

COTTON AND ITS BY-PRODUCTS

in Uganda

BACKGROUND PAPER



UNITED NATIONS
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COTTON AND ITS BY-PRODUCTS SECTOR IN UGANDA



Background Paper

Prepared by Fredrick Lugoja

March, 2017

Acknowledgments

UNCTAD commissioned this background paper as part of UN Development Account Project 1617K: "Improving the value added of cotton by-products in Eastern and Southern Africa (ESA)". The paper was prepared to inform discussions with stakeholders in the early stages of the project. For more information, please visit the project site at: <http://unctad.org/en/Pages/SUC/Commodities/SUC-Project-1617K.aspx>."

This paper was prepared by a consultant, Mr. Fredrick Lugojja, Market Information and Monitoring Officer at the Cotton Development Organisation (Uganda). The work was supervised by Ms. Yanchun Zhang, Chief, Commodity Policy Implementation and Outreach Section (CPIOS) with the contributions of Mr. Kris Terauds, Economic Affairs Officer, Special Unit on Commodities.

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Contacts

For further information on the Special Unit on Commodities, please contact us at:

UNCTAD
Special Unit on Commodities
Palais des Nations
8–14, Avenue de la Paix
1211 Geneva 10
Switzerland
Phone: +41 22 917 1648 / 6286
E-mail: commodities@unctad.org

UNCTAD/SUC/MISC/2017/4

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List of Acronyms

AGOA	Africa Growth Opportunity Act
ATM	African Textile Mills
CBOs	Community Based Organization
CCB	Cotton Control Board
CDO	Cotton Development Organization
COMESA	Common Markets for Eastern and Southern Africa
EAC	East African Community
EPA	Economic Partnership Agreement
EU	European Union
GOT	Ginning Out-Turn
GOU	Government of Uganda
JITCO	Jinda International Textiles Corporation Ltd
LMB	Lint Marketing Board
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDA	Ministries Departments and Agencies
MPED	Ministry of Finance Planning and Economic Development
MTIC	Ministry of Trade, Industry and Cooperatives
NARO	National Agricultural Research Organization
NGO	Non-Government Organization
NYTIL	Nyanza Textile Industries Limited
TEMAU	Textile Manufacturers Association Uganda
TEXDA	Textile Development Agency
UCOPA	Uganda Cottonseed Oil Processors Association

UDC	Uganda Development Corporation
UGCEA	Uganda Ginners and Cotton Exporters Association
UIA	Uganda Investment Authority
UIRI	Uganda Industrial Research Institute
UNCTAD	United Nations Conference on Trade and Development
UNECA	United Nations Economic Commission for Africa
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization
WUCC	Western Uganda Cotton Company

1. Introduction

Agriculture is one of the most important economic sectors in Uganda, with significant contributions to employment, food security, foreign exchange earnings and production of industrial raw materials. According to the Uganda Bureau of Statistics, in 2015/16, agriculture generated 23.6% of the country's GDP and employed over 68% of its population.

Cotton is one of the traditional cash crops grown in Uganda, used both as an export good and as a raw material for the domestic textile and edible oil industries. The Cotton Development Organization (CDO) estimates that the cotton value chain employs a total of 2.5 million people, directly and indirectly, in the production and marketing of its primary products, such as textiles and garments, as well as its by-products, such as soap, edible oil and animal feed.

2. Cotton in Uganda

2.1. History

Colonial Period: Cotton was introduced in Uganda by the British Colonial Government in 1903 as the first cash crop (Mukiibi, 2001). By the mid 1930's production reached 60,000 metric tonnes (MT) (Baffes, 2009). One of the most divisive methods used to encourage cotton production during colonial rule was the enforcement of a poll tax, used to supply the British textile industry with cotton. Baffes (2009) explains that the poll tax contributed to "forced labor conditions," because cotton was the only crop able to generate cash to pay the tax. The poll tax law was repealed prior to World War II. But the tax remained in practice until independence, and refusal to plant cotton resulted in imprisonment. Forced promotion of cotton during the colonial period displayed a disregard for farmers' interests by, and in favour of, the colonial rulers.

Colonial governance also set the stage for heavy government involvement in regulation of the cotton sector. In 1933, the Cotton Control Board (CCB) increased government restrictions considerably with the passage of the Cotton Zone Ordinance. The Ordinance established fourteen zones, each allotted with a ginnery that maintained a monopoly on its zone's harvest. Furthermore the Ordinance enacted a minimum price scheme (Lundbæk 2001). Although this heavy government involvement could protect farmers from sharp price declines, it ultimately served the interests of ginneries by ensuring that farmers, dependent on government price protections, produced cotton instead of more lucrative crops. The Lint Marketing Board (LMB), a government body established with the passage of the Lint Marketing Board Act (1959), also took an active role in the textile industry. According to Masinga and Ruhweza (2007), the LMB held a "monopoly on domestic and international trade of cotton lint and seed, with ginning and marketing functions vested in the cooperative unions." The LMB also took on marketing and regulation responsibilities as time progressed (Baffes, 2009). Both the LMB and Cotton Zone Ordinance were in place until 1994, although their roles essentially evaporated with the collapse of the cotton industry during the 1970s and 1980s.

Colonization was formative not only in introducing the crop but also introducing social and governmental structures for the cotton value chain. One of the most notable social structures brought on by colonization was the influx of citizens from other British colonies. During the colonial period, ethnic Indians controlled most of the post-harvest activities, such as ginning, marketing and trade (Baffes, 2009). According to Chell (2013), the influence of early immigrants can still be seen today in numerous ancestral Indians taking part in production (e.g. Rwenzori Cotton Ginners Company Ltd.; Southern Range Nyanza; Fine Spinners Ltd.).

Among its many institutional legacies, the colonial period established cotton cultivation as an important economic activity in Uganda (Chell, 2013).

Pre-Liberalization Period after Independence: Following Uganda's independence in 1962, cotton production continued to increase, peaking at 84,000 MT in 1969 (Baffes 2009). The stable cotton prices experienced during the colonial period continued throughout this period. The price stability of this period is especially remarkable when compared to the volatile price fluctuations that followed, from the 1970s onward. Stable prices may have made reliance on cotton exports appear to be a sustainable development strategy during the early post-independence period. Citing cotton's relative price stability and historical economic significance, the new Government of Uganda (GOU) adopted a policy of promoting cotton farming (Chell, 2013).

Exports for the newly independent Uganda relied heavily on coffee and cotton (Masinga M. Ruhweza A. 2007). Cooperatives and block farms, established near the end of the colonial period, expanded during the post-independence years as the cotton sector became increasingly nationalized. Competition among ginners declined and, a few years after independence, cooperatives took over all ginning operations. The climate of decreased competition allowed cooperative ginneries to continue their monopolies on cotton purchases within zones established during the colonial era. Baffes (2009) notes that growth during the post-independence phase was unsustainable, as it was based on expansion of land devoted to crop production. Meanwhile, yield per acre actually decreased during this period. Land expansion for cotton production was spurred by the unsustainably high prices paid to growers, often on credit. Price stability had emboldened cooperatives to give large payouts to farmers, which created short-term incentives to grow more cotton, but proved unsustainable for ginneries. Poor business practices caught up with many cooperatives, which bought cotton on credit, only to repay farmers late or not at all.

As cotton markets became globalized in the 1970s, an era of price volatility began. Although the policy environment in Uganda boosted production over the short term, it was economically unsustainable once political and price stability was disturbed (Chell, 2013). The resulting collapse of production, following a period of prosperity, emphasizes the caution necessary when managing ginneries under a cooperative. For ginneries to be sustainable, cotton prices paid to farmers need to provide incentives for farmers to grow cotton, while also keeping the ginnery profitable (Chell, 2013).

The growth in cotton production following independence proved illusory. The unsustainable expansion of land under cotton cultivation, rising political turmoil, and poor economic management all destabilized the industry (Chell, 2013). A decline in world cotton prices deepened the consequences of mismanagement. Even when prices bounced back, the industry failed to right itself, underlining the importance of effective management and prudent pricing.

Management of the cotton sector was further damaged under the Amin regime (1971-1979). Its expulsion of Ugandan Asians in 1972 and its subsequent Properties and Businesses (Acquisition) Decree of 1973 (Asiimwe, 2012), destabilized many post-harvest industries. Historically, Ugandan Asians owned and managed most post-harvest processing activities - their expulsion therefore left many businesses without knowledgeable leaders and technicians.

Management problems also plagued government institutions. For example, the LMB's monopoly on cotton lint and seed sales (Ahmed and Ojangole, 2012) became a drag on the sector as the decade progressed. According to Baffes (2009), "the administrative expenses of the Lint Board for one bale of cotton rose from UGX66 in 1970 to UGX618 in 1979, an almost 10-fold increase." Increased administrative costs reduced farmers' profits during this

time, further discouraging them from growing cotton. In 1972, cotton production remained at 78,000 MT, not a significant decrease from 1969 peak production of 84,000 MT (Baffes, 2009). By the 1974/75 season, the Amin regime's policies had taken effect and cotton prices fell. In 1976, cotton production collapsed to 14,000 MT (Baffes, 2009).

