A review of current state and future directions of cotton production in Ethiopia

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Abstract: Ethiopia is one of cotton-producing countries and export part of its products to the international market. Cotton continued to be cultivated in Ethiopia for many centuries both in irrigation and rain-fed systems. The country has a huge potential to produce cotton in different agroecology that absorbs the large and young work force. Considering the suitable environmental conditions to grow the crop and the availability of cheap manpower, the Ethiopian government has given priority to develop the textile and garment sectors since the last two decades. The existing textile industries in the country are cotton-based and are in their booming stage. On the other hand, availability and quality of raw material is not satisfying the growing demand. In order to support the increasing number of textile and garment industries, supply of quality and enough raw material in a sustainable manner is crucial. Therefore, this review details information based on primary and secondary data, which are related to the country’s potential for cotton production, the characteristics of cotton, available cotton varieties, marketing systems, and cotton initiatives working in the sector. This work also tries to pinpoint multi-dimensional problems facing cotton production, marketing and quality management systems and indicates possible solutions for the betterment of the sector.

Subjects: Agriculture & Environmental Sciences; Industrial Engineering & Manufacturing; Industrial Textiles

Keywords: cotton initiatives; cotton production; quality; textile; cotton varieties

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PUBLIC INTEREST STATEMENT

This work has an impact in Ethiopian cotton sector because it shows current state and future directions of cotton production in Ethiopia. It elaborates the country’s potential for cotton production, the characteristics of cotton, available cotton varieties, marketing systems, and cotton initiatives working in the sector. This work also tries to pinpoint multi-dimensional problems facing cotton production, marketing, and quality management systems and indicates possible solutions for the betterment of the sector. The cotton sector is now transformed to the developing world and this study gives brief information about the textile sector’s main raw material in Ethiopia which is striving to exceed in the cotton sector in Ethiopia. The Author has the potential to impact on wider level because she had a rich experience in the sector beyond the specialist in academic area.
1. Introduction

The manufacturing sector has been the main locomotive of economic growth and transformation in the world (Hallam, 2018). In the mid-17th century, industries in textile and garment sectors, had a considerable contribution to the economic and social transformation of many countries. Currently, many Asian and African countries are following a similar approach. The government of Ethiopia, in its industrial development policy, has given a priority for the development of the textile and garment sector which uses cotton as the main raw material (Gebreeyesus, 2013).

Ethiopia, with agrarian-based economy, realized that the textile and garment sector is important for its economic transformation towards a manufacturing-based economy. In this regard, the textile and garment sector has received priority in the country’s Growth and Transformation Plan II (GTP II), next to leather industry. Introduction of GTP in 2010 has brought important changes to position the manufacturing sector to lead the economic growth. Ethiopian Textile Industry Development Institute (ETIDI) has been enhancing cotton production in the country (Oqubay, 2018).

In order to sustain the development of the increasing textile and garment sector, the continuous supply of quality raw materials with reasonable price is crucial. Most of the existing textile industries in Ethiopia are cotton-based; a commercial commodity in the country. However, the amount and quality of cotton produced is quite low compared to other major cotton producing countries. Moreover, characterization of cotton fiber quality is not common and fiber standards are not yet established (Plan et al., 2016). Therefore, cotton in Ethiopia is identified by the name of the farm, farm owners or ginneries instead of its varieties and quality levels (Addis et al., 2020).

The knowledge, skill and laboratory facilities for cotton characterization, grading and standardization are available in institutions which are closely working with the textile industries such as Ethiopian Institute of Textile and Fashion Technology (EiTEx) and Ethiopian Textile Development institute (ETDI). Therefore, this review was initiated to summarize opportunities and challenges of cotton production in Ethiopia and indicate directions for the improvement of the sector.

2. Objective

To study the current situation of the cotton sector in Ethiopia from seed to fabric and give recommendations for its enhanced production.

