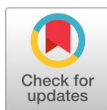


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Sustainable Practices in the Pakistani Textile and Fashion Sector: A Study on Environmental Impact and Ethical Consumer Behavior

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ABSTRACT The textile and clothing industry in Pakistan is very important for the country's economy. It is also hurting the environment very badly. The government is trying to make the industry more sustainable with policies like the Textile and Apparel Policy 2020-2025. The government needs to make rules and give more support to small companies. The textile and clothing industry in Pakistan needs to change the way it works. It needs to use water and energy and produce less waste. The industry also needs to be more transparent about what it's doing to help the environment. This qualitative study draws on semi organized talks with the representators of big Pakistani Textile brands like: Sapphire, Gul Ahmed and Khaadi, were studied to look on current sustainability projects. The numbers came after this research was that some of these companies are still polluting a lot and the government needs to do more, to help the industry become more sustainable. It needs to make rules that will help the environment and give companies incentives to follow these rules. Heightened environmental concerns are driving the need for increased sustainability in the textile and clothing industry of Pakistan. It is also a big polluter. Being one of the country's largest foreign exchange earners, this sector is not only a major contributor to the economy but also a large repository for emissions and wastage of natural resources. The textile and clothing industry in Pakistan needs to use energy and water. It needs to produce waste and be more sustainable. The government can help by making rules that will help the environment. The recommendations include stricter regulations, the introduction of targeted incentives, and investment in consumer education, as well as the balancing act between economic growth and ecological sustainability. Thus, the study demonstrates that while the market is taking some steps to pivot towards more responsible practices, actual change will require a more comprehensive and systematic approach.

INDEX TERMS consumerism, eco-friendly fabrics, ethical practices, green technology, sustainability, textile and fashion industry.

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Highlights

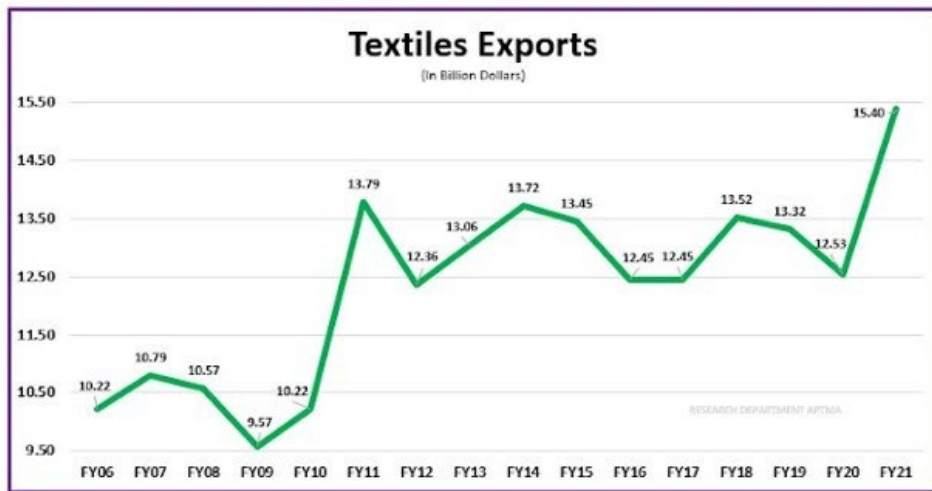
- Semi-structured qualitative interviews with representatives of Pakistan's leading fashion companies reveal a sharp contrast between their public sustainability proclamations and actual emission levels.
- Textile sector policies create the framework for the development of sustainable practices, but do little to support weaker links in the supply chain, favoring large, established mills instead.
- This article offers an inside view into the workings of Pakistan's apparel and textile industry, providing insightful data on the ecological impact and sustainability practices currently implemented.

