a big role, and in this endeavour, they need to be supported and encouraged through all possible means.

c. *Application of Better Farming Methods*

The focus here must be to develop improved cotton production packages and introduce to producers through the extension system effectively. The packages should include improved methods of land preparation, seeding, irrigation practices, harvesting, post-harvest handling, crop protection etc.

d. *Improved Post Harvest Management*

The activities here include taking proper care of the crop during transportation and storage to prevent losses and damages. Similar care should be made during ginning, particularly in maintaining the desired moisture level of the crop and keeping it clean from dirt and waste materials.

e. *Effective Extension Services*

This is an activity that has been lacking in the past and the importance of the service to increase cotton production and productivity is enormous. The Ministry of Agriculture and its counter parts at regional levels must provide extension service on cotton if production and productivity are to be increased in the country.

f. *Improved Research Works*

Research works have also been weak, and this need to be changed if the potential for cotton production in the country is to be realized. The Ethiopian Agricultural Research Authority must work hard to expand its research activities to solve crop productivity constraints faced by different producers in the country.

g. *Dissemination of Knowledge about Standards*

Knowledge about the quality standards required in cotton production has, as noted earlier, been limited, and the need to rectify the situation has been obvious. To this effect, the Ethiopian Standards Authority, in collaboration with other concerned agencies,

must advice and support farmers and traders where and when they need such support, and disseminate all information about standards through all possible means.

h. Promotion of Irrigation Practices

The Ministry of Water Resources and other relevant agencies must work hard to expand irrigation facilities of all types-large and small- particularly in the rain deficit areas.

4.4.2. Measures to use Marketing Opportunities and minimize constraints

The following additional measures are recommended to improve market opportunities and minimize constraints: -

a. Establishment of Strong Market Information System

As noted earlier, it is of crucial importance that producers and suppliers of cotton get adequate information about the type and quality of the product in demand in different markets. Suppliers also need information on alternative market outlets and the levels of prices offered in these markets. Availability of such information helps marketing decisions of where and how much to sell and at what price. The establishment of a good market information system is therefore needed to undertake the following: -
Collection and processing of price information from all major domestic markets, and their dissemination to producers, traders, service co-operatives, and relevant government agencies on regular basis. Collection and processing of information on the type, quantity and quality of production at

the farm and intermediary levels, and its dissemination to relevant agencies at wereda, regional, and federal levels, as well as to traders, service co-operatives, and similar other establishments. Compilation of information from external markets on levels of prices and demand, and the quality and standard they expect of the products supplied, and the dissemination of the information to exporters, producers, service co-operatives, trade unions, and other relevant bodies on regular basis. Training and deployment of qualified field enumerates, and establishment of information flow networks at desired levels. Building the capacity of service co-operatives, trade unions, and similar other bodies to compile and disseminate to their members the market information they receive, and providing them with any other additional support required.

b. Promotion of Contractual Arrangement in Production and Marketing

To ensure a steady supply to buyers at all levels and a reliable market to producers, and to remedy the many constraints its absence has created, establishment of a system for pre-delivery contractual arrangements between the following market players is essential.

- ✓ Between farmers and local buyers;
- ✓ Between farmers or service co-operatives and ginneries;
- ✓ Between service co-operatives and textile factories;
- ✓ Between local suppliers and exporters, as well as between local suppliers and ginneries and textile factories, and
- ✓ Between small scale and private commercial farms, ginneries and textile

factories Such contracts are expected to help facilitate the establishment of purchase prices, the type, amount, and quality of the product to be produced and marketed, payment arrangements between the parties concerned, obligations of the contracting parties, and the type of support to be provided to producers. To this effect, a guideline, which specifies the procedures, and the rules and regulations that need to be observed, must be developed.

c. Encouraging the Participation of Private Investors

Conducive environment has to be created for the participation of investors both in cotton production and marketing, as well as in oil processing and ginning.

d. Creating Better Access to Finance

The financial constraints faced by cotton producers and traders needs to be addressed through the following alternatives: -

- ✓ Supporting saving and credit associations to broaden their areas of involvement,

- ✓ Establishment of Service Co-operative banks with Government's loan-able fund to be maintained until they are self-supporting.
- ✓ Establishment and expansion of inventory credit system.
- ✓ Provision of financial support to government production enterprises, and similar other support to private investors.

4.5. Model development for improvement of value chain performance

For developing the model, four strategies have been selected and the detail model analysis is discussed in table below. (Brent, 2005; Raphael and Mike, 2002).

5. FUTURE WORKS

Table 11 must be done in future with collaboration of the previously discussed actors & supporters/enablers. In this action plan, after performing the activities, the deliverables will range from achieving better performance in production & quality to production of technical textiles.

