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Analysis of Cotton Value Chain in Pakistan: Identifying the Process and Critical Factors in Sustainable Agribusinesses

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ABSTRACT

Pakistan is currently among the top five exporting nations of cotton worldwide and being the third-largest exporter of cotton and its byproducts, Pakistan earns a significant amount of foreign exchange in this way. The study aimed to depict cotton value chain process in Pakistan and to identify the critical factors contributing toward the cotton value chain process. This paper delves into the concept, methodology, benefits, and challenges associated with value chain, along with real-world examples of its successful implementation. The study followed a descriptive research design and utilized secondary data published by USDA Cotton and Products Annual Report, Pakistan Bureau of Statistics and Ministry of Commerce, Government of Pakistan. The study mapped cotton value chain and critical factors in the process. In addition, the study offered useful insights and policy implications for government officials and practitioners, which would help them enhance the process of the cotton value chain. There are a few limitations to the study that can be removed in further research in order to arrive at more accurate findings.

Keywords: Cotton Production, Cotton Value Chain, Cotton Production in Pakistan, Pakistan, Cotton Value Chain Factors.

INTRODUCTION

Sustainable agribusinesses play a vital role in advancing environmentally conscious and socially accountable methods in the agricultural industry. These enterprises combine environmentally friendly farming practices with sustainable competitive advantages, focusing on geographical factors and stakeholder networks in the agricultural supply chain. Sustainable agribusiness clusters are crucial for tackling the difficulties encountered by small-scale farmers in rural regions, empowering them to efficiently adapt to competition and globalization. The significance of sustainable agriculture entrepreneurship has escalated, especially in times of crises such as the COVID-19 epidemic, emphasizing the pressing requirement to establish business models that prioritize sustainability and social capital (Lang *et al.*, 2022). In the realm of sustainable

agribusinesses, adopting practices that support environmental conservation, fair labor standards, and community well-being is paramount. Sustainable agri-food supply chain practices are critical for ensuring the long-term viability of agricultural activities (Berti, 2020). By prioritizing sustainability, agribusinesses can enhance their reputation, meet consumer demands for ethically produced goods, and contribute to the overall well-being of society. Integrating sustainable practices into agribusiness value chains not only benefits the environment but also leads to improved economic outcomes for farmers and stakeholders along the value chain (Joshi *et al.*, 2023).

Underscoring the significance of doing an analysis of the cotton value chain within Pakistan is the fact that the cotton sector is an essential component of the country's economy. The importance of understanding product

flow, information flow, and management control within value chains has been underlined in previous research (Sari *et al.*, 2022). This emphasis has been seen across a variety of industries. Identifying sustainable value propositions and potential for future sustainable value creation has become increasingly important as a result of research that has focused on sustainability within global textile value chains (Mellick *et al.*, 2021). The necessity of aspects such as customer attention and a blend of approaches to adapt to altering demands has been established by research conducted by Power *et al.* in 2001 during their assessment of important success factors in supply chain management. The cotton industry's value chain is of significant importance owing to its far-reaching effects on numerous facets of the economy and society. A comprehensive comprehension of the cotton value chain is imperative in order to optimize operations, increase efficiency, and guarantee the industry's sustainability. Value chain analysis has been shown to increase competitiveness, reduce costs, and enhance quality in the production and processing of cotton. Through an analysis of the various phases comprising the cotton value chain—from cultivation to retail—interest parties are able to discern prospects for augmenting value, fostering innovation, and expanding into new markets.

The cotton value chain is an important component in the process of fostering social responsibility and environmental sustainability (Fayet & Vermeulen, 2014). A number of studies have shed light on the significance of implementing sustainable practices in the cotton production industry (Tlatlaa *et al.*, 2023). These activities include minimizing the use of pesticides, preserving water resources, and fostering fair labor standards. Through the use of value chain analysis, it is possible to identify areas in which sustainability measures can be incorporated, which will ultimately result in a cotton industry that is more environmentally and socially responsible. Participants in the value chain have the power to improve the reputation of cotton products, satisfy the demands of consumers for environmentally friendly products, and make a contribution to a more sustainable future if they place an emphasis on sustainability among themselves. The evaluation of interactions between various participants in industries such as the cotton sector in Pakistan requires the utilization of value chain analysis (Batool & Saeed, 2017). Product flow, information flow, and

management control are some of the major factors that are identified as contributing to the efficiency and effectiveness of the value chain as a result of this (Sari *et al.*, 2022). Approaches from other industries, such as important success criteria in agile supply chain management, putting an emphasis on customer focus, and a mix of approaches to satisfy dynamic requirements, could be utilized in the research being conducted (Power *et al.*, 2001).

