

Textile / Legacies

Mapping the
Sustainable Fashion
Ecosystem in **Pakistan**

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About the Programme

In 2023, British Council Pakistan launched a programme to support and advocate for a more sustainable, regenerative, equitable and transparent fashion and textile industry in Pakistan. This report presents the findings and recommendations that emerged from the first phase of the programme.

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Introduction

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Introduction

“

If we understand that design leads to the manifestation of human intention and if what we make with our hands is to be sacred and honor the earth that gives us life, then the things we make must not only rise from the ground but return to it, soil to soil, water to water, so everything that is received from the earth can be freely given back without causing harm to any living system. This is ecology. This is good design. It is of this we must now speak.

William McDonough¹

”

This report explores the current state of Pakistan's fashion and textile industry and the perils and promise it holds for a more sustainable future. Our narrative shifts across the country's vast industrial hubs, bustling metropolises and rural landscapes to chronicle the environmental, social and cultural impact of this industry. It examines the concept of sustainability as it is understood and practised in Pakistan, while also locating it within a larger global context.

Pakistan's fashion industry is relatively young but growing rapidly, and while large-scale production fuels growth, it often does so at the expense of people and the environment - as has been the case in other parts of the world. As a mounting body of evidence reveals, the global fashion industry is failing the planet. The industry currently contributes an estimated 10% to annual carbon emissions, amounting to more than all international flights and maritime shipping combined. There are enough clothes in the world today to clothe the next six generations, with 85% of these destined for landfills².

As the crisis intensifies, so too does demand. Fuelling the industry is a culture of overconsumption that shows little sign of abating. How then can pathways to sustainability be found? For Pakistan, a key advantage lies in its deeply ingrained, centuries-old textile and garment practices that are naturally low-waste, earth-friendly and people-centric. While much of the population may be unfamiliar with the concept of 'sustainable fashion', many indigenous techniques align with modern sustainability ideals and are still practiced, albeit in fading pockets

1. McDonough, W. (1993, February 7). A centennial sermon: Design, ecology, ethics, and the making of things. The Cathedral of St. John the Divine, New York, NY.
2. www.weforum.org/stories/2020/01/fashion-industry-carbon-unsustainable-environment-pollution

across the country. The central proposition of this report is that these time-tested, local methods hold immense potential to influence a more sustainable industry model if blended with contemporary innovations.

The insights and findings captured within these pages have been drawn from a wide range of sources that span across the fashion supply and value chain, illustrating that sustainable business models in Pakistan are possible through small-scale, localised and independent operations. These models face real challenges, but the opportunity to reshape the industry remains within reach. Pakistan's largely self-sufficient, well-integrated

supply chain provides a solid foundation, while its heritage offers solutions that could enable the industry to avoid the environmental pitfalls seen elsewhere.

At this critical juncture, our report outlines a path forward that prioritises sustainability through the revival of indigenous practices, support for local businesses and strategic shifts in the industry's approach. If these actions are prioritised, Pakistan could move towards a more economically and environmentally sustainable fashion sector with a distinct edge in global markets, where demand for responsibly produced fashion continues to rise.