Table 10. Model for improving the performance of value chains through combinations of four strategies (Kaplinisky et al., 2002; Linda, 2003)

| Trajectory | Process | Product | Functional | Chain |
|--|---|---|-------------|---|
| | ↓ → ↓ | | | |
| Examples | Original | Original | Original | Moving chains |
| | equipment | design | brand | e.g. |
| | assembly (OEA) | manufacture | manufacture | From relying only on cotton, moving to synthesizing of polymers to produce synthetic yarns. |
| | Original equipment manufacture | With the cooperation of R &D, here new products will be developed. e.g. hybrid cotton production, different colored production, | | |
| | OEM | | | And also practicing silk and wool production. |
| Here in each processes of the value chain in order to improve efficiency and productivity we can benchmark best practices like best agricultural practices and irrigation technologies, proper use of standard operational procedures, such as seed preparation, planting, harvesting, etc | | | | |
| Degree of disembodied activities | Disembodied content of value adding increases progressively → | | | |

Table 11. Works that has to be done for the coming years

| No | Gaps identified | Activities to be conducted | Achieved results/deliverables | Time frame | Remarks |
|----|---|---|---|------------------------|--|
| 1 | Lower efficiency and productivity in each processes of the textile industries, Lower quality of the products which leads to higher rejections (B-grade fabrics) | Giving factories standard operational procedures, use of best practices, use of scheduled maintenance activities for the machineries, avoidance of those practices which led to higher rejection level, | Higher efficiency and productivity, Better quality of cotton raw material and textile products (low B-grade fabrics), Higher export level of different count yarns and fabrics, | 2011-2012 E.C | Due to the implementation of the best practices, productivity and efficiency along with better quality will be achieved gradually and finally higher export sale will be achieved. |
| 2 | Absence of different cotton varieties | Benchmarking other factories' best practices (local or foreign factories) regarding new product developments | Different products to be developed which have potential market dominations, | 2012 E.C onwards | |
| 3 | Sticking on cotton products only | Trying to synthesize synthetic polymers for the production of synthetic yarns, | Production of synthetic yarns (polyester, acrylic, Nylon) and natural fiber like silk and wool. | 2013 E.C onwards | |
| 4 | Absence of technical textiles production | Identification and selection of technical textile categories, | Production of technical textiles | 2016 E.C onwards | Regarding the categories of technical textiles there are about 11 categories listed as; Agrotech, Buildtech, Clothtech, Geotech, Indutech, Medtech, Mobiltech, Hometech, Oekotech, Protech and Sporttech |

6. CONCLUSION

In this study work overview of the textile sub-sector has been seen at a glance. From that, mapping of the cotton value chain has been developed and based on the mapping, 4 marketing channels have been suggested. Where by the short-length channels, help in maximizing profits mainly by reducing the transportation & carrying costs. In the study it is assessed that Ethiopia has more than 3 million Ha of land suitable for cotton production, but the annual cotton area planted in Ethiopia accounts only for about 3.6% of the total area, both in rain-fed and irrigated conditions. While seeing the

productivity of irrigated and rain fed farms, it is only 24 and 10 qt/ha respectively, which is found to be very low comparing with countries like Tunisia, Egypt, Angola, Mali and others. So as to increase the yield, proper utilization of the potential production land, production of quality cotton satisfying 'Cot look cotton market quality index' as referred in table 6 and for producing premium quality cotton satisfying the demand of textile factories, this study recommends the possible solutions for full utilization of opportunities and reverse/mitigate constraints in both production and marketing segments. For this, opportunities and constraints of the value chain have been assessed in detail at micro,

meso and macro level of significance and discussed in Table 9. In the study, Model is also formulated for improving the performance of value chains through combinations of four strategies: process, product, functional and chain strategies. For future also, an action plan has been developed with incorporation of addressed gaps, activities to be conducted and expected results/deliverables along with time frame and with incorporation of the value chain actors & supporters/enablers.

References

- Brent Gloy. (2005). 'A GUIDE TO UNDERSTANDING THE VALUE CHAIN', Department of Applied Economics and Management, Cornell University, Ithaca, NY 14853.
- Raphael Kaplinsky and mike Morris: 'a handbook for value chain research'.
- Kaplinsky, R., Morris M., & Readman, J. (2002). 'Understanding & Upgrading Using Value Chain Analysis', London, UK.
- Linda Mayoux, (2003). 'Participatory value chains analysis for pro-poor enterprise development', consultant for wise development. www.intracen.org/The-Cotlook-A-Index/
- National cotton development strategy (2018-2032) and Road map, (2017). 92115 Clichy cedex, France.