The detailed investigation of the cotton value chain in Pakistan is lacking, despite the fact that there is a deficit in the research. The analysis of the cotton value chain in Pakistan is essential for gaining a grasp of the complexities of the sector and determining the aspects that are key to its performance. One way to provide a full perspective of the cotton value chain in Pakistan is to make use of the insights gained from relevant studies on value chain analysis, stakeholder involvement, and important success factors. This will allow for the chain to become more efficient and sustainable. Through the identification of the processes and essential components that have an effect on the cotton value chain in the country, the purpose of this study is to fill this lack of knowledge. Having a solid understanding of these aspects is absolutely necessary in order to improve the effectiveness and long-term viability of Pakistan's cotton industry. As a result, the goals of this research are to map out the stages of the cotton value chain, identify the essential factors that influence its operations, and conduct an analysis of the regulatory intermediates that are present within the business.

The cotton value chain is vital for economic development, the creation of jobs, and the reduction of poverty in regions where cotton production is the predominant economic activity. Stakeholders have the ability to maximize the value gained by cotton production through the optimization of the value chain. This can result in increased incomes for farmers, improved livelihoods for communities, and overall economic growth. To be able to make decisions that are in the best interest of all stakeholders throughout the cotton value chain, it is essential for policymakers, researchers, and industry participants to have a comprehensive understanding of the dynamics of the cotton value chain. This includes the processes that are responsible for price transmission, market integration, and value distribution.

LITERATURE REVIEW

At least 3000 BCE is when cotton was first cultivated, spun, and woven in the Indus Valley; during this time, cotton was also used in Egypt. *Gossypium arboreum*, the native cotton of the Indian subcontinent, was first cultivated as early as 6000 BCE in the ancient remains of Monjadharo (Malik & Ahsan, 2016). It descended from the primordial *Gossypium herbaceum*. The "bengalense"

variety of *G. arboreum* was raised in Pakistan. In the 1930s, *Gossypium hirsutum* was first grown in tandem with the subcontinent's textile revolution. Less than 2% of Pakistan's cotton-growing acreage is currently planted with *G. arboreum* as a result of the species' gradual shift in cultivation. Its cultivation is expected to drop even further (Malik & Ahsan, 2016).



Figure 1 depicts global cotton production (metric tons) as of the year 2022-23 according to the annual report of "Better Cotton Initiative" global organization (Ghori *et al.*, 2022).

Cotton Industry in the Global Context

Cotton Production in Pakistan

Pakistan has a rich history with cotton, tracing back to ancient times. The earliest evidence of cotton, discovered in Mehrgarh near Quetta, dates back to around 5000 BC (Jarrige & Meadow, 1980). This versatile crop quickly spread to various regions in Pakistan, including the Indus Valley, Harappa, and Balakot. Today, Pakistan stands as the fifth-largest producer of cotton globally, with a significant presence in both production and consumption of cotton yarn, ranking third worldwide (ur Rahman *et al.*, 2020). Approximately 1.3 million out of 5 million farmers in the country cultivate cotton, covering 6.0 million acres, which constitutes 15% of the cultivated area in Pakistan