The fluctuation of 1974/75 was the largest price decline seen in Uganda's independent history (Chell, 2013). Although the cotton market recovered quickly, production in Uganda languished for years to come. Following its collapse in the 1970s, cotton production continued at a substantially lower rate, reaching a record low of 2,000 MT in 1987 (Baffes, 2009). This period of decline damaged severely the long-term prospects of Uganda's cotton industry. As well as a collapse in cotton production, the period was characterized by: a neglect of research and extension services; inefficient processing, marketing and export monopolies; a collapse of the ginning industry; poor management of cooperatives; a lack of production inputs; as well as general insecurity in the country. Reviving the cotton sector would face many challenges.

Post-Liberalisation Period: In 1986, a new government came into power and, in 1987, it enacted a macroeconomic reform policy geared at promoting healthy and sustainable economic development. This included divesting government parastatals through outright sale, privatization, equity participation or restructuring. Subsequently, the Lint Marketing Board (LMB), was restructured and the marketing, processing and export functions were fully liberalized in 1994 (Mukiibi, 2001).

Following the liberalization of the cotton sub-sector and through the enactment of the Cotton Development Statute of 1994 (now the Cotton Development Act of 2000), the GOU established the Cotton Development Organisation (CDO) in November 1994 and charged it with overseeing and promoting the cotton sector, its activities and products (Cotton Development Act of 2000).

According to the CDO, liberalization has led to a number of achievements in reviving the cotton sub-sector, including:

- **Marketing** – As a result of liberalization, cotton is sold on cash-on-delivery terms and farmers are free to sell to the highest bidder.
- **Ginning capacity** – Cooperative union ginneries have been privatized and total ginning capacity has increased from 100,000 bales (each 185 bale contains 185 kilograms (kg) of cotton lint) in 1994/95 to over 900,000 bales. As a result, operators must now compete for farmers' cotton.
- **Quality control** – The quality of lint has greatly improved following strict quality control and ginnery monitoring as well as refurbishment of the CDO Cotton classing laboratory. This translates into better prices for premium-grade Ugandan cotton. Uganda joined the International Cotton Association (ICA) and Bremen Cotton Exchange (BCE), to promote Uganda's cotton and harmonize cotton standards.
- **Training of technicians** – Under the Cotton Subsector Development Program (CSDP), the GOU established a Ginning Training School in 1998 at Busitema National College Agricultural Mechanization. In 2007 the College became a University and now offers a Diploma in Ginning Engineering and a Degree in Textile Engineering.
- **Cotton production** – Production has risen steadily, from 33,000 bales in 1994/95 to a post-liberalization high of 254,036 bales in 2011/12.

2.2. Cultivation

According to Baffes (2009), cotton is grown primarily by small farms with an average size of less than 0.5 hectares. He estimates that 250,000 households are engaged in cotton production. Cotton is grown across approximately two thirds of Uganda's land area, as shown in Annex 1. Cotton is grown as either a monoculture or inter-cropped with food crops. Cultivation is characterized by manual hoeing and low use of inputs. The crop is entirely rain-fed and harvesting is manual (i.e. hand-picked).

2.2.1. Economic importance

- Source of income** - As shown in Table 1, cotton is a cash crop that is a major source of revenue for both rural households and the national economy.
- Food security** - Cotton is normally grown as a land-opening crop and in rotation with other crops. As a land-opening crop, cotton adds nutrients to the soil through its foliage, thus increasing yields of follow-on crops - such as millet, sorghum or maize - thereby contributing to food security.
- Employment** – According to the CDO, the cotton sub-sector employs an estimated 2.5 million people, directly and indirectly, as farmers and farm labourers, seed cotton and cottonseed buyers, transporters, ginnery workers, cotton exporters, textile and garment manufacturers, oil millers, etc. The CDO also established that cotton production engages women and youth. Although these two groups typically do not own land, they can often access it for short periods during the year.

Table 1 - Cotton production and earnings since liberalization

Period / season	Cotton lint production (bales @ 185 kg)	Earnings from lint sales (US\$ million)	Earnings by farmers (Sh. billion)
1994/95	33,000	12.82	7.39
1995/96	56,416	20.67	11.06
1996/97	110,700	38.09	19.84
1997/98	32,000	10.6	6.99
1998/99	82,000	25.49	18.37
1999/00	117,000	29.0	19.66
2000/01	100,000	27.75	23.52
2001/02	120,000	17.76	18.14
2002/03	110,000	24.42	30.8
2003/04	158,000	43.85	54.12
2004/05	254,000	37.59	45.78
2005/06	102,600	20.88	24.7
2006/07	134,000	27.27	32.5
2007/08	66,500	19.68	25.74
2008/09	125,310	24.57	48.49
2009/10	70,300	20.68	27.94
2010/11	146,894	101.91	179.06
2011/12	254,036	47.94	148.1
2012/13	102,619	30.19	59.83
2013/14	78,364	25.08	49.84
2014/15	93,093	22.04	56.74
2015/16	110,707	25.81	88.01
Av. for 1994-2004	91,911	25.05	20.99
Av. for 2005-2015	128,202	33.64	65.56

Source: Cotton Development Organization, Uganda

d) **Raw material** - Cotton is a raw material from which a number of products are derived:

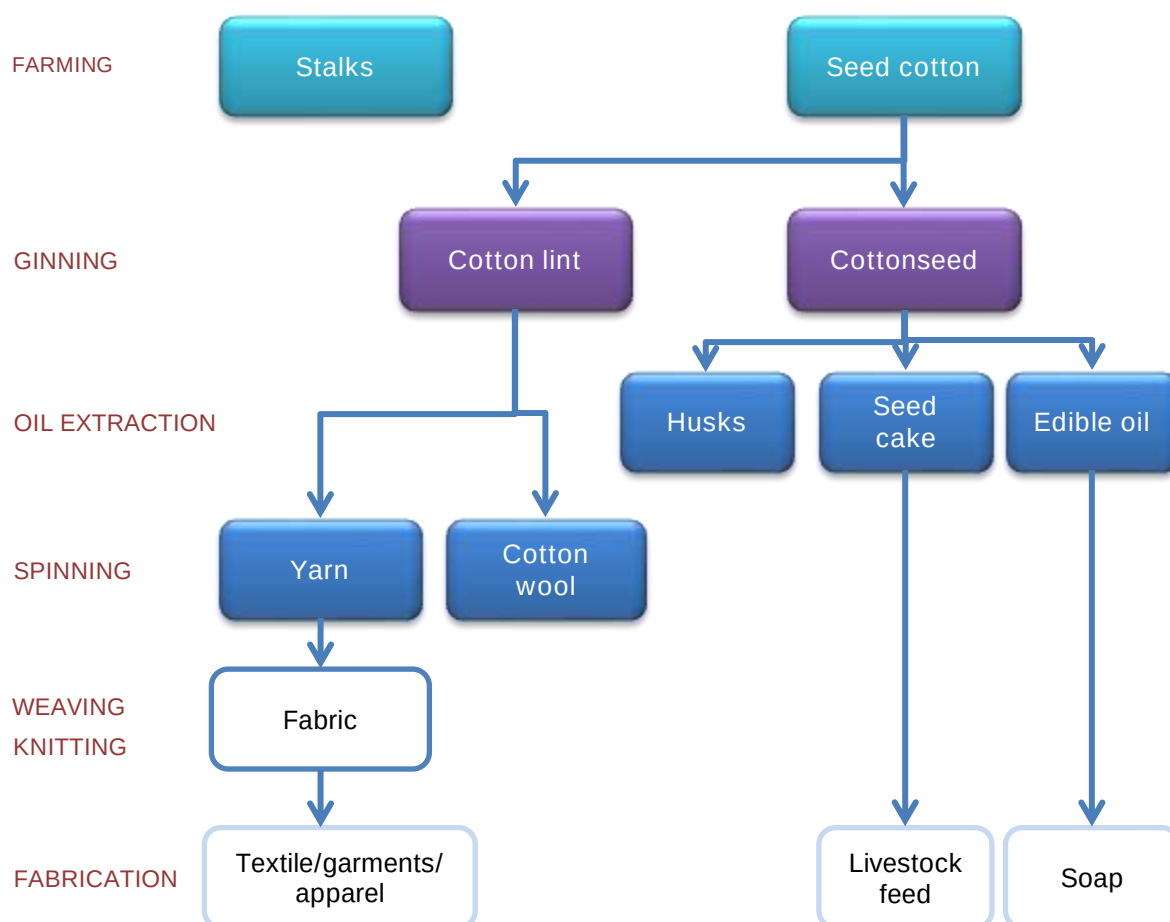
- Lint for yarn, textiles, garments, sanitary and medical materials
- Seed cake for animal feeds and fertilizer
- Edible oil for cooking and soap stock
- Hulls for livestock feeds and poultry litter
- Linters for cotton swabs, paper, plastic and films manufacture and pharmaceutical products
- Cotton stalks can be utilised as wood fuel and are used in the manufacture of particle boards and paper.