• To study the trends of cotton production in Ethiopia.
• To study the country’s potential for cotton production,
• To study the characteristics of cotton, and available cotton varieties
• To assess Cotton initiatives working in the sector.

3. Methodology/research approach

The methods conducted to achieve the objectives of the project were: Literature survey: A survey of available published and unpublished documents, Proper focused group discussion conducted with agronomists, the industry personnel’s, and cotton sector experts, Observation (site visits): take place on selected farms, ginneries, and the textile industry to assess the technical issues. The main cotton production regions Amhara, Tigray, Benishangul Gumuz, Gambella and Afar regional states were addressed.

4. Analysis

4.1. History of cotton production in Ethiopia

Ethiopia is believed to be one of the countries of origin of cotton and cultivation of the crop is deeply rooted in the history of the country’s agriculture. The Amharic word ‘tet’, meaning cotton, is dated back to 350 A.D, including in the era of the Axumite King, King Aizana, which is written in the
inscriptions that Axum had long known for its raw materials such as iron, bronze, as well as cotton textiles (Nicholson, 1960). Cotton has been grown and used in Ethiopia since the ancient times. Accordingly, hand spinning and weaving are a well-established and widespread craft.

According to Nicholson (1960), one of the species of cotton, Gossypium herbaceum which occasionally found in fields and gardens of Ethiopia might be indigenous in the country. This author also stated that cultivation and use of cotton in several regions of Ethiopia. He also stated the ability of the local people to manufacture breeches of thick clothes and cotton tents made of native cotton which had been used by kings and their courts as they had no permanent habitation at that time (Nicholson, 1960).

Production of cotton at a commercial scale was initiated by the Italians during the period 1935–1941, which stopped soon after. The present phase in cotton development began in 1948 with the first request of the Ethiopian Government for technical assistance from the United Nations and other agencies for further surveys, planning, research and training of Ethiopian personnel. After reinitiating commercial-scale cotton production in 1960s, the entire cotton and textile sector was nationalized in the 1970s. Starting from the year 2000, state cotton farms and ginneries were privatized, and state-owned textile factories were either leased or sold to investors (Zeleke et al., 2019) and

4.2. Cotton production and its potential in Ethiopian
Smallholder agriculture is the dominant sector that provides over 85% of the total employment and foreign exchange earnings and approximately 55% of the gross domestic product (GDP). All the regional states of the country have a huge potential for cotton production with variations in land size, environmental suitability and proximity to textile and ginning industries (Figure 1). To accelerate economic transformation and attract domestic and foreign investments, the government has been developing industrial parks that provide the necessary services and facilities for industries (Figure 1). Starting from 2019, Industrial parks development Corporation (IPDC) has been developing additional parks in Dire Dawa, Mekelle, Kombolcha, Adama, Bahir Dar and Jimma, which will soon be operational.

The Agricultural Development Led Industrialization (ADLI) and the GTP II strategies of the country clearly stated that cotton and sugarcane are the second strategic export and import
substitution commodities next to coffee. Import substitution is the government’s strategy that emphasizes to replace some agricultural or industrial imports to encourage local production for local consumption.

The National Cotton Development Strategy (NCDS) has been planning to increase seed cotton productivity in the country from 15 q/ha to 20 q/ha on rain-fed areas and from 25 q/ha to 35 q/ha of raw cotton for irrigated cotton production system. The average ginning out-turn (37%) is among the lowest in Africa, which is lower compared to 42% in Western Africa both handpicked (NCDS –2017, n.d.). Ethiopia produced an average of 34 thousand metric tons of lint cotton in the year 2000–2018 (USDA 2018). (Hilbert et al., 2018) stated that the Ethiopian government is actively supporting investors and the ongoing development of the sector in the country.

The total cotton consumption of the factories is expected to be around 111,081 ton of lint cotton at their annual full production capacity. There is an increasing trend every five years (Figure 2). Now, Ethiopia produces 230,000 tons of seed-cotton/year and faces a yearly gap of 70,000 tons of lint to meet the domestic demand of the developing textile sector.