(Kamal *et al.*, 2022). The cotton industry plays a crucial role in the economy, contributing 0.8% to the GDP and 5.2% to the value addition in agriculture. Moreover, cotton accounts for 51% of the total foreign exchange earnings of Pakistan. This growth has fostered a robust textile industry in the country, boasting over 1000 ginning factories, 400 textile mills having 7 million spindles with the capacity of around 27,000 looms in the mill sector, and numerous other units, making it a vital sector of Pakistan's economy (S. R. Khan, 2002). Cotton cultivation primarily targets its fiber, prized for being hypoallergenic and a good conductor of heat, ensuring comfort in various weather conditions. Additionally, cottonseed offers multiple uses, including cooking oil and industrial applications such as soap,

cosmetics, and pharmaceuticals. Cottonseed oil, rich in unsaturated fats and antioxidants like Vitamin E, enjoys popularity both domestically and industrially in Pakistan (Lusas, 2020). The cotton plant's stalk serves as fuel in rural areas and contributes to ethanol production for fuel blends, enhancing soil organic matter. Cotton cultivation is concentrated mainly in Punjab, which accounts for 70% of the country's cotton production, followed by Sindh with 28%. The major cotton-producing districts in Punjab include Rahim Yar Khan, Bahawalnagar, and Multan, among others. Research institutes such as the Cotton Research Institute Multan and its allied stations have developed numerous cotton varieties, extensively cultivated in Punjab and Sindh (Ali *et al.*, 2019).

According to the USDA Foreign Agricultural Report published in November 2023, the projected cotton production for the 2023/24 season remains steady at 6.5 million bales, with an area of 2.4 million hectares (US Department of Agriculture, 2023). Typically, Punjab province contributes around 70% of the total production. However, this year, Punjab's share is expected to decrease due to localized pest attacks towards the end of the growing season. Conversely, Sindh's production performed well. Recent data indicates that cotton arrivals at ginneries have reached 5.1 million bales (480 lb.), with 2.7 million bales from Sindh and 2.4 million bales from Punjab. The highest cotton arrivals were observed in Sanghar district of Sindh, totaling 1.17 million bales (480 lb.), followed by Bahawalnagar district of Punjab with 0.58 million bales (480 lb.).

The import projection for the 2023/24 period remains consistent at 4.2 million bales, showing a marginal decrease compared to the previous year. The notable rise in local production is contributing to a reduced need for imports. According to the Pakistan Bureau of Statistics, textile product exports in 2023 are expected to decline compared to the corresponding to 2022 (Kamal *et al.*, 2022). Nevertheless, there was a substantial increase in exports of raw cotton and yarn by 137% and 43%, respectively. China emerged as the primary buyer of yarn. The government has established the cotton support price at Rs8,700/40 kg (\$757/Ton) for the 2023/2024 period. However, due to a favorable local crop, market prices have dipped below this support level. In October, seed cotton prices in Sindh ranged between Rs6,800 and Rs7,100, while prices in Punjab hovered around Rs7,300. Although the government lacks

a mechanism to directly intervene and procure at the support price, it has been urging ginneries to make purchases at the Rs8,700 mark. Nevertheless, the majority of transactions have been conducted well below this set level.

Improving cotton yields and growing textile and apparel exports—both in terms of overall volume and worldwide market share—are top priorities for the Pakistani government. Pakistan's textile and clothing industry is the biggest, employing over 40% of the country's industrial labor force, which consists of about 10 million people, 1.5 million of whom are farmers who grow cotton for the textile industry (M. U. Arshad *et al.*, 2022). A combined 55–60% of Pakistan's export value is made up of textile and cotton products. After missing expectations in previous years, the overall value of textile and apparel exports during the fiscal year 2021–2022 reached a record-breaking US\$15.4 billion. Pakistan is the world's fifth-largest producer of cotton.

The National Textile Policy 2020-2025 (NTP) was approved by the government in December 2021 in order to further its goal of attaining "strategic, sustainable, and responsible economic growth." To achieve this, it will be necessary to put in place an E-commerce strategy, improve integration into global value chains, and abide by regulatory and compliance norms. The policy's approval was postponed in order to address a few root reasons, such as dependency on energy subsidies and other types of support, that contributed to past years' export targets being missed. But in 2022, energy subsidies were removed in order to comply with debt requirements established by the International Monetary Fund (IMF).

Aiming at a value of US \$20 billion in the fiscal year 2021–2022, the recently proposed National Textile Policy (NTP) sets lofty export targets that are expected to rise to US \$40 billion by the fiscal year 2023–2024. Furthermore, it is expected that the Generalized System of Preferences-Plus program extension by the European Union to Pakistan will stimulate demand for cotton. Since market year (MY) 2014–2015, when cotton output was strong, Pakistan's cotton production has seen a notable decline (Munir, 2023). There was a dramatic 61% drop in cotton production from that year to MY 2020–2021. Climate change, the restricted genetic diversity of cotton germplasm, and the unavailability of the most recent generations of genetically modified (GE) cotton seeds have all been related to this reduction.