According to the CDO, domestic value addition to lint is at an average of 3.3% of the total lint produced. Meanwhile, all the cottonseed produced is consumed by domestic millers.

e) **Value addition** - The cotton value chain in Uganda starts on the farm, with production of seed cotton by about 200,000 - 250,000 households spread in 2/3 of the country. Beyond the farm gate, a number of follow-on value addition activities yield a range of value added products, as shown in Figure 1, and these include:

- **Ginning:** Cotton ginneries in Uganda are entirely dependent on supply from producers. Ginning is a highly specialized process whereby seed cotton is separated into cottonseed and cotton lint. The lint is cleaned, and finally pressed into bales. According to CDO, the average Ginning Out-Turn (GOT) in 2015/16 was 42.75% lint, 53.3% seed and 3.95% process waste. Additional information is provided in section 2.3.1 below.
- **Spinning and Weaving/Knitting:** The textile mills in Uganda source all their lint locally from the ginners. They are largely integrated industries doing spinning, weaving and knitting, as well as garments. Additional information is provided in section 2.3.2 below.
- **Absorbent Cotton Wool Production:** The cotton wool manufacturing firms in Uganda also source all their lint locally from the ginners. At the factories, cotton lint is processed through a series of steps that render the cotton hydrophilic in character and free from external impurities. According to a CDO survey on status of cotton value addition in Uganda carried out in 2016, the average conversion ratio of lint to cotton wool is 100:86. Additional information is provided in section 2.3.3 below.
- **Edible oil extraction:** All the cotton seed crushed at the mills in Uganda is sourced locally from the ginners. Oil is extracted from the cottonseed using the expeller–pressing method, coupled with chemical refining. According to a 2016 CDO survey on the status of cotton value addition in Uganda, the processing of cotton seeds yields approximately 12% cotton seed oil, 50% seed cake, with the balance in husks and linters. Additional information is provided in section 2.3.4 below.

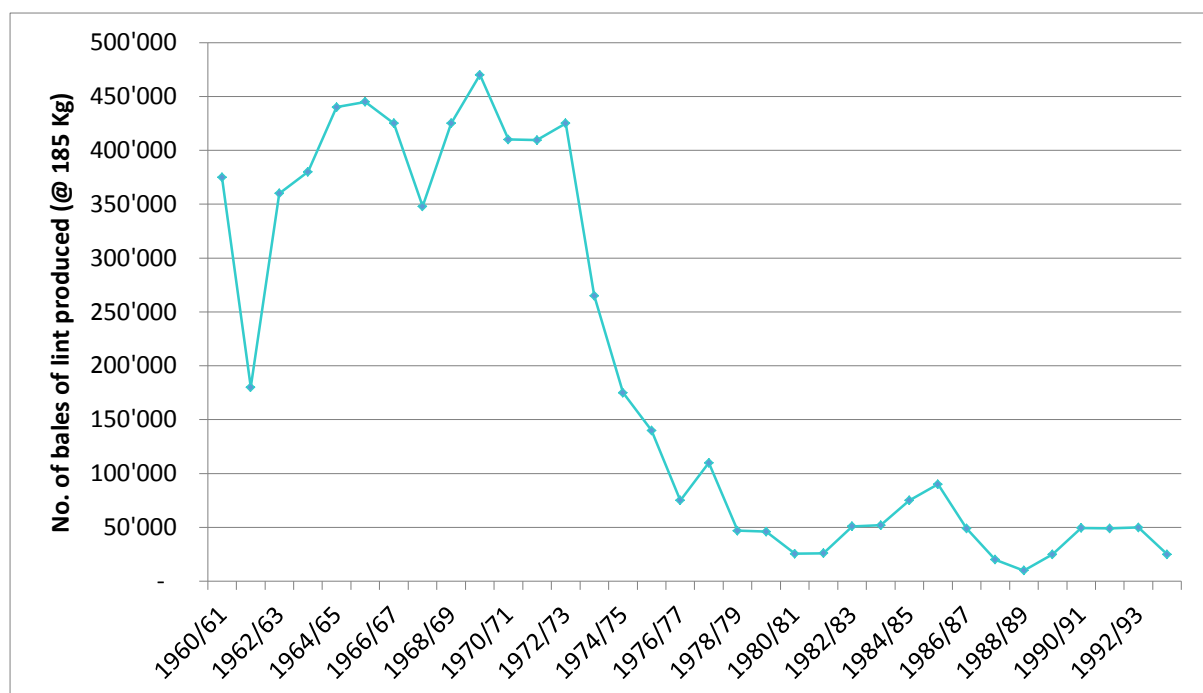
Figure 1 - The cotton value chain in Uganda



Source: Author

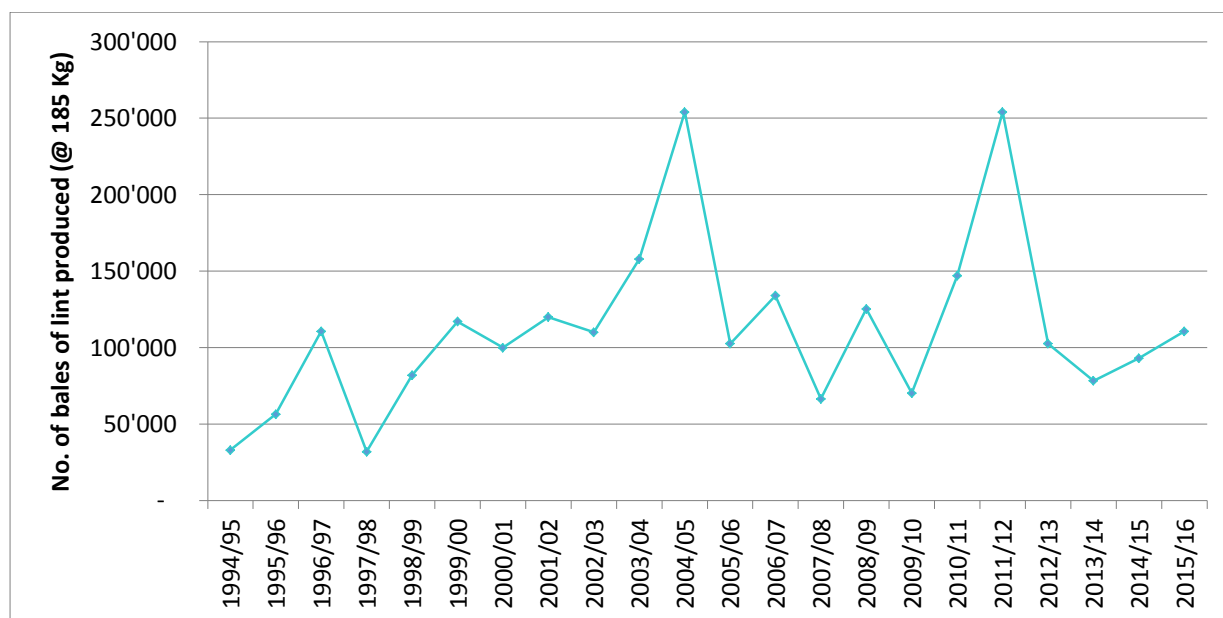
2.2.2. Production trends

Figure 2 shows cotton production in Uganda between 1960 and 1994, prior to liberalization of the sector. During the 1970s and the 1980s, production declined drastically, mainly due to civil strife, economic turmoil and poor governance.

Figure 2 - Cotton production prior to liberalization in 1994

Source: Cotton Development Organization, Uganda

After liberalization, production rose steadily, from 33,000 bales in 1994/95, to a high of 254,036 bales in 2011/12, as shown in Figure 3. Annual fluctuations are largely due to price movements and the effects of climate change on rainfall.

Figure 3 - Cotton production since liberalization in 1994

Source: Cotton Development Organization, Uganda

2.2.3. Challenges

According to field observations conducted by the CDO, key challenges affecting cotton production include;

- **Inadequate funding for research and technology development** has slowed down development of new varieties and production technologies, hampering the sector's ability to adapt to changing stakeholder demands and emerging constraints, in particular climate change.
- **Climate change and overdependence on rain-fed production** – climatic changes, including to rainfall patterns and volumes, has adversely affected the timing and duration of the planting and rainy. Dependence on rain-fed agriculture precludes farmers mitigating these adverse impacts by using alternative sources of water.
- **High cost of production inputs** – Most of the production inputs (e.g. fertilizers, pesticides, and spray pumps) are imported from abroad. This makes them costly to farmers. The situation is further worsened when the shilling weakens against major foreign currencies.
- **Declining soil fertility in most parts of the country.** This is effect is worst in areas where land is fragmented into ever-smaller parcels, such as in eastern Uganda.
- **Weak farmer group cohesion due to the seasonality of cotton production** – Farmer groups are rarely permanent, as farmers tend to move in and out of cotton production every season, largely in response to fluctuations in cotton prices. This undermines the continuity of services these groups deliver (e.g. provision of inputs and marketing), as well as their political influence.
- **Competition for land and labour from other agricultural enterprises** – Since farmers decide every season whether or not to grow cotton, the area planted to cotton fluctuates annually. Furthermore, farm labour is often shared across several activities, resulting in a lack of specialization and low adoption of recommended agronomic practices for cotton production.