Cotton production potential in Ethiopia is not accurately estimated, nevertheless, taking large area of land suitable for cotton (Table 1). In 2012 Ethiopia cultivated only 3% of the total suitable area for cotton production, which is estimated to be 2.7 million hectares. Ethiopia has a better potential compared to other African countries to grow a wide range of cotton varieties both in rain fed and irrigated systems in different agro-climatic zones. On the contrary, the variety DP 90 currently covers more than 90% of cotton production areas (Addis et al., 2020).

In 2032, it is expected to grow cotton on one million hectares of land, which is half of the land area identified as highly suitable for cotton cultivation and production; 1.1 million tons of lint and 1.4 million tons of cotton oil seed. Based on this strategy, the annual cotton production could reach to 2.6 million tons of seed cotton (NCDS –2017, n.d.). To assure sustainable development of the textile and garment sector in Ethiopia, continuous supply of quality cotton at reasonable price is required. However, cotton production in the country is facing multi-dimensional problems. Generally, yield per hectare is low compared to the main cotton producing countries in the world (Zerihun, 2016).

In Ethiopia, traditional cotton production is practiced in altitude between 300 and 1,800 meters above sea level (m.a.s.l.) and commercial cotton has been cultivated by the private farmers under different agro-ecologies ranging from 300 to 1,200 m.a.s.l. currently, the cotton farms around the awash valley is replaced by sugarcane plantations. Other cotton-growing areas including Arbaminch (Sille), Woyita, Omorate in the South; Gambela and Beles in the West; Metema and Humera in the North and North West and Gode in the East are still producing cotton.
4.3. Cotton demand and supply in Ethiopia

Ethiopia's cotton production is not enough to meet the growing demand from the textile and apparel sectors. At the same time, according to the (ETIDI), there are at least 12 spinning mills in the pipeline to address some of the expected demand for yarn. These planned facilities, plus the 15 existing spinning mills currently operating, will bring the country's installed annual processing capacity of lint cotton to 200,000 metric tons. The existing facilities are operating at about half capacity. Increased production as well as imports are required to close this gap. For the production year 2019/20, the demand forecasted to be 64 thousand metric tons.

4.4. Cotton varieties and production system in Ethiopia

Cotton is one of the major cash crops in Ethiopia and is extensively grown in the lowlands under large-scale irrigation schemes. It is also grown on small-scale farms under rain-fed agriculture. Werer agricultural research center since 1964, which has the mandate to select and develop genotypes, that are suitable for different agroecology of the country, has released 22 varieties and 7 hybrids for irrigated and 5 varieties for rain-fed areas (Bedane & Arkebe, 2019), which only few of them are commercialized (Table 2). Currently 96% of the cotton varieties grown in the country are of the upland type, which DP 90 covers 80% of the acreage followed by Stäm 59A (15%) and Acala SJ2 (0.5%) and the remaining 4% is covered by land races and local varieties (ICA Bremen the global center for cotton Testing and research, 2018). The species Gossypium hirsutum represents 98% of the annual commercial cotton production in the country. This species has superior quality because of its wide range of adaptability and high yield potential.

The two main types of cotton farming systems are grouped as large-scale and small-scale productions. Previously, around 60% of Ethiopian cotton was produced under irrigation and the remaining 40% under rain-fed conditions. Currently, due to the increase in irrigated sugarcane production, the percentages are cultivated with irrigated and rain-fed cotton have changed (Table 3).