Research Scope

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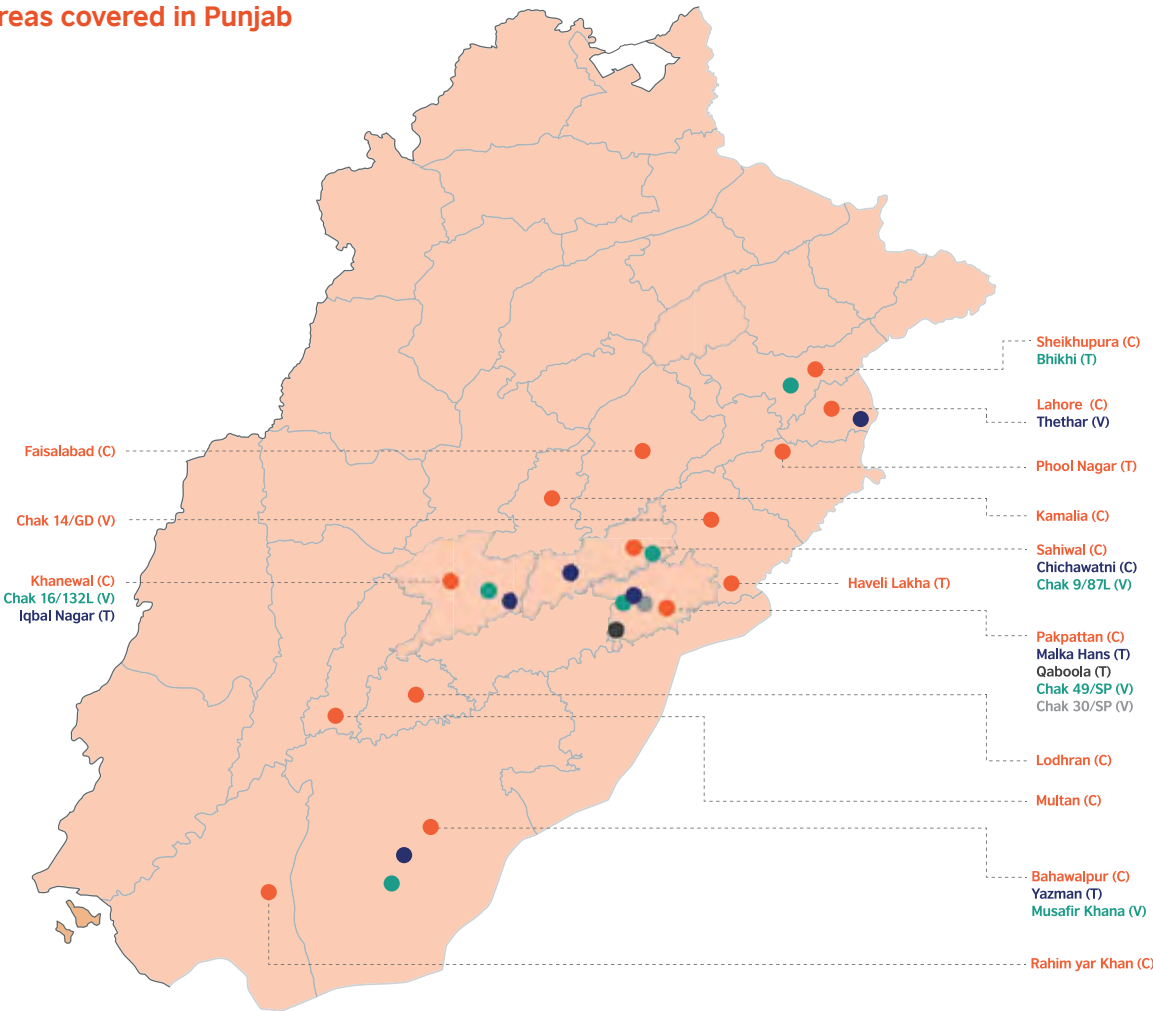
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Research Scope