2.3. Value addition

Cotton has two major components: lint and cottonseed. Lint is the primary product of seed cotton and is transformed by the textile industry into yarn, textiles, garments and apparel, as well as into absorbent cotton wool. Meanwhile, cottonseed is a by-product that can be transformed into four major products, namely: edible oil, cottonseed cake, soap stock and cotton husks. Stalks are another cotton by-product -they are rarely transformed, but rather used as wood fuel or burnt in the field to control pests.

2.3.1. Ginning

Ginners are crucial actors within the cotton industry: their position, efficiency and organization are critical for the effective operation of the entire value chain. Currently, there are 39 ginneries in Uganda, with an installed ginning capacity of close to one million bales. Out of these 21 were operational and 18 silent in the 2015/16 season, as shown in Table 2. The ginneries are located in the main cotton-growing regions: the Eastern, Northern, West Nile, Mid-West, Central and Western Regions, as shown in Annex 2.

According to the CDO, 33 ginneries are privately owned while 6 ginneries are owned by the cooperative unions. The ginneries consume all Uganda's seed cotton production.

Uganda predominantly uses roller-gin technology, which is preferred for preserving the integrity of the cotton fibre. Only 3 of the 39 ginneries use saw-gin units. According to the CDO, lint outturn usually ranges between 40% and 44% (see Table 3). Since seed cotton is hand-picked, its lint has superior fibre characteristics, as compared to machine-picked cottons. Seed outturn ranges between 50% and 56%. Ginneries with installed capacity of less

than 15,000 lint bales have a breakeven production level of approximately 3,000 bales, while the breakeven level for those with installed capacity of more than 15,000 bales is between 5,000 and 6,000 bales.

After harvest, intermediary agents aggregate seed cotton from several farmers and deliver it to the ginneries. These agents either work for the ginnery or are independent. They often also act as field extension workers. The agents procure the crop, store it, undertake additional sorting and deliver the produce to the ginnery. In return, the ginners, train, coordinate and monitor their agents, providing them with advance funds, commissions and adequate transport facilities.

Table 2 - Ginneries: Ownership, location and capacity

No	Ginnery	Ownership	Location		Operational Status in 2015/16	Installed capacity (bales)	Capacity utilization		
			latitude	longitude			2013/14	2014/15	2015/16
1	Aboke	Rafiki Cotton Industry	2.00494504	33.47334414	silent	15,120	0%	0%	0%
2	Aduku	Twin Brothers Ltd	1.99819584	32.71573325	operational	22,320	13%	18%	22%
3	Arapai	Teso Co-op Union	1.74315138	33.58047232	silent	14,400	0%	0%	0%
4	Balawoli	Ajay Cotton Ltd	1.03010857	33.10077231	silent	25,920	1%	0%	0%
5	Bugema	Africot Trading Company	1.03731299	34.17712653	silent	54,000	0%	0%	0%
6	Bulangira	Cottfield EA (U) Ltd	1.13095377	33.87945045	silent	43,200	0%	0%	0%
7	Bulumba	Bon Holdings Ltd	0.99683024	33.45285759	silent	15,840	5%	0%	0%
8	Busembatia	Pramukh Agro Industries Ltd	0.77359962	33.62818195	silent	14,400	5%	0%	0%
9	Bushenyi	Bushenyi Cotton Co. Ltd	-0.220017	30.09815583	operational	25,920	16%	26%	29%
10	Busolve	South Base Agro Industries Ltd	0.85392709	33.93261602	operational	19,080	3%	8%	6%
11	Coo-rom	West Acholi Co-op Union	2.75591327	32.30132173	operational	36,000	11%	12%	21%
12	Dabani	Dabani Ltd	0.43130072	34.04820565	silent	14,400	0%	0%	0%
13	Hoima	Olam Uganda Ltd	1.44160227	31.34325167	operational	21,600	17%	18%	22%
14	Icheme	Iceme Cotton Co. Ltd.	2.43487473	32.61943297	operational	30,240	25%	20%	18%
15	Iki-Iki	North Bukedi Cotton Company	1.09559882	34.01635241	silent	20,160	0%	0%	0%
16	Jaber	South Base Agro Industries Ltd	2.19374196	32.34539093	operational	20,520	6%	4%	6%
17	JITCO	Rwenzori Cotton Ginners Ltd	2.2547281	32.91154565	operational	13,000	24%	36%	38%
18	Kabole	North Bukedi Co-op Union	1.23258166	33.71026802	silent	15,840	15%	12%	0%
19	Kabulubulu	Meena Industries Ltd	1.69503984	33.0858454	operational	21,600	7%	12%	12%
20	Kachumbala	CN Cotton Ltd	1.20273856	34.12721121	operational	21,600	14%	18%	17%
21	Kasese	Nyakatonzi Growers Coop Union	0.17419422	30.08819553	operational	23,760	11%	23%	29%
22	Kibuku	Olam Uganda Ltd	1.04585834	33.80102458	operational	27,000	9%	13%	12%
23	Kitgum	East Acholi Co-op Union	3.29277844	32.89665059	operational	21,600	6%	0%	17%
24	Kiyunga	Mutuma Commercial Agencies	0.76245287	33.3331781	silent	14,400	0%	0%	0%
25	Ladoto	Lukonge Cotton Co. Ltd	1.26314652	33.87291533	operational	21,600	10%	11%	16%
26	Lukhonge	Lukonge Cotton Co. Ltd	0.93794796	34.23086266	silent	14,400	8%	10%	0%
27	Luzinga	Bon Holdings Ltd	0.69727167	33.19739135	silent	15,840	0%	0%	0%
28	Masindi	Bunyolo Cooperative Union	1.66275065	31.70248319	silent	21,600	0%	0%	0%
29	Mukhongoro	CN Cotton Ltd	1.33629522	33.89036687	silent	15,840	0%	0%	0%
30	Nakivumbi	Bon Holdings Ltd	0.55176535	33.6000843	operational	30,240	6%	13%	17%
31	Ngetta	Lango Co-op Union	2.27389835	32.91787013	silent	21,600	0%	0%	0%
32	Nyakesi	Novo Enterprises Ltd	0.72180617	34.12518287	operational	21,600	11%	12%	13%
33	Odokomit	MMP Agro Industries Ltd	2.2631017	32.86878353	operational	43,200	23%	18%	16%
34	Parombo	Rwenzori Cotton Ginners Ltd	2.30878735	31.20168552	operational	32,400	19%	18%	24%
35	Pakwach	Mansons Ltd	2.46098695	31.49963167	operational	34,560	23%	25%	32%
36	Rhino Camp	Gulu Agricultural Dev.Co. Ltd	2.97256753	31.39965568	silent	28,800	0%	0%	0%

Cotton and its By-Products Sector in Uganda

No	Ginnery	Ownership	Location		Operational Status in 2015/16	Installed capacity (bales)	Capacity utilization		
			latitude	longitude			2013/14	2014/15	2015/16
37	Rwenzori	Rwenzori Cotton Ginners Ltd	0.1658689	30.08217297	operational	32,400	7%	17%	22%
38	Soroti	Country Farm Cotton Co. Ltd	1.71340124	33.59303579	silent	10,800	0%	0%	0%
39	Western Uganda	Western Uganda Cotton Co.	0.15845452	30.07937199	operational	27,000	9%	22%	30%
Total						923,800	9%	10%	12%

Source: Cotton Development Organization, Uganda

Table 3 - Ginning out-turn 2015/16

No.	Ginnery	Lint %	Seed %	Process Loss %
1	Aduku	44.67	52.78	2.55
2	Busolwe	42.70	52.92	4.38
3	Bushenyi	43.22	52.47	4.31
4	Coorom	42.41	54.96	2.63
5	JITCO	41.71	51.80	6.49
6	Hoima	44.77	52.26	2.97
7	Icheme	42.07	56.09	1.84
8	Jaber	40.00	50.00	10.00
9	Kachumbala	43.78	51.53	4.69
10	Kasese	43.70	53.15	3.15
11	Kitgum	44.04	53.60	2.36
12	Kibuku	42.92	53.54	3.54
13	Kobulubulu	43.73	53.84	2.43
14	Ladoto	43.41	54.70	1.89
15	Nakivumbi	42.79	52.32	4.89
16	Nyakesi	41.45	54.40	4.15
17	Odokomit	43.85	51.38	4.77
18	Parombo	40.70	55.90	3.40
19	Pakwach	42.09	56.04	1.87
20	Rwenzori	42.24	53.52	4.24
21	WUCC	41.57	52.10	6.33
Average		42.75	53.30	3.95

Source: Cotton Development Organization, Uganda

Ginners also provide important support to farmers. For example, the Uganda Ginners and Cotton Exporters Association (UGCEA) offers its Cotton Production Support Program, which provides farmers with subsidized inputs and tractor rentals, as well as extension services.

2.3.2. Textiles

According to the National Textile Policy, the Ugandan textile sub-sector was founded in the 1950s and 1960s, spearheaded by the Uganda Development Corporation (UDC), which worked in tandem with the international partners, such as the Calico Printers Association of the United Kingdom and Yamato International of Japan, as well as domestic partners, such as Nyanza Textile Industries Limited (NYTIL) in Jinja, Mulco Textiles in Jinja, African Textile

Mills (ATM) in Mbale and Lira Spinning Mill in Lira. Under the auspices of UDC, a National Textile Board was established in late 1960s to guide the development of the textile industry in Uganda, with a focus on import substitution.