I. INTRODUCTION

Pakistan's clothing and fabric industry holds deep roots and stays among nation's top sectors. key economic foundations. The transition toward more sustainable practices is highly dependent on government policies and the implementation strategies led by local stakeholders. One of the proposed frameworks to achieve ecological sustainability goals is the Artificial Intelligence, MultiRestoration, Ecological Optimization Framework (AI-MEOF). This framework would allow the industry to use technologically advanced solutions to ensure optimized consumption of resources while minimizing waste production and lowering the ecological footprint while still meeting the economic goals of manufacturers which lowering their ecological footprint, while addressing the economic pressures they already face. The other proposed initiative would be the development of an alternate production system based on extensive collaboration with regional manufacturers to develop a more profitable system that still retains the traditional artisanal aspect. Pakistan's clothing and textile industry has a long history and is one of the country's most critical sectors and economic pillars. These alliances concentrate on maintaining artisan techniques, enhancing quality, manufacturing output, reinforcing the cultural story behind Pakistani fabrics and aiding support efforts and long- term economic stability. As these partnerships increase, both makers and firms may gain advantages, while the industry overall finds chances to lower its ecological impact and enhance global standing of Pakistan fabrics via better, genuine brand identity.

A. RESEARCH RATIONALE

Textile and fashion industry remains vital to Pakistan economy, representing sixty percent share, percent of all national exports - valued at USD 15.40 billion in 2021 [1]. (Figure 1). Meanwhile, it remains one of nation's primary ecological offenders. The lack of green funding limits and expensive green manufacturing have blocked big scale sustainability efforts, change even with rising worldwide focus on green practices [2]. Real change within the sector is stopped by poor rules, small money from firms survival, and customer habits which still prefer lower cost, less eco-friendly items, implying that any durable impact needs ongoing sector dedication. This research thus looks at green production methods, moral buying habits, and state rules aid, utilizing main views from leaders at famous Pakistani clothing firms.



Pakistan Textile Exports FY 2006-2021. Source: APTMA

FIGURE 1. Pakistan's textile exports, FY2006–2021 (Aptma.org.pk, 2022)

B. NEED FOR SUSTAINABLE FASHION

Pakistan's textile industry ranks as the second biggest source of national greenhouse gases. Generating roughly 8.1 million tonnes of carbon dioxide each year. This harm is worsened by severe reliance on fossil- energy fuel used during steps like spinning, weaving, and dyeing [3] Dyeing and finishing textiles by themselves need about 200 litres of water per kilogramme of fabric, and the created sewage contaminates roughly 90

percent of close fresh water supplies. A major worry since Pakistan holds second place already globally on the water- deficit indicator [4] [5] (Table I).

TABLE I
AVERAGE WATER CONSUMPTION IN TEXTILE FABRIC
PROCESSING [4]

Processing Subcategory	Minimum (m ³ /ton)	Maximum (m ³ /ton)
Wool	111	285
Woven	5	114
Knit	20	84
Carpet	8.3	47
Stock / Yarn	3.3	100
Non-woven	2.5	40
Felted fabric finishing	33	213

Despite being highly industrialized, Pakistani consumers are generally more inclined to fast fashion and the disposable culture it promotes. The dynamic nature of the market, driven primarily by price changes, appears to influence the purchasing behaviors of locals more than their ecological footprint. Therefore, ethical fashion, despite its numerous benefits, has a hard time competing with cheaper alternatives [2]. Ethical production methods are also more costly in Pakistan, wherein compared to neighboring countries like Bangladesh and India, local clothing and textile manufacturers do not have access to various sustainability subsidies, tax incentives, green financing opportunities, or carbon footprint reduction programs [6]. As a result, the industry as a whole is vulnerable to natural resource waste and a higher risk of ecological damage with little intention to change in the foreseeable future. This situation is primarily the result of inadequate governmental regulations and the general public's lack of ecological awareness. The former needs to be addressed through tighter control over emissions rates and waste produced by manufacturers and promoting a more ethical approach to consumption at the consumer level. The textile and clothing industry must transition toward a low-carbon platform while prioritizing water conservation and encouraging more ethical consumer behaviors.