Locations

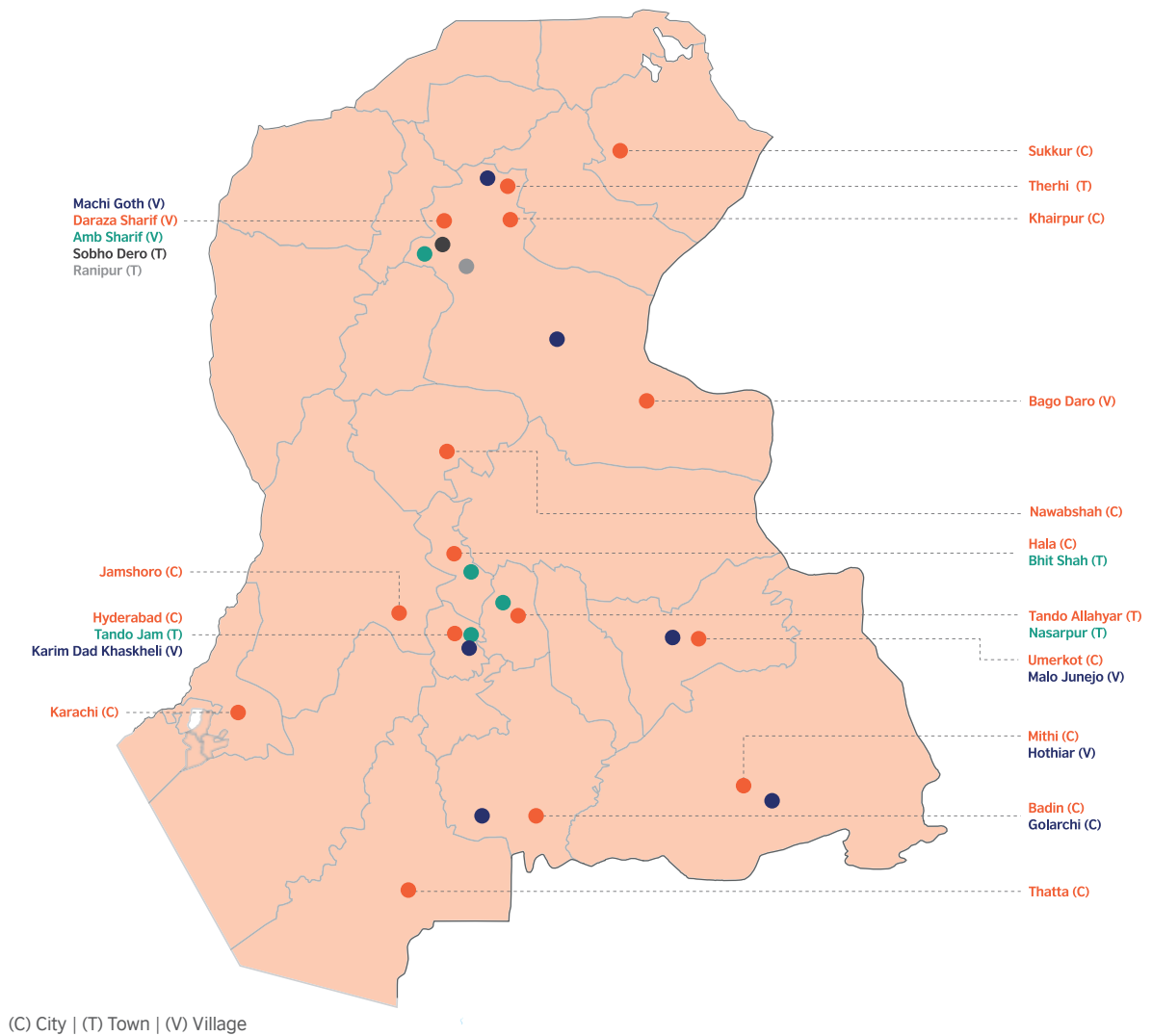
Research for this report was carried out over a period of ten months (October 2023 to July 2024), during which time the project team travelled to 52 locations across Punjab and Sindh.

Areas covered in Punjab



(C) City | (T) Town | (V) Village

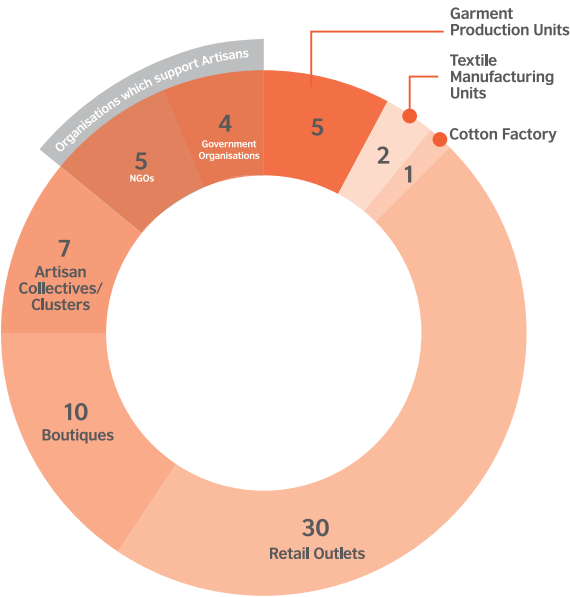
Areas covered in Sindh



Data Collection

Multiple methods were employed to gather data including surveys, structured and unstructured interviews, focus group discussions, field visits, workshops and secondary research.