Following the Nationalization Policy in the early 1970s, textile mills in Uganda were nationalized. At its peak in 1972/73 the textile industry consumed approximately 400,000 bales of cotton, 85% of domestic production (IL&FS Clusters, 2014). In 1994, the GOU liberalized the textile and garment industry and divested government-owned mills. Nevertheless, in the early 1990s, the sector collapsed under the burden of obsolete machinery and other operational constraints, especially unreliable and expensive electricity.

In 2015/16, there were only two operational textile firms in Uganda (see Table 4):

- (i) **Southern Range Nyanza Limited** is an integrated textile and garment manufacturing unit based in Njeru, Buikwe District. Established in 1954 as Nyanza Textiles Limited (NYTIL), it is one of the few textile mills in Uganda that is still operational. Its activities include: spinning, weaving, fabric production, dyeing and apparel manufacturing (e.g. knitwear, sportswear, casual, institution uniform, bedsheets, table cloth, etc.) under its brand name, Fredum.
- (ii) **Fine Spinners Uganda Ltd**, commissioned in December 2014, is a new integrated textile and garment manufacturing unit based in Bulogobi, Kampala. Its activities also include: spinning, weaving, fabric production, dyeing and apparel manufacturing.

The mills are not operating at full installed capacity due to the high cost of production and a low demand for locally produced fabrics and garments as a result of high competition from cheaper imports and second-hand clothes.

As a result, domestic consumption of lint remains low, at an average of 3.3% of the total lint produced. Idle spinning capacity also exists, in the form of the non-functioning Lira Spinning Mill.

Table 4 - Operational textile mills

Name of Company	Installed Capacity		Capacity Utilization (2015/16)	Products
	No. of Spindles	Garments (pieces/month)		
Southern Range Nyanza	11,000	520,000	61%	Knitted garments, woven garments, fabrics in different varieties and bed linens
Fine Spinners Uganda Ltd	10,000	384,000	65%	Cotton spun yarn, cotton sewing threads, knitted fabrics and knitted garments.
Total	21,000	904,000	63%	

Source: Cotton Development Organization survey on status of cotton value addition in Uganda, 2016

In 1998, the Textile Manufacturers Association Uganda (TEMAU) was formed as an umbrella organization for textile manufacturing firms.

In 2015/16, apparel and garment production in the country was dominated by over 400 micro and small-scale garment producers. Production in the sector is largely for the domestic and regional markets, focused at production of suiting and uniform materials, corporate promotional wear, bed sheets, curtains, Institutional and Armed Forces uniforms and a wide range of knits and coarse casuals (IL&FS Clusters, 2014).

Furthermore, there exists a vibrant cottage industry of hand-made items, comprising mostly household items (e.g. upholstery, curtains and bed covers) and a broad range of apparel,

including ceremonial and bridal wear. Women or women's groups run the majority of these enterprises (IL&FS Clusters, 2014).

2.3.3. Cotton wool

There are four absorbent cotton wool manufacturing firms in Uganda: Mutuma Commercial Agencies Ltd, Nile Surgicot Ltd, South Base Agro Industries Ltd and Anik Industries (U) Ltd (see Table 5). A large proportion (90%) of the absorbent cotton wool produced is sold domestically to National Medical Stores (NMS), Joint Medical Stores (JMS), private pharmacies and drug shops around the country. The remaining 10% is exported to neighbouring countries, including Kenya, Rwanda and the Democratic Republic of Congo.

Table 5 - Absorbent cotton wool manufacturing firms

Name of Company	Location (District)	Year of Establishment	Installed capacity (MT/year)	Capacity utilization (2015/16)	Products
Anik Industries Ltd	Wakiso	1995	880	30%	Surgical cotton wool (<i>Carex</i>)
Mutuma Commercial Agencies	Luuka	1999	475	34%	Surgical cotton wool (<i>Pearl</i>), Maama Kits
VIVA Holdings Ltd	Mukono	2012	233	12%	Surgical cotton wool (<i>Safex</i>), Maama Kits
Nile Surgicot Ltd	Jinja	2008	200	75%	Surgical cotton wool (<i>Softouch</i>)
South base Agro Industries Ltd.	Oyam	1996	150	33%	Surgical cotton wool (<i>Doctor Plus</i>), Maama Kits
Gulf Cotton Ltd	Kampala	2008	72	29%	Surgical cotton wool (<i>Advance</i>)
TOTAL			2,080	34%	

Source: Cotton Development Organization survey on status of cotton value addition in Uganda, 2016

2.3.4. Cottonseed oil and cake

The first cottonseed oil mill in Ugandan was established in 1929 (Enger and Burgess, 1989). Production of edible oil was limited until stimulated by food shortages for soldiers stationed in Africa during World War 1. In 1944, Uganda had only 10 oil mills. Ten years later, there were 43 mills in the country. The construction surge began in 1945, when the GOU allowed free entry of cottonseed processors. After 1955, the number of firms entering the industry stabilized.

From 1945 to 1972, the edible oil sector was characterized by surplus crushing capacity and varying degrees of government control. The GOU first controlled entry, allocated cottonseed and controlled prices to millers. Later, entry and price controls were relaxed, but crushing seed allocation remained controlled by the Lint Marketing Board (LMB), the government agency with a marketing monopoly on lint and cottonseed. LMB sold by private negotiation, but also by open tender to the highest bidder, severely depressing milling profits. In some years, millers established purchasing cartels to reduce the cost of crushing stocks.

The industry experienced difficulties after the Amin regime expelled Asian owners in 1972. Oil mills were allocated to owners unable to operate them efficiently. Oilseed production declined, reaching its lowest point in 1987-88, including only 3,729MT of cottonseed. Another cause of the industry's decline was the poor condition of equipment, which had been neglected since 1972. This was in part because of a lack of foreign exchange for purchasing

spare parts. Some machinery was obsolete and not serviceable. Moreover, there were too few trained technicians to run the mills efficiently (Enger and Burgess, 1989).

In much the same way as for lint, the economic turmoil in Uganda in the 1970s and 1980s undermined the country's once flourishing oilseeds industry. Not only did the production of oilseeds, including cottonseed, decline, but processing infrastructure was neglected.

In 1994, the GOU implemented the five-year Cotton Sub-sector Development Project, to revamp cotton production in all cotton producing regions of the country. Since the implementation of the Project, cottonseed output has risen continually, as shown in Table 6.

In 2015/16, there were nine cottonseed processors in Uganda, namely: Nile Agro industries Ltd, Mutuma Commercial Agencies, Singo United Investments Ltd, Wamala Growers Cooperative Union Ltd, Ekirya Atabaala General Merchandise Ltd, Kasese Oil Mill Ltd, Rwenzori Cotton Ginners Company Ltd, Western Uganda Cotton Company Ltd and Twin Brothers Company Ltd (see Table 7). They are represented by the Uganda Cottonseed Oil Processors Association (UCOPA), formed in 2007.

Table 6 - Cottonseed production since 1994

Period / season	Cotton lint production (bales @ 185 kg)	Total Quantity of Cottonseed produced (MT)
1994/95	33,000	12,000
1995/96	56,416	20,900
1996/97	110,700	40,900
1997/98	32,000	11,800
1998/99	82,000	30,300
1999/00	117,000	43,300
2000/01	100,000	34,700
2001/02	120,000	40,260
2002/03	110,000	38,460
2003/04	158,000	55,950
2004/05	254,000	91,030
2005/06	102,600	35,400
2006/07	134,000	46,500
2007/08	66,500	17,350
2008/09	125,310	42,731
2009/10	70,300	23,972
2010/11	146,894	50,091
2011/12	254,036	86,626
2012/13	102,619	34,993
2013/14	78,364	26,722
2014/15	93,093	31,745
2015/16	110,707	37,751
Average	111,706	38,794.6

Source: Cotton Development Organization, Uganda

According to a 2016 CDO survey on status of cotton value addition in Uganda, the nine oil mills consume all of the cottonseed ginned in Uganda, an average of approximately 38,794MT per year for the last 22 years. In turn these mills sell their entire edible oil

production, approximately 40,000 MT from all seed types, to domestic wholesalers, bakeries and confectionaries. A large proportion of the cottonseed cake is also sold domestically to feed manufacturers and dealers, while the rest is exported mainly to Rwanda and Kenya. Cottonseed husks are used for mushroom growing and fuel purposes.