The production of cotton has been negatively impacted by a number of causes, such as pest infestations and extreme weather occurrences like the rise in destructive floods that have seriously damaged cotton harvests, particularly in 2020 and 2022. Climate warming is expected to prolong these occurrences; in 2020, flooding destroyed around a million cotton bales (Abbas, 2020). Such events have had especially negative economic effects on small and marginal cotton farmers. As a result, some farmers have switched to growing other crops in recent years, such as sugarcane, maize, and rice, which offer higher profitability and more stability. Over the course of seven years, the area set aside for cotton cultivation has decreased by 25%, from 2.95-million-hectare liters (MHA) to an anticipated 2.2 MHA in 2021 (A. Arshad *et al.*, 2021). Pakistan's textile and clothing industries have increased their imports of cotton in reaction to the country's declining local cotton production. These issues impeding local cotton production are the focus of the recently announced National Textile and Apparel Policy, 2020–2025 (NTAP) (Elevate Limited, 2022).

METHODOLOGY

The study is descriptive and designed to discover the characteristics of the cotton value chain process in Pakistan. The objective of a descriptive research design is to systematically collect data in order to characterize a population, situation, or phenomenon. Specifically, it helps to address the what, when, where, and how questions related to the research problem, rather than focusing on the why question. Unlike experimental research, the descriptive research approach does not include the researcher controlling or altering any elements. Instead, only the variables are acknowledged, observed, and measured. There were a variety of secondary data sources that were used to acquire data for the study. Secondary quantitative data were obtained from the following sources for the purpose of this study: i) the USDA Cotton and Products Annual Report of Pakistan; ii) reports released by the Pakistan Bureau of Statistics; and iii) reports published by the Ministry of Commerce, Government of Pakistan. Following the completion of the analysis, the data was provided in the areas of the papers that were pertinent to the topic

MAPPING THE COTTON VALUE CHAIN IN PAKISTAN

According to the data, the cotton value chain (CVC),

which includes a number of steps from cotton farming to the creation of ready-made clothing and finally exports, is one of Pakistan's most important value chains. This complex chain involves numerous actors, industrial units, and processes essential for transforming raw cotton lint into the final product. In order to gain a thorough understanding of the dynamics inside the CVC, all relevant stakeholders were identified through focus group discussions (FGDs) and key informant interviews (KIIs). Figure 2 provides insights into the complex web of links throughout the sector by showing both vertical and horizontal linkages throughout Pakistan's cotton value chain.

Cotton Production

Raw cotton fiber acts as the primary raw material for Pakistan's textile industry, serving as the essential input for approximately 400 textile mills. The textile industry boasts an installed capacity of approximately 13 million spindles, 200 thousand rotors, and 9,000 looms, highlighting the extensive infrastructure dedicated to textile production in the country (Pakistan Central Cotton Committee, 2019).

After rice and wheat, cotton is the third most widely grown crop in Pakistan in terms of crop area. An estimated 1.5 million cotton growers work in the nation, though the number varies greatly from year to year. Farmers frequently don't concentrate just on growing cotton; instead, they frequently make crop-growing decisions all year long depending on a variety of circumstances (USDA Foreign Agriculture Service. Cotton and Products Annual Report – Pakistan (April 02, 2021).

The key inputs for Pakistani cotton production are seeds, fertilizer, insecticides, machinery, extension services, and credit. Public organizations including agriculture banks, district/provincial agriculture departments, and agriculture universities usually offer finance and extension services, whereas the private sector owns the majority of fertilizer and pesticide industries. However, a small number of multinational corporations have monopolized the market for fertilizer and pesticides, driving up the cost of inputs for farmers.

Furthermore, during the last ten years, fertilizer use efficiency has drastically decreased, an indication of lax regulation of Pakistan's inputs business that has left the private sector with large profit margins and cotton growers with low returns.