Field visits



Interviews

17	Fashion Designers	04	Textile Designers
07	CEOs of major fashion labels	15	Sustainable Fashion Enthusiasts
10	Industry Professionals (merchandisers, administrators)	05	Marketplace Players
06	Suppliers	04	Wholesalers
05	Cotton Researchers	06	Fashion Researchers
40	Retail Staff	20	Factory Workers
08	Labour Union Representatives	03	Policy Analysts
100+	Artisans (weavers and spinners, dyers, dye makers, block printers, washermen, embroiderers, rilli makers, cap makers, kamarband and paranda makers, shoe makers)		
12	Tailors	24	Fashion Educators
200	Design Students	900	Customers

Brands

A total of twenty-two brands are covered in this study:

Mass-producing medium and large brands

13 brands	Generation	Shahnameh
	Royal Tag	Nishat Linen
	Sapphire	Gul Ahmed
	Ethnic	Alkaram
	Outfitters	Zara Shahjahan
	Limelight	Khaadi
	Bareeze	

Small and micro sized brands

09 brands	Koel	Jugnu
	Znali	The Brown Store
	Rastah	Umar and Imrana
	Aomi	Aangan
	Jehan	

This selection was made based on popularity as reflected in our consumer surveys, and wherever possible, verified in market share reports. Each brand was evaluated for its environmental, social, cultural and ethical sustainability and supply chain traceability and transparency. Their ad campaigns were studied and up to 100 products from each brand were examined for the quality and choice of materials, trimmings, labels, methods and type of colouration (dyeing and printing), construction techniques, alterability, durability and packaging methods. This was done through retail store and website visits.

Interviews were conducted with retail staff members regarding working conditions and wages, and wherever possible, with the CEO/ Director and administrative staff regarding their ethos and policies. In-house designers were also interviewed to learn about their research methods, design strategies and awareness regarding sustainability. Visits to garment-manufacturing units enabled interviews with managers, tailors, finishers and others on working conditions, wages and implementation of labour laws and policies. While some brands answered questions candidly

and allowed complete access to all aspects of their business, others chose not to participate in the study despite multiple attempts to engage them.

Limitations and Challenges

- Owing to time and other constraints, this study is limited to the Punjab and Sindh provinces where the local fashion and textile industry is mostly concentrated. Balochistan, Khyber-Pakhtunkhwa, Gilgit Baltistan and Azad Jammu Kashmir - all of which have rich indigenous fashion and textile traditions - have not been covered.
- Our findings are based on engagement with a handful of large and well-known labels. It was not possible to include the vast number of small brands which operate across the country.
- Some individuals and organisations chose not to participate in research involving the British Council, due to political differences with the policies of the British Government and its colonial legacy.

- Considerable effort was invested in building rapport with participants from underdeveloped areas, as they were initially hesitant to engage in research supported by an international organisation. It was later revealed that their scepticism was rooted in negative past experiences with the development sector, which had left them with the impression that such organisations tend to belittle local practices, underestimate their understanding of complexities, and are generally unwilling to truly listen. Some described how their

indigenous methods of living and constructing homes were altered by these organisations, supposedly to protect them from climate disasters but ultimately making their lifestyles less sustainable and ill-suited to local weather conditions.

For a summary of fieldwork and interviews conducted, please see Appendix 1.

For a summary of workshops and roundtables, please see Appendix 2.