4.5. Challenges of cotton production in Ethiopia

Access and maintenance of pure cotton seeds is fundamental for successful cotton production. In Ethiopia, there is no formal cotton seed enterprise or seed supply chain to cotton producers. As reported by National Planning Commission (2016), the lack of quality seeds and poor supply chain

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**Table 1. Seed cotton production areas and productivity plan for fifteen years (2016–2030)**

| Regional states | Potential area | Area covered (%) | Production seed cotton (QT/hectare) | Important Woredas in cotton production |
|-----------------|----------------|------------------|--------------------------------------|----------------------------------------|
| Tigray          | 269,129        | 6.3              | 279,569                              | Plain and Robi Valley                 |
| Amhara          | 678,711        | 6.7              | 677,176                              | Kobo, Quara, Armachicho,              |
| SNNP            | 600,929        | 1.3              | 163,994                              | Humbo, Arbaminch, Silie, Abaya, Waylto and Omarate |
| Oromia          | 407,421        | 0.1              | 11,000                               | Upper awash, Didessa Valley           |
| Gambella        | 316,451        | 2.2              | 13,320                               | Baro-Akobo, plain, Abobo, Goge, Bara valley |
| Beneshangul Gurmuz | 1,303,167    | 0.2              | 56,220                               | Beles, Pawe, Kumruk, Kemash           |
| Afar            | 200,000        | 15.5             | 82,6717                              | Middle Awash (Amibara, Algeta, Gewane, Dafan Bolharna) and Lower Awash valley |
| Somali          | 225,000        | -                | -                                    | Gode                                  |
| Total           | 3,000,810      | 3.7              | 2,167,876                            | Gode                                  |

Source (National Cotton Commodity Research Strategy (NCCRS) (NCDS –2017, n.d.);
SNNP = Southern Nations, Nationalities and Peoples. Woreda is administrative unit, which is equivalent of a district.

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Table 2. Released and commercial cotton varieties in Ethiopia (Gudeta & Egziabher, 2019)

| Variety name | Altitude (m.a.s.l) | Time to mature (days) | Ecology | Seed Cotton production (Qt/Hectare) |
|--------------|-------------------|-----------------------|---------|-------------------------------------|
|              |                   |                       |         | Research field | Farmer Field |
| DP90         | 300–1400          | 140–150               | Irrigation | - | 15 – 25 |
| Stem-59 A    | 300–1400          | 140–170               | Irrigation | - | 29–32 |
| Roba         | ~ 1000            | 150–170               | rain fed  | 15–25 | 15–25 |
| Roba B 50    | ~ 1000            | 140–170               | rain fed  | 15–25 | 15–25 |
| A-333-57     | ~ 1000            | 140–170               | rain fed  | 27–35 | 12–25 |
| Bulk-202     | ~ 1000            | 140–170               | Rain fed  | 20–25 | 20–25 |
| Albar 637    | 300–1400          | 150–180               | Rain fed  | 15–25 | 15–25 |
| Acala1517/70  | 300–1000          | ~180                  | Irrigation | 15–25 | 15–25 |
| Tate (Cuokra)| 750               | ~130                  | Irrigation | 48 | 25–38 |
| Enat         | 750               | 130–140               | Irrigation | 48 | 28–40 |
| Cucurava     | 750               | 129–140               | Irrigation | 50 | 28–40 |

Table 3. Percentage of cotton produced in different types of production and production systems for the production year 2015 (source NCDS –2017)

| Type of production | Production system | Total |
|--------------------|-------------------|-------|
|                    | Irrigation | Rain fed | |
| Large scale        | 31.6%      | 34.6%      | 66.3% |
| Small scale        | 3.5%       | 30.3%      | 33.7% |
| Total              | 35.1%      | 64.9%      | 100%  |

affects both cotton producers and textile mills. The supply of cotton seeds in the country is poorly organized and many farmers use the seeds coming from ginneries, year after year. Mostly, the ginneries and some private commercial cotton farms supply seeds without any quality control including purity and germination tests (Zerihun, 2016).