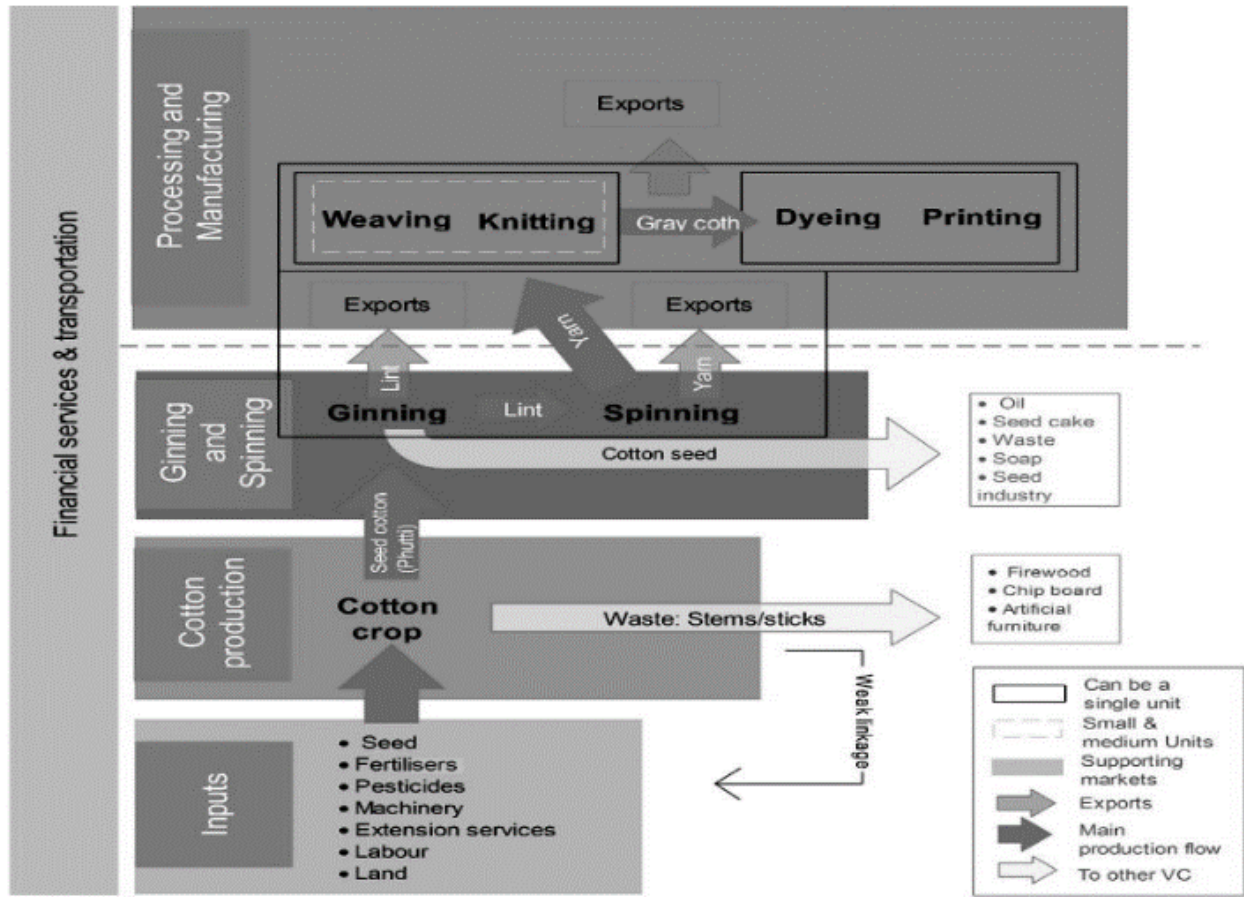


Figure 1. Cotton Value Chain Process.

(Source: Batool & Saeed, 2017).

Approximately 99 percent of the land used to grow cotton is privately owned. Within privately owned farms, there are three main ownership structures: sharecropping, which divides the harvest between landlords and tenants, contractors, and private ownership (where land is rented out on an annual basis). Phutti, or seed cotton, is one of the cotton crop's main products. While homeowners use the trash from cotton plants—including stems and sticks—for firewood, other producers frequently use it to make products like clipboards and fake furniture.