Table 7 - Cottonseed processors in Uganda

Name of Company	Location (District)	Year of Establishment	Installed capacity (MT/year)	Capacity utilization (2015/16)	Type of Oil produced
Nile Agro Industries Ltd.	Jinja	2000	14,400	76%	Refined
Rwenzori Cotton Ginners Co. Ltd.	Nebbi	2009	9,000	2.4%	Single refined
Mutuma Commercial Agencies	Luuka	1999	8,640	13%	Single refined
Kasese Oil Mill Ltd.	Kasese	2005	6,240	6%	Crude oil
Western Uganda Cotton Company	Kasese	2005	5,040	36%	Refined
Singo United Investments Ltd.	Mityana	1993	4,800	25%	Single refined
Twin Brothers Co. Ltd.	Lira	1995	3,000	48%	Semi-refined
Wamala Growers Coop Union Ltd	Mityana	2004	2,400	28%	Crude oil
Ekirya Atabaala General Merchandise Ltd.	Masaka	1996	900	30%	Semi-refined
TOTAL			54,420	33%	

Source: Cotton Development Organization survey on status of cotton value addition in Uganda, 2016

2.3.5. Markets

RATES (2003) observed that Uganda has a relatively small domestic market due to its population size, low purchasing power and the predominance of the subsistence economy. RATES (2003) suggested that internal markets could be promoted through improved infrastructure, dissemination of market information, value addition to products and product diversification, and the establishment and enforcement of product grades and standards. Uganda has some comparative advantage within the East African region for the export of agricultural products including cotton, although capitalizing on this advantage requires the supply of products in sufficient volumes and quality.

Apart from addressing fundamental domestic impediments to trade, Uganda has also been active in expanding its multilateral and regional trade relationships. For example, Uganda is member to the World Trade Organization (WTO), the Cotonou Agreement that governs trade between the European Union and the African, Caribbean, and Pacific Group of States (ACP). Within Africa, Uganda is a member of the Common Market for East and Southern Africa (COMESA) and the East African Community (EAC).

In addition to the above, Uganda benefits from several market access initiatives. These include the Africa Growth Opportunity Act (AGOA), which grants duty free and quota free access to the US market for specific products. Uganda also has access to the EU market through the Economic Partnership Agreement (EPA).

Uganda has opportunities to tap into these regional and global markets to develop cotton by-products industries.

3. Impediments to Development

The cotton sub-sector in Uganda plays a critical role in the Nation's economy (Baffes 2009). It was, however, observed by RATES (2003) and IL&FS Clusters (2014), as well as during the 2016 CDO survey on status of cotton value addition in Uganda, that, despite the ongoing government efforts to strengthen the competitiveness of the sector, several impediments constrain its potential growth. These include;

- a) **High energy costs:** IL&FS Clusters (2014) reported that Ugandan electricity tariffs are the highest in the East African region, at US\$0.12 per kilowatt-hour (kWh). With increasing fuel prices, the cost of energy accounts for up to 20-30% of the total cost of production, particularly in mechanized operations, including ginning and spinning (IL&FS Clusters, 2014). Aside from the high tariffs, power outages, surges and interruptions cause significant production losses. Altogether, access to energy represents a major competitive disadvantage for Ugandan firms.
- b) **High transport costs:** Uganda's landlocked position significantly increases trade costs. Inadequate internal road networks and poor road conditions inflate the cost of industrial production.
- c) **Outdated machinery and equipment:** Ginneries, textile mills and oil mills throughout the country use outdated machinery, constraining their ability to produce quality goods at competitive prices. The use of obsolete machinery results in reduced efficiency and increased cost of operation and maintenance. In addition to quality issues, servicing and repair of the existing machinery is also a problem, due to a lack of skilled technicians and the unavailability of spare parts, often leading to low capacity utilization (RATES, 2003; IL&FS Clusters, 2014).
- d) **High cost of credit:** The high cost of capital limits investments in upgrading existing machinery, or purchasing new equipment. On commercial loans, banks charge interest rates ranging from 18% to 24% per annum (RATES, 2003; IL&FS Clusters, 2014).

Moreover, the low revenues earned by ginneries, textile mills and oil mills over recent years means many of them have liquidity problems, lacking sufficient working capital to cover operating costs (IL&FS Clusters, 2014).

- e) **Shortage of cottonseed:** The low production of cotton has resulted in low utilization of the installed capacity at all the cottonseed-based processing firms. This has adversely affected the operations and profitability of these firms in Uganda (IL&FS Clusters, 2014).
- f) **Limited capacity to stock lint:** According to the CDO, domestically produced lint is only available on the Ugandan market from January to May each year. Outside of this period, ginners are unwilling to hold lint bales without payment. The financing required to stock bales for the entire year therefore becomes an additional cost for spinners and cotton wool manufacturers.
- g) **Shortage of specialized technicians** results in inefficiency in operations and a high dependence on expatriate technicians, adding to the cost of production. It is also observed that the required semi-skilled workforce recruited for edible oil milling, as well as textile and apparel fabrication, often come from an agricultural background. Their limited exposure to machinery-based work further widens the skill gap, resulting in lower labour productivity, increased worker turnover and a higher cost of production (RATES, 2003; IL&FS Clusters, 2014).

- h) **Limited apparel production:** Despite the sector being labour-intensive and the country's eligibility for preferential market access accorded under regional and international trade agreements (for example EAC, COMESA, and the EU and the US markets through EPA and AGOA), the commercial-scale production of apparel is limited. A variety of factors contribute to this situation, including: a limited supply of fabric; a lack of capital investment in spinning, weaving, yarn and fabric production; and an unattractive business climate that discourages private investments. Uganda is the second-largest cotton producer in the region, leaving it considerable potential to develop a cotton-to-clothing value chain that caters to domestic and regional demand (IL&FS Clusters, 2014).
- i) **Reduced competitiveness of domestic textile industry:** The influx of cheaper imported products and second-hand clothing has undercut the competitiveness of domestic textile manufacturers. With their limited purchasing power, many consumers are attracted to cheaper imported clothing, which sells at a discount of 25-30% below domestically produced textiles (IL&FS Clusters, 2014). As a result, many mills have cut production or closed. Counterfeits and second-hand clothing are also cheap substitutes for domestic textiles. More generally, many Ugandans perceive that domestically produced textiles are of lesser quality and, therefore, prefer imported ready-to-wear garments (RATES, 2003; IL&FS Clusters, 2014).
- j) **Access to Information:** Limited access to information on technology and market access also constraints profitable business (RATES, 2003; IL&FS Clusters, 2014).

4. Stakeholder Analysis

The CDO classifies primary and secondary cotton stakeholders in Uganda into four groups, summarized in the Table 8.

Table 8 - Description of cotton stakeholder groups

Stakeholder Group	Roles, Functions and Interactions
GROUP A – FARMERS AND THE PRIVATE SECTOR	
Cotton Farmers	Grow the crop and comprise of 200,000 to 250,000 households spread across 2/3 of the country. Farmer's engagement in the cotton value chain is limited up to the farm-gate. Some of the farmers are also engaged as commission agents by the ginneries, to assist in collection of seed cotton. Farmers obtain production inputs, extension services as well as tractor hire services from ginneries.
Uganda Ginneries and Cotton Exporters Association (UGCEA)	Brings together ginneries and lint exporters. Formed in 1997, the Association is a private sector body whose primary objective is to provide a forum for discussing issues affecting ginneries and exporters. UGCEA is also involved in procurement and distribution of production inputs as well provision of extension services to farmers.
Uganda Cottonseed Oil Processors Association (UCOPA)	Established in 2007, the Association was formed as an umbrella organization of cottonseed processors. The oil millers purchase cottonseed from ginneries for milling into cottonseed oil which is used primarily for cooking oil and cottonseed cake. The seed cake is used in the compounding livestock feeds.
Textile Manufacturers	Established in 1998 as an umbrella organization for textile manufacturing

Cotton and its By-Products Sector in Uganda

Stakeholder Group	Roles, Functions and Interactions
Association Uganda (TEMAU)	firms. TEMAU members procure lint domestically from ginners and serve both the domestic and export market.
Textile Development Agency (TEXDA)	A textile training agency established in 1999 and currently funded by UNIDO under MTIC to work in partnership with TEMAU.
Cotton wool manufacturers	Make surgical cotton wool and maama kits from cotton lint. They procure lint domestically from ginners and sell most of their value-added products domestically.
NGOs, CBOs and other community structures	Involved in helping the community members improve their economic status
GROUP B - GOVERNMENT AND UNCTAD/UNECA/COMESA	
Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)	The Ministry is mandated is to create an enabling environment in the agricultural sector, with the objective of: enhancing crop production and productivity for improved food and nutrition security, employment, widened export base and improved incomes for farmers. CDO and NARO are under MAAIF.
Cotton Development Organization (CDO)	Established in 1994, the CDO assumed some of the functions of the former Lint Marketing Board. It is a statutory body responsible for the promotion of cotton, as well as the monitoring of the production, marketing and processing of cotton in Uganda. The CDO carries out ginnery inspections and certifications and gives guidance to farmers and ginners on seed cotton and lint quality, as well as on packaging requirements.
National Agricultural Research Organization (NARO)	A corporate and apex body under MAAIF with a mandate to promote, coordinate and disseminate all aspects of agricultural research, including applications such as: crops, livestock, fisheries and forestry. It collaborates with CDO.
Ministry of Finance, Planning and Economic Development (MoFPED)	Coordinates development planning of strategic initiatives. It also mobilizes public resources and ensures effective accountability in the use of such resources for the benefit of all Ugandans.
Ministry of Trade, Industry and Cooperatives (MTIC)	Formulates and supports strategies, plans and programs that promote and ensure expansion and diversification of tourism, trade, cooperatives, environmentally sustainable industrialization, appropriate technology, conservation and preservation of other tradable national products, to generate wealth for poverty eradication and benefit the country socially and economically.
Uganda Industrial Research Institute (UIRI)	Undertakes applied research, and develops and acquires appropriate technology in order to create a strong, effective and competitive industrial sector for the rapid industrialization of Uganda.
Uganda Investment Authority (UIA)	A statutory agency mandated to initiate and support measures that enhance investment in Uganda and advise GOU on appropriate policies conducive for investment promotion and growth.