Key Findings at a Glance

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Key Findings at a Glance

Unsustainable Practices in the Fashion Industry

Pakistan's fashion and textile sectors, alongside their agricultural and industrial supply chains, are predominantly unsustainable. Environmental degradation, exploitative labour practices and inadequate enforcement of laws persist. Global market demands and local regulations have done little to drive meaningful change due to corporate greenwashing and weak accountability mechanisms. Economically unsustainable expectations from global businesses which outsource from the country further exacerbate the issue.

Outsourcing of Environmental Costs

As a significant supplier of textiles and apparel to Western fashion labels and importer of discarded clothing from the West, Pakistan disproportionately absorbs the environmental and social costs of global fashion production.

Potential for Transparency and Traceability

Pakistan has a well-integrated supply chain with the potential for transparency. However, most businesses treat such data as proprietary and are reluctant to engage with it.

Parallel Systems

A parallel, inherently sustainable textile and garment production system is still in place in some remote areas of the country, continuing centuries-old indigenous practices. These systems offer solutions to sustainability challenges but remain marginalised in the mainstream fashion industry.

Vanishing Skills

Many traditional fashion and textile practices are fading due to lack of transmission to younger generations, threatening the survival of these skills. These include:

General Skills

- Hand-spinning
- Basic sewing and mending
- Clothing care
- Cutting and sewing
- Embroidery and stitches
- Block-printing
- Upcycling crafts

Hereditary and community-specific skills

- Weaving
- Construction of handlooms and spinning wheels
- Knowledge of natural dye sources, recipes and extraction techniques
- Construction of traditional fabrics

Sustainable Brands and Greenwashing

In many cases, brands claiming sustainability engage in greenwashing. Genuinely sustainable businesses are typically small-scale, operating locally or online, and often incorporate indigenous practices. These brands highlight a path forward, as mass production is fundamentally at odds with sustainability. Promoting this ecosystem could help Pakistan emerge as a major producer of sustainable fashion products.

Knowledge Gaps

Many designers lack awareness of the environmental and social impacts of their work, reflecting gaps in education and industry practices. Access to sustainable resources like natural dyes and eco-friendly materials is limited, further discouraging sustainable initiatives.

Several designers that were interviewed are keen to incorporate more sustainable practices but feel ill-equipped due to lack of resources and inability to spend time on research. In general, they know little about sustainable solutions that may be found in traditional practices.

The few designers who do consider sustainability are usually self-trained and tend to either work independently or are part of small businesses.

Lack of Education in Sustainability

Fashion schools in Pakistan do not offer specialised courses in sustainable practices, and indigenous knowledge is largely absent from curriculums. While some educators address these themes in the classroom, they do so in their individual capacity. This has created a disconnect between fashion and textile students and traditional artisans.

Material Trends

Unlike other parts of the world where synthetic materials like polyester dominate, Pakistan's textile sector is still heavily cotton-dependent. Although cheaper and more durable, synthetic materials are

not preferred due to their unsuitability for local weather conditions, there is a concerning trend within the industry of stakeholders encouraging the use of polyester based on a misguided narrative that it is a sustainable alternative to cotton. In recent years the use of synthetic materials has seen an upward trend at the expense of cotton.

The dominance of water-intensive American cotton and the growing use of synthetic blends exacerbate environmental harm. American cotton consumes enormous amounts of water and requires heavy use of pesticides and fertilisers, which has led to decreasing water tables, pesticide poisoning and decreased soil fertility.

There is a lack of transparency about the material composition of fabrics and garments being sold in the market, with misleading claims of pure cotton turning out to be synthetic blends.

Except for a few diminishing pockets in Haroonabad and Vehari, indigenous eco-friendly varieties of Desi cotton are nearly extinct, having been abandoned in favour of American cotton.

Alternative fabrics from hemp (Khyber Pakhtunkhwa, Gilgit Baltistan, Azad Jammu Kashmir and Balochistan), banana fibre (Sindh), jute and bamboo (Punjab) and their blends remain unexplored, despite their ecological benefits. Fabric woven from banana fibre is being produced at a micro level in isolated locations in Sindh.