Additionally, cotton waste is shipped to the USA, France, Italy, Korea, Thailand, and other nations. The poor quality of Pakistani cotton, which is a result of the picking, transporting, and ginning procedures, is a major problem for the sector. Study participants stated that because Pakistani cotton is mostly plucked, raw cotton has a rubbish content of about 9%, while machine-picked cotton in other cotton-producing nations has a trash percentage of about 3.5%.

After harvest, the majority of traceable operations in the cotton production chain occur during the storage, transit, and trade stages. Farms often don't store cottonseed for very long because of its high oil content, which makes it unsuitable for long-term storage. Large-scale farmers often sell their cottonseed directly to ginners; small- and medium-sized farmers may do the same, but they might use middlemen or local markets. These middlemen, called beoparies, buy cotton from nearby farmers and carry it, frequently using motorbike rickshaws or tractor trolleys with frames covered in polypropylene sheets. Fertilizer packing bags are often sewn together to create these polypropylene sheets. After that, cotton is shipped to cotton trading hubs, which are run by companies connected to ginning facilities. The majority of this trade is done informally, and small-scale farmers frequently depend on the loans these middlemen give. Buyers may mix seed cotton during trade, and it is frequently exposed to light, dust, dew, and other impurities.

Ginning

Ginning is a crucial process that separates cotton fiber from seeds. According to respondents, there are currently roughly 1100 large and small ginning mills operating in Pakistan. The two main byproducts that this industry produces are cottonseed and cotton lint. Spinning facilities receive lint, also known as ginned cotton, which is a cleaner form of raw cotton that has undergone further processing. Among other things, cottonseed—the residual fraction of the cotton bowl—is used to manufacture cottonseed oil, seed cake, soap, and animal feed. Serious challenges face Pakistan's ginning business, including a lack of modern, efficient technology, a lack of marketing expertise, non-standardized ginning practices, and low government assistance costs. All of these problems combine to obstruct the nation's ginning industry's growth and effectiveness. As the first stage in raising the value of raw cotton fiber, the spinning sector is essential to the cotton value chain (CVC). Yarn is the product of spinning mills and is a major input for many different areas of the textile manufacturing industry. This industry includes, among other things, the manufacturing of knitwear, dyeing, printing, and ready-made clothing. Spinning units create yarn that is utilized both domestically and internationally. It is also provided to knitting, garment manufacturing, and weaving

operations for the production of grey cloth. Vertically integrated activities, including in-house spinning facilities, combined knitting and weaving operations, and dyeing and sewing processes, are found in some large textile factories. They can maintain quality control throughout the value chain and streamline production operations thanks to this integration.

Potential Climate Risk to Cotton Value Chain in Pakistan

One significant factor contributing to the reduction in cotton cultivation area in Punjab is the changing climatic conditions. The optimal temperature range for cotton plants is typically between 30-35°C. However, in cotton-growing regions of Pakistan, average summer temperatures often exceed 45-48°C or even higher. These high temperatures can lead to flower or bud shedding and have a detrimental effect on fiber quality due to stress (Wajid *et al.*, 2020). Furthermore, heavy rainfall or drought during the growing season also poses significant risks and can cause considerable damage to the cotton crop (Tariq *et al.*, 2017).

Cotton Trade

USDA Foreign Agricultural Services compiled a comprehensive report on production/supply, imports and exports of cotton in Pakistan. Table 1, 2 and 3 show some statistics from Pakistan Bureau of Statistics (PBS).

Table 1. Production, Supply and Distribution (1000 tons, 1000 HA).

Cotton	2021/2022		2022/2023		2023/2024	
Market Year Begins	Aug 2021		Aug 2022		Aug 2023	
Pakistan	USDA Official	New Post	USDA Official	New Post	USDA Official	New Post
Area Harvested	2,000	2,000	1,800	1,800	2,400	2,400
Beginning Stocks	475	475	420	420	333	322
Production	1,309	1,309	851	851	1,418	1,418
Imports	982	982	982	982	916	916
Total Supply	2,765	2,765	2,253	2,253	2,667	2,656
Exports	11	11	22	11	16	16
Domestic Use	2,335	2,335	1,898	1,920	2,182	2,182
Loss	0	0	0	0	0	0
Domestic Use and Loss	2,335	2,335	1,898	1,920	2,182	2,182
Ending Stock	420	420	333	322	469	458
Total Distribution	2,765	2,765	2,253	2,253	2,667	2,656
Yield (KG/HA)	653	653	472	472	590	590

Table 2: Import Matrix (1000 tons).