Worer Agricultural Research Center (WARC) has been multiplied and released cotton seeds based on the Ethiopian standards. Ethiopian cotton seed standard specifies the requirements for certifying open-pollinated cotton (G. hirsutum) and includes provisions like seeds-terminology, seed-sampling, seed-purity analysis, seed germination test, seed biochemical test for viability, seeds determination of seeds health and seeds verification of moisture content. In addition to this, it includes field and laboratory standard requirements for open-pollinated cotton seed.

The Ethiopian Seed Enterprise (ESE) and the Regional Seed Enterprises (RSES) in Amhara and Tigray regions are playing a role in seed production and distribution although all cotton seed productions are not fully controlled by these Enterprises (Zerihun, 2016). Cotton seed preparation requires unique procedures unlike other crops (CTA, 2017). Acid delinting is becoming the norm for removal of fuzz fibers and seed preparation in Ethiopia. Cotton production should be environmentally, economically, socially, and industrially beneficial not only for the producers and the textile industry but also for the nation.
4.6. Initiatives in cotton production

Since cotton production got a high priority by Ethiopian government, some cotton initiatives have been already started with governmental and non-governmental agencies to promote and maximize cotton production. Organic cotton production, better cotton initiative and cotton made in Africa (CmiA) are some of the initiatives. Voluntary certification programs such as the Global Organic Textile Standard (GOTS) and CmiA and organic cotton initiatives are running in different regions in Ethiopia (Partzsch & Kemper, 2019).

4.6.1. Organic cotton production

The use of organic cotton can add value at each stage of the production process, both to farmers and intermediaries. Organic cotton production has been implemented in some African countries such as Benin, Burkina Faso, Mali, Senegal, Tanzania, Uganda, Zambia, Zimbabwe and Ethiopia. This method of cotton farming is generally more labor intensive, and yields are usually lower than the conventional cotton cultivation systems; hence to be successful the price of organic cotton lint should be higher than the one of conventional cotton or subsidies should be given to the farmers (Zerihun, 2016) Ethiopia is becoming known for its organic cotton production and there are some certified organic cotton producers in the southern part of the country, with further plans to expand to other potential cotton producing areas.

4.6.2. Better cotton initiative (BCI)

The concept of ‘sustainable industrialization in Ethiopia is now integral to the UN’s Sustainable Development Goals (Faulkner et al., 2012). NCDS –2017 (n.d.) states that Ethiopia is a participant of the Better Cotton Initiative. Better Cotton Initiative (BCI) participants should produce cotton in an environmentally friendly fashion and be socially sustainable. The legal framework in Ethiopia, after its amendment of May 2015, is now ready for the introduction of GM cotton, at least on an experimental level. The question is now to know whether it is relevant to take such a decision, as it can have a considerable long-term impact on the Ethiopian cotton sector (NCDS –2017, n.d.). Effects can result from direct impacts which arise as a result of the modifications to the crop itself including effects on human health, inheritable factor flow, and impacts on soils. Indirect impacts arising from the effects of GM crops controlling on the environment since the country is planning to produce BC cotton on the local commercial farm. These include changes to farming inputs, farm management practices (Hilbert et al., 2018).

4.6.3. Cotton made in Africa (CMIA)

The National Cotton Development Strategy indicated that sustainable cotton production was started by CMIA in African countries such as Burkina Faso, Cote d’Ivoire, Malawi, Mozambique, Zambia, and Zimbabwe. In Ethiopia, CMIA is working in Quara and Methema woredas of the Amhara regional state starting from 2014. CMIA assists small-scale farmers to produce socially and ecologically sustainable raw material. The meaning of sustainability in this regard includes social satisfaction for farmers, high yields, income generation while protecting the environment. CMIA cultivated using sustainable methods by smallholder farmers, in which cotton is grown in rain-fed conditions with decisive and accountable use of pesticides and fertilizers (Hilbert et al., 2018).