II. METHOD

This study employs a qualitative research design to examine how prominent Pakistani fashion brands are addressing sustainability. Data were gathered through semi-structured interviews with representatives from sustainability and corporate communications at three of Pakistan's most recognized fashion brands: Sapphire, Gul Ahmed, and Khaadi. These brands were chosen for their publicly documented sustainability initiatives, making their representatives well-suited to discuss both the achievements and limitations of current practices.

With participants' consent, interviews were audio-recorded and transcribed verbatim for accuracy. The credibility of the findings was enhanced through member checking, where interview summaries were sent back to participants for confirmation. The resulting data were analyzed using Braun and Clarke's [7] six-phase thematic analysis approach: familiarization with the data, initial coding, theme development, reviewing themes, defining themes, and reporting. This method allowed patterns to surface across the interviews while providing a clearer understanding of the sustainability challenges and opportunities described by the brands while ensuring transparency and reliability in the analysis.

III. RESULTS

Three themes emerged from the thematic analysis of the interview data. First was the role of green production processes and practices in the clothing industry. Secondly, the role of advertising in promoting ethical consumerism was revealed. Lastly, the influence of government policies was identified as the third theme. Generally, the interviews imply that Pakistan's clothing industry is moving forward. Tangible moves to sustainability – via recycling schemes, organic colors, and knowledge initiatives – yet remains limited by heavy carbon outputs, water contamination, cost-conscious buyer needs, and rules aiding big firms instead of small ones. Every theme will be examined separately here, using the interview records plus the broader literature material.

A. GREEN MANUFACTURING IN FASHION BRANDS

Sustainable production stands at the core of ecological planning within apparel sectors. A sector often condemned regarding ecological harm [8]. Still, the brands within this research have taken quite distinct paths regarding sustainability. Thematic review of the interview transcripts

revealed that large Pakistani brands are encouraging waste reduction and reusable substances, despite their ongoing large carbon outputs indicate to an environmental effect that rests uncomfortably next to their green-production assertions. A person at Sapphire stated that the company launched its initial ready-to-wear sustainable line in 2021, featuring kurtas made from 100 percent recycled cotton dyed with natural dyes an approach that follows established circular economy principles [9]. Utilizing reclaimed cotton and organic pigments here lessens dependence upon fresh supplies and also artificial compounds. Chen et al. [10] Likewise discovered that reclaimed cotton manufacturing employs, utilizes substantially fewer water and energy resources compared to standard cotton. Thereby reducing its scarcity impact on water supplies up to nearly ninety-seven percent. Yet Azanaw et al. [11] Observe that reused textile mostly focuses on waste instead of pollution from dyeing and finishing. Thus, brands like Sapphire may still pose ecological risks despite the supposed sustainability efforts on their part. The contradiction becomes apparent when discussing with Gul Ahmed representative, who explained that the company's emissions have spiked recently, peaking at 208,000,000 kg. Meanwhile, the carbon dioxide equivalent reached 249,000,000 kg CO₂e in 2022 compared to 248,000,000 in 2021 (Figure 2).