	August - July 2021/2022	August -July 2022/23	August -October 2023/24
United States	351.1	426	33.7
Brazil	189.6	187	16.2
Australia	23.8	90	3.5
Cote d'Ivoire	125.9	55	3.8
Afghanistan	73.9	65	
Argentina	32.9	12	
Turkey	28.2	50	3.1
Tanzania	26.5	17	
Benin	13.8	5	
Greece	13.7	15	
Togo	13.3	3.4	
EU 27 External Trade	12.9	48	1.05
Others	64.3	9	
Total	982.2	982.4	62.2

Table 3. Textile Exports (Million USD).

	July -October 2023	July-October 2022	Percent change
Textile Overall	5,565	5,940	-6.33
Raw Cotton	23	9.8	137.13
Cotton Yarn	407	285	42.85
Cotton Cloth	645	750	-13.94
Cotton Carded or Combed	5	2	142.6
Yarn other than Cotton	13	14	-6.5
Knitwear	1,482	1,712	-13.41
Bed Wear	945	996	-5.18
Towels	337	316	6.67
Tents, Canvas & Tarpaulin	37	37.5	1.09
Readymade Garments	1,083	1,187	-8.71
Art, Silk & Synthetic Textile	117	146	-19.85
Made-up Articles (Excl. Towel and Bed wear)	234	238	-1.45
Other Textile Materials	235	245	-4.36

FACTORS EFFECTING COTTON VALUE CHAIN IN PAKISTAN

Women & Child Labor

The cotton picking stage of cotton production involves significant involvement from the female labor force in Pakistan. Statistics and figures reveal that a majority of the female cotton pickers are aged 30 or under 30 years old. The process of cotton picking in Pakistan typically doesn't demand any specialized skills, leading to the involvement of individuals, including children younger than 18 years old, in this sector. Studies indicate that nearly all individuals engaged in cotton picking are illiterate.

Lack of Education

High levels of education, large farm size, good knowledge of cotton insect pests, and the utilization of mechanical pest management techniques are identified as significant factors supporting cotton production efficiency. Therefore, training programs focusing on cotton pest identification, pesticide selection, and proper usage are crucial for enhancing cotton production efficiency in Pakistan (M. Khan & Damalas, 2015).

Farmers and Short-term Farm Labors:

Access to credit is a crucial factor in determining the economic stability and resilience of farming households, as it enables them to overcome losses caused by climatic

changes. However, credit facilities are typically available only to land-owning farmers, who are better positioned to mitigate crop losses through agricultural loans. Small-scale farmers, on the other hand, often rely on informal channels such as middlemen, personal contacts, and resources to access loans.

As changes in climate lead to reduce per-acre yields, laborers in the agricultural sector may experience lower wages due to crop losses. In some cases, they may even face extended periods of unemployment.

Support Markets

The primary supporting industries for the cotton sector, or the Cotton Value Chain (CVC), include the transport and credit industries. A broad network of agricultural credit banks supports and underpins the production activities of cotton growers, offering vital assistance. The biggest of these, Zarai Taraqiati Bank Limited, provides sizeable loans to farmers in the agricultural sector. These loans are mostly meant for farm supplies and are available in three different terms: short-term (up to six

months), medium-term (up to five years), and long-term (up to eight years). The cotton industry's weak points in terms of transportation are still unknown and need more research.

Small Industries

Though they operate on a far lower scale than the primary cotton industries, a number of other sectors are connected to the CVC industry. These come in a variety of forms, the most well-known of which are the seedcake, cardboard, firewood, soap, and banana oil industries—all of which were covered previously. Since all of these industries rely heavily on cotton, any disruption to the crop is expected to have a significant effect on them as well.