4.6.4. Bottom up

Cotton production can have some negative impact on the environment which are necessary to produce the crop (Wakelyn & Chaudhry, 2009). Bottom up is a project initiative that aims to contribute to a sustainable, inclusive, and transparent value chain that generates business growth, improves working conditions and promotes labour and environmental standards in the Ethiopian cotton and garment industry by 2021. Bottom up will do this by promoting and advocating the adoption of responsible social and environmental practices comparing with international standards in Ethiopia by encouraging cotton producers.
4.6.5. Fair trade cotton
Cotton growers from developing countries including Ethiopia, typically produce small quantities of cotton that puts them at a significant disadvantage on the global market. Moreover, while production costs rise each year, the price of cotton has been decreasing. Fair trade is based on paying producers a guaranteed minimum price. The minimum price should be high enough to cover the costs of sustainable production and the producer’s costs of living, plus the costs of control and certification required by the inspection body. While organic and fair trade cotton remain niche products, two initiatives aim at enlarging the market for sustainable cotton by meeting the requirements of the mass market through the big retail companies (NCDS –2017).

5. Cotton marketing
In Ethiopia there are two benchmark prices on the local market for lint cotton. The first one is a price setting mechanism by which Ethiopian Industrial Inputs Development Enterprise (EIIDE) buys cotton from local producers at fixed price and the second benchmark price is taken from cotton transactions between local producers and textile factories (Et.Gain report, 2019).

The performance of cotton market chain analyzed using marketing margins supplemented with analysis of costs incurred and gross profits generated for different market chain actors in Ethiopia, showed poor performance of the chain. In the chain, the farmers are the most disadvantaged actors. Several factors affect the supply of marketable cotton at farm level. In a case study, conducted in Metema district of Amhara regional state, structure conduct performance analysis of the cotton market chain indicated poor performance of the chain that places farmers at a disadvantageous actors in the value chain. (Bosena et al., 2011).

Like other Africa countries, Ethiopian smallholders usually sell the seed cotton to traders who do not set different prices according to quality. The absence of incentives does not encourage the farmers to pay special attention to the quality of the harvesting. But for lint cotton, it is planned that Ethiopia Domestic Distribution Corporation (EDDC), makes joint purchases on behalf of local cotton buyers. The EDDC reportedly makes these procurements based on the qualifications provided by the end user (Tefera & Tefera, 2015).

It is necessary for the cotton spinning mills to produce good quality yarn at a competitive price. The cost and quality of yarn is greatly dependent on the cost and quality of cotton (Sheikh & Lanjewar, 2010). Lack of well-organized research work on cotton affects its production, productivity, quality and marketing in addition to systematic grading and classification. The current marketing and pricing system have been based only on cotton weight, which resulted in giving a less attention to cotton quality by cotton growers and ginneries (Hilbert et al., 2018). Unlike lint, there is no seed-cotton market price system. Most of the cotton produced in country is sold as lint and seeds, after commission ginning. The high trash content in seed-cotton is directly correlated to the absence of quality-supportive incentive.

Currently there are economic risks, due to an increase in the cost of production, yield, and price volatility, transportation costs from distant woredas and the absence of a reliable market. Cotton production and marketing is done in an arbitrary manner and there is no practice where producers can be assured of a reliable market and traders of a steady supply of cotton (Zerihun, 2016).

Most cotton is grown in lowlands hence the competition with sesame, sorghum and sugarcane is high as per selling price advantage. Cotton is used as a rotation crop since farmers assume the fertility of their land improves in the next cropping cycle after cotton. The comparison of the cotton area and the area for other crops in the potential cotton-growing zones shows that cotton represents only 1.4% of the total annual crops, compared to 14.4% for sesame and 21.4% for sorghum and the rest 62.9% is covered with different crops (NCDS –2017, n.d.).
6. Ethiopian cotton quality for spinning mill

Yarn quality is characterized by the inherent characteristics of the constituent various fiber properties, which partially predict the physical properties of yarn and the success of spinning (Hallam, 2018). On the other hand, Faulkner et al. (2012) stated that cotton fiber properties play an important role in determining the spinning performance of final yarn quality parameters to some extent.