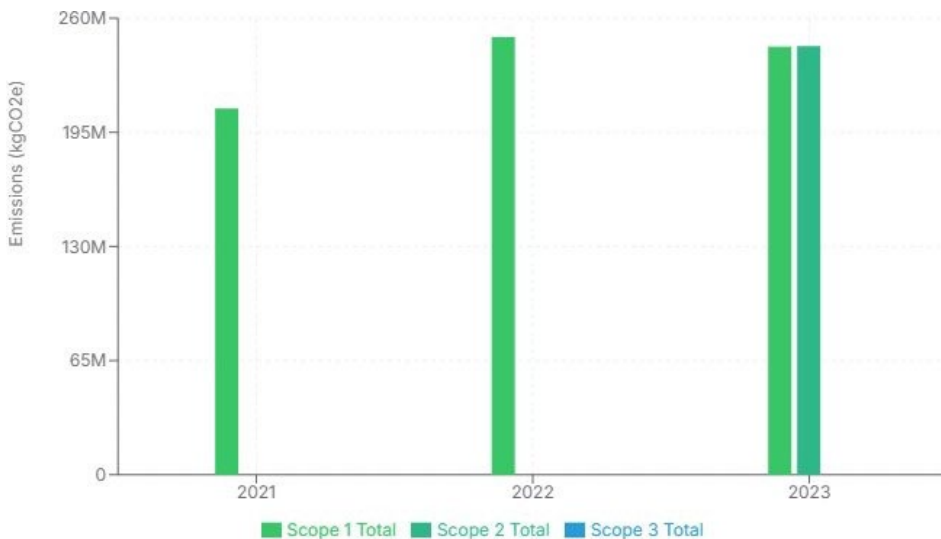


FIGURE 2. Upward trend in Gul Ahmed's carbon emissions despite green manufacturing claims [12]

According to data provided by Ditchcarbon.com [12], the pattern is similar to the trend outlined above, which complicates the view on Gul Ahmed's eco-friendliness. Although the brand's green manufacturing program addresses specific issues, like the rising emissions suggest a need for more comprehensive improvements, which is a sign of greenwashing [13]. Debnath et al. [14] Which highlight the prevalence of energy-intensive processes and continued reliance on fossil fuels as significant barriers to large-scale sustainable production adoption in the industry. According to Figure 2, despite the best efforts on the part of the company to engage in ethical production, the increasing trends of emissions prevent it from claiming to be fully sustainable. Overall, the concerns raised apply to the industry at large, as suggested by Islam et al. [15]. While natural dyes are often promoted as part of sustainable manufacturing, the report indicates that they may require more resources to produce than synthetic alternatives. For example, supercritical CO₂ extraction procedures peak at 31.4 degrees C and 1,070 psi, which implies that sustainable production sometimes involves indirect environmental costs. Without addressing the complex interconnection of factors, green production runs the risk of becoming an exercise in marketing rather than a meaningful commitment to ecological stewardship.

B. ENCOURAGING ETHICAL CONSUMER BEHAVIOUR

Marketing holds a pivotal part in forming how buyers judge and behave regarding moral buying choices. The brands checked within this research always employed sustainability-focused ads, to prompt more ethical purchasing, framing ecological messages as a way to urging buyers to ponder acquisitions more deeply. Sapphire's Revive the Thread campaign, for instance, urges clients to give away worn or thrown clothes and textile (Figure 3), whereas Khaadis Play Your Part program, introduced in 2022, aimed to increase consciousness within wider campaign for societal transformation. Gul Ahmed has adopted similar approach with its eco- nice tote bags, sold not just as items but as a sign of green dedication. Initiatives such as these rely on social marketing rules, which seek to move behavior for social, instead of just financial gain [16], and fit into wider green buying trends where nature friendly goods are seen better than normal options [17].



FIGURE 3. Sapphire promoting garments made from the “Revive the Thread” initiative [18]

The research indicates this method works. Hota [19] discovered that sustainability- targeted promotion increases buyer knowledge and promotes moral buying. PwC [20] states that clothing shoppers will pay an average price for sustainability, premium at 9.7 percent, and Maduku et al. [21] also noted individuals tend to be more inclined to buy ethically if sustainable choices look good and are seen clearly. Simultaneously, various researchers warn that a market-driven strategy toward sustainability may fail. Silently move blame away from firms toward buyers. Instead of changing themselves and production methods. Brands might request that customers alter their actions – A movement that threatens positioning sustainability as personal choice instead of corporate duty. Tallullah [22] claims that communication based on moral buying frequently does implicitly blames customers for issues which are actually structural, whereas Wren [23] makes that consumer education by itself fails to ensure fashion

sustainability. Enforcement, supply- transparency chains, and corporate accountability remain equally vital. Viewed thus, programs such as Play Your Part and Revive the Thread might unintentionally shift the burden, Burden of sustainability onto consumers instead of driving reform within the industry itself.