Cotton and its By-Products Sector in Uganda

Stakeholder Group	Roles, Functions and Interactions
UNCTAD/UNECA/COMESA	International organizations providing technical assistance to the cotton sector.
GROUP C - General Public and Institutions of higher learning	
General Public	At the periphery of the project, with minimal interest or influence.
Institutions of higher learning	Busitema University - established in Busitema University in Busia District. The institution aims to provide skill training in value-added cotton products and improving the competitiveness of the sector. It offers exclusive graduate and diploma courses on Ginning and Textile Engineering. Kyambogo University - has strived to give the country's economy on average 13 graduates every year (Bachelor of Science in Textile and Clothing Technology and Diploma in Textile Design) since 2006.
GROUP D - Local Politicians	
Local Politicians	In cotton-growing areas, local politicians are key stakeholders in influencing public opinion, including among farmers, about policies, programmes and projects that affect cotton cultivation.

Table 9 classifies stakeholders into their comparative influence (power) and interest in the project implementation.

Table 9 - Stakeholder influence matrix

	<i>Low power (influence)</i>	<i>High power (influence)</i>
High interest	GROUP A UGCEA* UCOPA* TEMAU TEXDA Cotton wool manufacturers* Cotton farmers* NGOs, CBOs and other community structures	GROUP B Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) CDO* Ministry of Finance, Planning and Economic Development (MoFPED) Ministry of Trade, Industry and Cooperatives (MTIC)* Uganda Industrial Research Institute (UIRI)* Uganda Investment Authority (UIA) National Agricultural Research Organization (NARO) Local politicians with a positive orientation UNCTAD/UNECA/COMESA
Low interest	GROUP C General public Competitors Institutions of higher learning	GROUP D Local politicians with a negative orientation

* Potential key stakeholder which UNCTAD may approach while implementing the project

For development initiatives in the cotton sector, the potential key stakeholder groups have different interests and risks, as presented in Table 10.

Table 10 - Stakeholder priorities and risks

Key stakeholder group	Priorities	• Risks
Farmers	• Production inputs • Extension services • Right varieties • Price	• Small scale • Disorganized
Private Sector	• Profit • Access to affordable credit • Acquisition of new technology • Availability of skilled labour	• Weak project management commitment • Poor decision making • Changing business interests
Government	Ministry, Department and Agency (MDA) objectives oriented	• Inconsistent or weak MDA commitment • Adopting and implementing policies that conflict with project's objectives • Inadequate funding • Changing priorities

5. Priority Cotton By-Products for Development

5.1. Cottonseed oil

Cottonseed edible oil is used in cooking and confectionery in Uganda. Nalubega (2012) reported that Uganda's edible oil demand stands at 120,000 Mt against a production capacity of 40,000 Mt leaving a deficit of 80,000 Mt annually. There is, therefore, still much growth to gain in consumption of edible oil in Uganda. B-Space Ltd (2014) observed that although World Health Organization (WHO) stipulated per capita consumption of edible oil as 19.21 Kg per person per annum, in Uganda it is about 3.2 Kg (16%).

5.2. Cottonseed cake as livestock feed

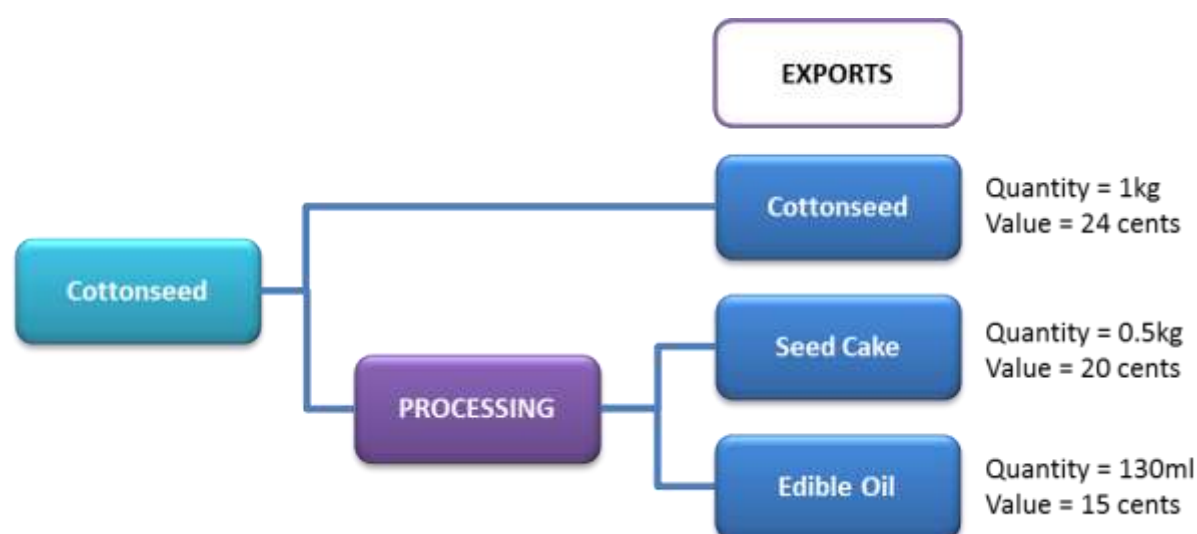
Cottonseed cake is used in livestock and aquaculture feeds as a major source of crude protein. Livestock feeds are principally composed of energy concentrates sourced from products such as maize and maize bran, rice bran or wheat bran and protein concentrates sourced from fish meal, soybean, sunflower cake or cottonseed cake. The feeds composition constitutes about 7–25% crude protein depending on the type and age of livestock (Gadberry, 2015); with cottonseed cake being the cheapest and most readily available source of protein in Uganda, according to the CDO.

The annual production of livestock feeds by the commercial and small scale feed millers is estimated at over 80,000 MT yet the demand is increasing rapidly due to the estimated 3% annual growth of the livestock sector and the decline in forage production, resulting mainly from climate change. According to the Uganda Bureau of Statistics, in 2012 the total livestock population was estimated at 12.8 million cattle, 42 million chickens, 3.6 million pigs, four million goats and 3.8 million sheep. For these animals, the Animal Feeds Handbook recommends the following daily portions of feed: 1.5 – 2 kg for cattle, 100 – 140 grams (g) or poultry and 1 – 3 kg for pigs. Using these benchmarks, the total annual feed demand for Uganda's livestock exceeds 7,000,000 MT, assuming 50% of the livestock are given compounded feeds for quick and proper growth and development.

There is need to strategically develop the livestock feeds sector to meet the huge demand. Furthermore, there is a huge East African market and demand for animal feeds that Uganda could exploit.

Figure 4 illustrates the approximate potential yield and value of deriving oil and seed cake from cottonseed. In this example, exporting a kilogram of cottonseed would earn US\$0.24, but converting it into oil and cake would generate a total value of US\$0.35, or 46% more.

Figure 4 - Value comparison, exporting raw cottonseed vs. edible oil and seed cake

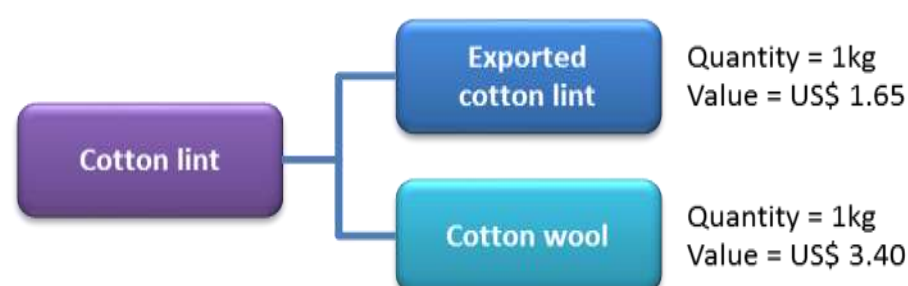


5.3. Cotton wool

It was observed during the 2016 CDO survey on status of cotton value addition in Uganda that absorbent cotton wool is made from lint with a lint-to-cotton-wool conversion ratio of approximately 100:86. The domestic market for cotton wool is quite large, the main buyers and distributors in Uganda being National Medical Stores (NMS) and Joint Medical Store (JMS), which must import some cotton wool to meet their annual requirement. At a cotton wool outturn of 86% and total installed capacity of 2,010 MT, existing companies can produce all the cotton wool needed in Uganda if barriers related to the development of cotton by-products in Uganda listed above are addressed.

Figure 5 below illustrates the approximate potential yield and value of deriving cotton wool from lint. In this example, exporting a kilogram of cotton lint would earn US\$1.65, but spinning it into wool would generate more than double the total value, at US\$3.40.