Raw material costs are the single greatest cost in the production of spun yarns. If spinners are unable to find bales of cotton with a fiber quality profile that meets their production needs from a region, they will turn to cotton produced in another region. When high volume instrument (HVI) data on fiber properties are available, bales are generally selected based on these data (B. Kelly et al., 2015).

As reported by C. M. Kelly et al. (2012) cotton breeders have used HVI as their main instrument for access fiber quality data and also fiber data generated by Advanced Fiber Information System (AFIS) technology, which is now available to provide additional information on fiber length and fiber maturity characteristics. In Ethiopia HVI is used for fiber quality assessment frequently. The popularity of HVI can be attested by the fact that its results are being used to grade cotton in many countries. The high testing speed of the HVI system enables the spinning mill to test each individual bale of cotton (Mwasiagi, 2012).

As explained by Estur (2008) and C. M. Kelly et al. (2012) the price of cotton lint is primarily linked to fiber characteristics but also to non-quality factors such as the way it is marketed internationally. The instruments that are used to measure fiber quality parameters (HVI and AFIS) can be used to measure the inherent characteristics of cotton fiber such as fineness, length, maturity and length distribution (Paudel, 2012).

The relative impacts of cotton fiber properties on the spinning performance and end-product quality depend on the structural differences of yarn types and spinning technology. The cotton production must be conscious of developments in spinning technologies and their fiber quality demands (B. Kelly et al., 2015). Based on this assumption in order to check the quality level, Ethiopian cotton is classed using High Volume Instrument (HVI) and the Ethiopian Industry Development Institute (ETIDI) is the one responsible for cotton classification in the country and released the attempted cotton standards (Table 4). ETIDI has set grading system even though it does not give a clear demarcation between the grades. In addition to HVI Thermo detector is used to measure stickiness of the fiber further, Shirley trash analyzer is used to measure the trash content of the fiber, moisture content and maturity ratio is estimated by HVI and contamination is estimated by visual assessment.

Spinning firms purchase local lint regardless of the quality and additional lint is imported. To be competitive in the global market the cost and quality of a yarn is mainly dependent on the initial cost and quality of the raw cotton used in the textile mills. Hence, it is a common practice in textile mills to mix cotton of different varieties in order to make a balance between cost and quality in Ethiopia due to the absence of different varieties of cotton with a different quality range the textile mills produce limited yarn count range (NCDS, 2017).

Generally, from the Literature survey, focused group discussion and site visits, the following issues were analyzed. Though cotton has been a major commercial commodity in Ethiopia for a longer time, there is no scientific information available regarding the quality parameters needed, both to get a quality output from the industry perspective and also to harvest cotton sellable at a premium price from the farmer’s perspective; The main problems observed in the cotton sector are the limited use of available potential land, poor cotton seed quality, lack of different varieties of cotton, poor follow-up and research activities and absence of applicable grading and quality
management system in the value chain; There are many cotton initiatives in the country but they are not working in coordinated and sustainable way.

7. Conclusion
Ethiopia has a huge potential for cotton production both in rain fed and irrigated systems. However, the amount of cotton produced in the country is not consistent and enough to satisfy the demand in a sustainable manner. Therefore, it is necessary to enhance the competitiveness of Ethiopian cotton to the global market through strengthening the customer supplier relations, empowering small holder farmers, providing intensive training about quality and practicing quality management system. The availability of land with suitable climate conditions, trainable manpower, booming of textile industries with attractive government incentives are promising for further development of cotton production in Ethiopia. From the SWOT analysis it can be conclude the main opportunities of the sector are due to the launching of many industries there is high demand of cotton lint. Even though there is high competition with synthetic fibers like polyester, competition with the developed world, high production cost and limited subsidies due to limited capital are the main threats of the sector; the main strength in the sector is government focus to the sector, high potential land for cotton cultivation and the presence of trainable man power. On the other hand, the absence of different types of varieties, poor market network, limited research and development activities, the presence of poor infra- structure are the main weakness of the cotton sector. The main problems observed in the cotton sector are the limited use of available potential land, poor cotton seed quality, lack of different varieties of cotton, poor follow-up and research activities and absence of applicable grading and quality management system in the value chain. From the trends of cotton production. The outcome of this survey can serve as an input into how best to build the capacities and skills of producers to achieve acceptable levels of production in line with sustainability practices and standards.