Economic and cultural elements within Pakistan make this situation even harder to understand. Sustainable goods stay beyond grasp for many people, especially considering the all-time high inflation level of 37.97 percent noted in May 2023 [24]. Though Pakistani brands initiatives, seek to normalize ethical buying, yet cost concerns still rule over shopper choices. Decision-making in lower- market income sectors [25], and the wider cultural draw of rapid fashion continues to limit long- term behavioral shift, even when sustainability messages are well accepted [2]. In sum, marketing efforts by large fashion brands, do seem to increase awareness and encourage sustainability as a way of living. Yet their real impact remains unclear. Impact on buyer actions stays limited by these profound moral, societal and economic barriers.

C. GOVERNMENT POLICY SUPPORT

The Textile and Apparel Policy 2020-2025 serves as the primary structure for the Pakistani state regarding industry matters promoting sustainability throughout the industry and it generally tracks global standards by highlighting energy saving, circular economy rules, and funding green efforts technology [26] (Figure 4). Objectives of the Textile and Apparel Policy 2020-2030 [27].

The benefits of such an advantageous institutional setup are not exclusively available to large corporations. Small and medium-sized enterprises (SMEs) comprise about ninety percent (90%) of all producers in Pakistan's clothing and textile industry [28]. However, the financial burden of adhering to enhanced environmental regulations falls disproportionately on their shoulders, as many SMEs do not benefit from preferential support measures. Even though they possess a critical role in Pakistan's competitiveness as a textile producer, their ability to make substantial environmental and social overheads is severely limited. On the other hand, larger firms are better positioned to leverage sustainability as a competitive advantage, acquiring competitive parity with international counterparts, an outcome that has the potential to challenge the existing regional business

ecosystem [29]. So, in combination with the National Compliance Centre, Textile and Apparel Policy 2020-2025 showcases a comprehensive sustainability vision that Pakistan can employ to promote green apparel manufacturing while also emphasizing social aspects, including ethical labor practices.



FIGURE 4. Objectives of the textile and apparel policy 2020–2025 [27]

The ability to transform the overall textile and apparel sector remains limited by the aforementioned unequal access to financial resources as well as the general consumer preference for cheaper products.

IV. CONCLUSION

Pakistan's apparel sector employs various sustainability practices, ranging from recycling programs to promoting organic dye applications and ethical advertising. The industry's overall footprint remains considerable, particularly in terms of carbon emissions and water waste. The gap between the pro-environment rhetoric and actual practices highlights the issue of greenwashing, where unsubstantiated environmental claims overshadow the lack of concrete initiatives aimed at reducing the industry's impact on local ecosystems.

Moral buying increases, but Pakistans price- vulnerable market keeps limiting uptake of green clothing. Small firms hit money blocks big ones miss. State schemes like the Textile and Apparel Policy 2020- 2025 offer a legal basis for sustainability, yet in reality their advantages have thus far touched primarily the nations bigger, previously solidified entities and apparel companies. Bridging this divide demands unified effort: tighter regulation, specific focus. Backing for small businesses, and ongoing work to move buyer needs toward truly green options.

A. LIMITATIONS AND FUTURE RESEARCH

The current research contains several limitations that future scholars ought to consider. First of all, no small business owner was interviewed for this study, which means that extrapolating the results on a broader level might be unreliable. Secondly, most of the environmental programs reported by the interviewees were self-reported, which means that independent audits will be required to confirm these findings. Future research should also attempt to analyze the financial feasibility of adopting various sustainability initiatives. In addition, investigating the role of technology in sustainable apparel production, including assessing the cost-benefit of various eco-friendly materials and analyzing consumer behavior patterns, would be advantageous. Lastly, comparing the performance of large multinational corporations and local small-to-medium sized apparel manufacturers in terms of current sustainability practices can provide valuable insights into the practical application of these initiatives.

Author Contribution

Nosheen Zaidi: Sole Author

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

Data supporting the findings of this study will be made available by the corresponding author upon request.

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Generative AI Disclosure Statement

The authors did not use any type of generative artificial intelligence software for this research.

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