Non-sustainable materials like satin, damask, semi-damask and taffeta are predominantly used for garment labels.

Yarn and Fabric Production

The spinning and weaving industries consume the most amount of energy in the fashion value chain of Pakistan, exposing workers and local communities to noise and dust pollution and respiratory diseases. Byssinosis is widely prevalent among the country's textile mill workers.

Most spinning and weaving machinery is imported and is only suitable for non-indigenous long staple varieties of cotton. Research in Pakistan has focused on developing fibre to meet the limitations

of imported machinery rather than developing technology suited to indigenous varieties of cotton.

The handloom cottage industry is active in Sindh, with much support and encouragement from provincial government bodies. On the other hand, in Punjab handlooms are on the verge of extinction due to systemic harassment of handloom owners by tax officials more so than government apathy.

The practice of hand-spinning has declined sharply. It is now very rare in Punjab and limited to a just a few handlooms in Sindh.

Textile Processing

Textile processing – dyeing, printing and finishing – is a major cause of water pollution in the country.

Synthetic dyes and screen printing dominate the local market and are responsible for poisoning in workers and harming aquatic life via wastewater discharge. Azoic dyes, whose components are known to be carcinogenic and have been banned in several countries, continue to be used in Pakistan.

Environmentally friendly block-printing is practiced at a small scale. The richness of its designs has contributed to its ongoing appeal. However, synthetic dyes are replacing natural dyes as the preferred choice among block-printers.

Natural dyes are difficult to procure in Pakistan. Once abundant in Sindh, indigo cultivation has now ceased, and knowledge of local sources and methods for extracting and producing many colours has either been lost or significantly diminished. Ajrak artisans remain among the few consistent users of natural dyes. Meanwhile, misleading claims by niche brands about using natural dyes further erode trust in the market.

Labour Rights and Garment Waste

Pre-consumer textile waste has surged with mass production. Traditionally, individuals who made their own garments, independent tailors and small-scale

production units found ways to recycle or upcycle such materials. However, industrial pre-consumer waste often ends up stored away and accumulating over years in garment production units. Some garment manufacturers sell this waste to small-scale dyers who burn it to generate heat energy.

Informal labour practices dominate the garment sector, leading to wage theft, gender discrimination, rights abuses and unsafe working conditions.

Packaging, Retail and Marketing

Excessive plastic continues to be used in packaging and bagging garments, with little to no effort being made to shift towards more eco-friendly alternatives such as biodegradable or compostable plastics. Even brands that aim for sustainability often overlook the environmental impact of their packaging, with paper and cardboard options remaining rare.

Resource-intensive marketing campaigns are commonplace, with extravagant sets and photoshoots held in foreign locations that often have no customer base for the brand. Additionally, significant energy is wasted on large-scale billboards in major cities across Pakistan.

In urban areas, retail stores of major brands and multi-brand showrooms consume excessive lighting, routinely leaving lights on outside business hours. Resources are also expended on refurbishments of store interiors each time a new collection is launched.

Consumer Habits

Environmental and social awareness around fashion remains limited among consumers in Pakistan. Millennials and Gen Z, particularly in urban areas, tend to purchase clothing frequently, with the average number of garments bought annually standing at seven per person³.

Despite this, Pakistan stands out as one of the most

3. Data gathered from consumer surveys completed for this report.



sustainable countries in terms of garment care and end-of-life practices. The cultural tradition of maintaining clothes for long periods is still strong. In Sindh, for instance, the repurposing and upcycling of old clothes to make rilli has been a long-standing practice, refined over centuries. However, concerns are growing that these practices may not be passed down to younger generations.

Unlike in developed countries, excessive energy use for washing and drying clothes is not a significant concern in Pakistan. Handwashing remains widespread, even in urban and affluent rural areas where washing machines are common. Many people still prefer handwashing garments to prolong their lifespan. Tumble drying is rare, with line drying being the standard method. Water pollution caused by detergent use is an area of concern, as the market for eco-friendly and material-specific detergents remains underdeveloped.