Figure 5 - Value comparison, exporting cotton lint vs. wool



5.4. Particle boards from cotton stalks

Cotton stalks are one of the important by-products of the cotton crop. It is estimated that cotton cultivation generates 2-3 MT of stalks per hectare (Patil and others, 2007). It has been observed in Uganda that most of the cotton stalks are treated as waste, although some are used as fuel wood by rural communities. The bulk of the stalks are burnt in the fields after the

harvest of the cotton crop, to control pests and disease-causing organisms. Cotton stalk is comparable to most of the common species of hard wood with regard to fibrous structure and hence can be used for manufacture of particle boards, preparation of pulp and paper, hard boards, corrugated boards and boxes, micro-crystalline cellulose and as a substrate for

growing edible mushroom.

Cotton stalks are used industrially to make particle boards in countries such as Turkey and India. Particle boards are used as door panel inserts, partitions, wall panels, marking furniture items, floor and ceiling tiles, etc.

With rampant deforestation and the boom in the construction sector in Uganda, it is necessary to find alternative sources of raw materials in order to preserve forests and protect the environment. Cotton stalks are a cheap raw material, can meet the required standards for particle boards and their utilization would give cotton farmers an extra income. The other benefits would include:

- Creation of business opportunities along the cotton stalk supply chain;
- Renewable raw material to board industries;
- Generation of rural employment;
- As many as 250 people will be involved on daily wages in collecting, cleaning and chipping cotton stocks to supply them to one factory with a capacity of 20 MT/day;
- Employment of transporters.

6. Proposed Survey Questions

Cotton by-products have the potential to contribute greatly to Uganda's economy. A number of questions, however, need to be answered in order to realize this potential, including:

Ugandan electricity tariffs are high by regional standards, at US\$0.12/kWh. In July 2015, the GOU approved a tariff of US\$0.05/kWh for textile mills.

Q1. What can be done to fast track the implementation of the new tariff, to attract new investors and to reduce costs of operations for existing textile mills?

Ginneries, textile mills and oil mills throughout the country use outdated machinery, constraining their ability to produce quality goods at competitive prices. The use of obsolete machinery results in reduced efficiency and increased cost of operation and maintenance. In addition to quality issues, servicing and repair of the existing machinery is also a problem, due to a lack of skilled technicians and the unavailability of spare parts, often leading to low capacity utilization.

Q2. How can the cotton sub-sector be supported in order to stimulate enhanced efficiency, increased productivity and encourage production of improved value-added products?

Q3. What measures should the Government put in place to develop technologies for small and medium scale manufacturers?

The high cost of capital limits investments in upgrading existing machinery, or purchasing new equipment. On commercial loans, banks charge interest rates ranging from 18% to 24% per annum.

- Q4. What should the Government do to alleviate the cost of borrowing, to provide the industry with greater access to financial services and long-term credit resources, so as to upgrade the production and process technologies?**

The low production of cotton has resulted in low utilization of the installed capacity at all the cottonseed-based processing firms. This has adversely affected the industry's operations and overall profitability of these firms in Uganda.

- Q5. What interventions should be undertaken to increase cotton production and productivity in Uganda?**

Domestically produced lint is only available on the Ugandan market from January to May each year. Outside of this period, ginneries are unwilling to hold lint bales without payment. The financing required to stock bales for the entire year therefore becomes an additional cost for spinners and cotton wool manufacturers.

- Q6. How can the Government help ensure a year-round supply of raw materials to domestic factories, without tying up investors' working capital?**

Shortage of specialized technicians results in inefficiency in operations and a high dependence on expatriate technicians, adding to the cost of production. It is also observed that the required semi-skilled workforce recruited for edible oil milling, as well as textile and apparel fabrication, often come from an agricultural background. Their limited exposure to machinery-based work further widens the skill gap, resulting in lower labour productivity, increased worker turnover and a higher cost of production.

- Q7. What measures should the Government put in place in order to enhance capacity-building and training in the required skills for the cotton sub-sector value chain?**

- Q8. What measures should the Government put in place to improve access to skilled labour?**

The influx of cheaper imported products and second-hand clothing has undercut the competitiveness of domestic textile manufacturers.

- Q9. What measures should the Government put in place to increase the competitiveness of domestic industries?**

- Q10. How can Uganda exploit regional and global markets to develop its cotton by-products industries?**

Limited access to information on technology and market access contributes to lack of awareness on new technology and markets.

- Q11. What measures should the Government put in place to improve access to adequate, up-to-date information on new technology and markets?**

7. Conclusion

Cotton is one of the key commodities for generating household incomes, creation of employment and alleviating poverty in Uganda. The potential for the sub-sector to contribute to the economic development of Uganda is considerable, given the cotton value chain's multiple levels of industrial activities (e.g. producing textiles, garments, edible oil and livestock feeds) and its positive impact on food security. If value addition activities can be expanded and fully exploited, the cotton sub-sector has the potential to contribute even more to economic growth, employment and poverty alleviation.

There are a number of benefits that result from promotion of cotton by-products in Uganda, including:

- Increased returns per kg of lint
- Employment
- Improved and stable farm gate prices accruing from increased returns from sale of value-added products
- Reduction in high turnover of farmers given the seasonality of cotton production and provision of additional income to rural households
- Import substitution

All stakeholders must contribute if Uganda is to revitalize its cotton and cotton by-products sectors, which would help improve the livelihoods of all Ugandans.

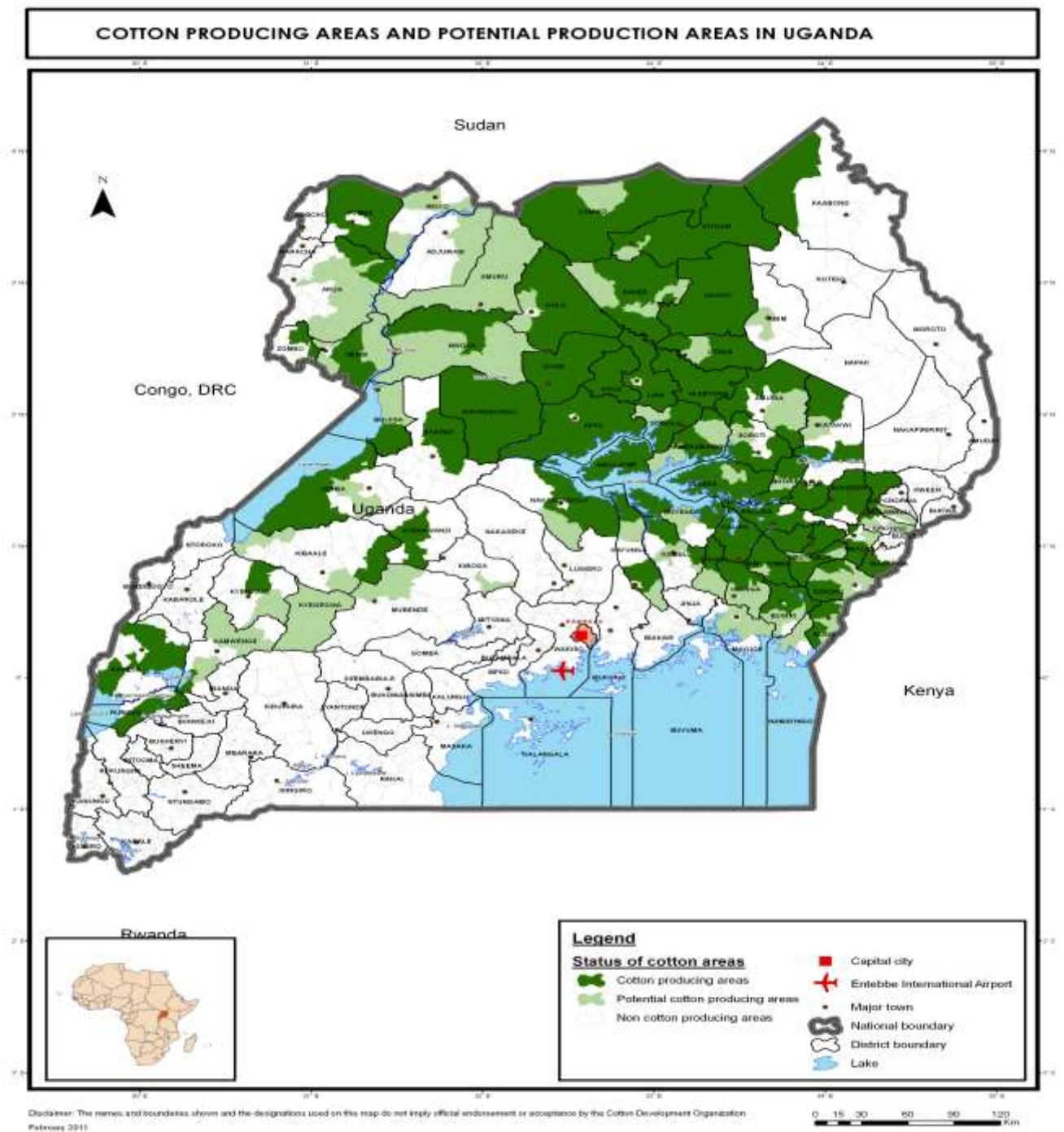
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9. Appendices

9.1. Map of cotton-producing areas in Uganda



Source: Cotton Development Organization, Uganda

9.2. Map of location of ginneries in Uganda



Source: Cotton Development Organization, Uganda