Policies: Recognizing the potential for value addition at each stage of the supply chain and leveraging the expertise and market knowledge of the textile and apparel sector, Textile and Apparel Policy 2020-25 by Ministry of Commerce, Government of Pakistan briefs export projections in Table 4.

Table 4. Export Projections.

Fiscal Year	Model Based Projections				Projections based on export target of FY 2021-22
	Scenario	Value-Added Textiles (Apparel, Made ups, and Carpets)	Textiles	Total	
2020-21	-	11,955	3,497	15,452	-
2021-22	I	11,418	3,064	14,482	20,000*
	II	13,432	3,604	17,036	
	III	14,397	3,863	18,260	
2022-23	I	12,955	3,209	16,164	25,000*
	II	15,514	3,843	19,357	
	III	16,947	4,198	21,145	
2023-24	I	14,251	3,258	17,509	31,000*
	II	17,374	3,972	21,346	
	III	19,354	4,425	23,779	
2024-25	I	15,841	3,343	19,184	40,000*
	II	19,661	4,149	23,810	
	III	22,328	4,712	27,040	

The Ministry of Commerce has proposed three scenarios for export projections, taking into account recent higher-than-expected growth forecasts by the Government of Pakistan (Ministry of Commerce, 2022, p. 7). Through

extensive consultations with private stakeholders, the Ministry of Commerce has recommended setting an export target of US\$ 20 billion for the textiles and apparel industry during the fiscal year 2021-22. This

target has been approved by the Prime Minister. Furthermore, the export target for the fiscal year 2021-22 has been extended until the fiscal year 2024-25, with a projection to double textiles and apparel exports to US\$ 40 billion (ibid).

STUDY LIMITATIONS

The study followed a descriptive research design and tried to grasp the chain analysis of Pakistani cotton. As research is entirely dependent on secondary data published sources like books, journals, working papers and reports from businesses and the government, there is no ethnography research, interviews, or survey added related to it. Without conducting interviews or surveys, gathering comprehensive information about the commodity chain was challenging since it was difficult to locate reliable proofs and data to bolster the validity of the chain analysis.

POLICY IMPLICATIONS

It is necessary to establish a supportive policy environment for adaptation measures, both at the local and industrial levels. More significantly, adaptation should also priorities sustainability because, for example, one-time grants and other short-term relief measures are ineffective over the long term. For the assessment of adaptation needs at the community level, the Ministry of Textile Industry, the Ministry of National Food Security & Research, and agriculture research institutes and R&D units may be involved.

There must be a representative cotton department under the Ministry of Textile Industry. The relationship between cotton growers and specialized textile companies needs to be strengthened. Industrialists ought to be made aware of the risks posed by climate change to the cotton industry, how these vulnerabilities could affect their businesses operations, and how their sector can help to encourage local adaptation. The Pakistan Central Cotton Committee and the Ministry of Textile Industry's research, development, and advisory cells may work together to improve the connections between the two industries. Options for collective adaptation should be determined and put into action.

The Pakistan Central Cotton Committee's functions also need to be expanded. For the encouragement of adaptation and to raise awareness of the problems, a dedicated unit must be developed for Pakistani cotton farmers to face climate change,

The introduction of a gender-friendly work environment in textile facilities is necessary due to the challenging working conditions faced by female laborers. If female employees are cleaning cotton, then safety kits containing masks and gloves should be supplied. Since they are required to raise awareness about occupational diseases, the Ministry of Labor and Manpower as well as provincial labor agencies may launch campaigns to raise awareness about potential health and safety concerns. To supervise this, provincial labor departments should also form gender units. Additionally, textile companies want to guarantee that labor rules are correctly applied.

CONCLUSION

The Cotton Value Chain is a complex system that is vulnerable to different levels of climate change. The production stage, when adjustments to environmental conditions have a direct effect on the cotton harvest. There are, however, additional reasons of vulnerability as well, such as the fact that the intense heat during the processing stage is making working conditions for industrial laborers worse; this is not directly tied to the cotton crop. Climate change's indirect consequences, which mostly affect production, have an impact on the entire value chain. These consequences include lower crop yields leading to input shortages at processing facilities and higher demand in the input industries for better-quality seeds, fertilizers, and pesticides. Furthermore, disruptions brought on by climate change may also influence auxiliary markets like transportation.

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