8. Future perspectives
In order to enhance the productivity and quality aspects of the cotton sector a strong production and quality management system must be formulated and continuous follow up must be implemented by considering the following points.

| Specification                      | Grade          |
|------------------------------------|----------------|
|                                    | A              | B              | C              |
| Staple length (mm)                 | ≥ 28.5         | 27 – 28.5      | 25             |
| Micronaire                         | 3.5–4.2        | 4.3–4.9        | 3.2–3.4 and>3  |
| Strength (g/tex)                   | ≥29            | 26–28.9        | 25–25.9        |
| Average sticky points              | 0–10           | 11–20          | 21–32          |
| Short fiber content (%)            | ≤10            | 11–12          | 13–14          |
| Trash content (%)                  | <3.5           | 3.5–4.5        | 4.6–5          |
| Moisture content (%)               | <8             | <8             | ≤8             |
| Maturity ratio (%)                 | ≥85%           | 81–84          | 75–80          |
| Length uniformity ratio (%)        | ≥83            | 81–82          | 76–80          |
| Color grade                        | 11-1 up to 21-1| 21-1 up to 31 | 41-1 up to 51-4|
| Contamination (g/bale)             | ≤ 5            | 11             | 10–15          |
| Proposed buying lint price         | 33             | 31             | 30             |

Table 4. Ethiopian cotton quality grading system specification and local trading prices (Etidi Data)
For sustainable growth and to become competitive at a global level, the current practice has to be changed. Mutually beneficial customer supplier relationships which promote strong relationships between the actors in the cotton sector should be practiced. Cotton producers should be empowered by different means such as providing subsidies, intensive training, implementing strong process control program and better cotton seed should be released to the sector with variable quality characteristics, which can be adopted to a different agroecology with appropriate purity and control system.

Establish commodity development organization which is responsible to coordinate and implement the regulatory framework for the development of the commodity sub-sector setting official standards, collection, analysis and dissemination of market information, rendering advice to government on agricultural commodity policy, coordinating seed multiplication activities, in liaison with research and extension.

Acknowledgements
I would like to express my deepest appreciation to a number of individuals, institutes, and companies. Specifically, I would like to express my deepest appreciation to Ethiopian Institute of Textile and Fashion Technology (EITEX), Ethiopian Textile Industries Development Institute (ETIDI), Weker Agricultural Research Centre (WARC), Ethiopian Institute of Agricultural Research (EIAR), ministry of research and agriculture development (MORAD), Asasa Agricultural research center (AARC) Ethiopian standards agency, Ethiopian statistics agency.

Funding
This work received funding from Excellence in Science & Technology (ExiST) a Higher Education and TVET program Ethiopia - phase 3 PE 679-higher Education kfw project no. [51235]. Funding This work received funding from Excellence in Science & Technology (ExiST) a Higher Education and TVET program Ethiopia - phase 3 PE 679-higher Education kfw project No.[51235].

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Conflict of interest
The authors declares there is no conflict of interest.

Citation information
Cite this article as: A review of current state and future directions of cotton production in Ethiopia, Tiliksew Addis, Abera Kachi & Jun Wang, Cogent Food & Agriculture (2021), 7: 1880533.

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https://doi.org/10.1080/23311932.2021.1880533

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