The practice of repairing and altering garments is still common. Many pre-Millennial women have mending skills, while professional darners, or rafoogars, can be found in local markets offering more advanced repair services.

When garments reach the end of their use they are typically repurposed or given away rather than being discarded. However, the practice of disposing of garments as waste has begun to take root, particularly with items purchased from flea markets.

Industry Collaborations

Key industry organisations in Pakistan, including the All Pakistan Textile Mills Association (APTMA), the Chain Store Association of Pakistan (CAP), the Pakistan Ready-Made Garments Manufacturers and Exporters Association (PRGMEA), Fashion

Pakistan Council (FPC) and the Pakistan Fashion Design Council (PFDC) play prominent roles in their respective segments of the fashion value chain. However, none of these associations have made significant or sustained efforts to engage with sustainability issues.

Both the PFDC (Lahore) and FPC (Karachi), which could have played pivotal roles in promoting sustainable practices among designers and brands, have lost much of their former influence within the industry. Sustainability does not appear to be a key focus for them at present.

There is no network or association that facilitates cross-sector communication between industries at various stages of the fashion value chain. Such collaboration would be crucial for addressing sustainability challenges and making meaningful progress in the sector.

Government Role

While sufficient legislation exists to address the environmental and social impacts of the fashion industry in Pakistan, the key issues lie in weak enforcement and inadequate penalties for non-compliance.

The government of Sindh has taken a proactive approach to supporting and preserving indigenous garment and textile crafts, as well as supporting artisans through various specialised departments and organisations. These include the Culture, Tourism and Antiquities Department, the Sindh Indigenous and Traditional Crafts Company (SITCO), Sartiyoan, the Sindh Rural Support Organisation (SRSO), and the Sindh Technical and Vocational Training Agency (STEVTA).



Stitched in Time: The Textile Heritage of Pakistan

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Stitched in Time: The Textile Heritage of Pakistan

Textiles have been central to the region that is now Pakistan for at least 7000 years. Archaeological evidence from this area includes some of the earliest examples of cotton seeds, fibres⁴, fabric and spinning wheel technology.

Excavations from the sites of Harappa in Punjab and Mohenjo Daro in Sindh have revealed that the people of the Indus Valley Civilisation (3300 BCE - 1300 BCE) had a thriving culture around fashion in the form of exquisitely designed and decorated garments, textiles and accessories. One of the most iconic artefacts, the Priest-King statue, embodies the sophistication of design and craftsmanship from this period. In addition to cotton, materials like wool, silk, hemp and jute were also widely used. Techniques for spinning, weaving and dyeing fabrics were highly developed, and cotton textiles from this region were exported to Mesopotamia⁵ and beyond.

Since then, the region of Pakistan has been clothing the world - a legacy reflected in the linguistic echoes of its textile heritage. The Old Indo-Aryan word for cotton, *karpas*, spread far and wide, shaping terms like *karpasos* in Greek,

gossypium in Latin, *karpas* in Hebrew and *kurfus* in Arabic. Even the words for a special kind of cloth in Egyptian (*shenjut*)⁶, Old Akkadian (*sinitum*)⁷ and Greek (*sindeon*)⁸ are thought to link back to Sindh. Historical accounts from Alexander the Great's expeditions praise the textiles manufactured here.⁹

In the pre-modern era, it was textiles that connected South Asia to other cultures. From the 1200s to the 1800s, the region was the de facto textile capital, producing over a quarter of the global supply. Punjab and Sindh were major production centres in addition to Gujarat, Bengal and the Coromandel Coast. Highly sophisticated and diverse South Asian textiles were sought after in Iran, Central Asia, Arabia, Egypt, East and West Africa, Indonesia, Japan and Europe. Traders carried these fabrics across land routes, while maritime trade extended their reach even further. They were so valued that they often served as an accepted form of currency in global trade.¹⁰

The role of Punjab and Sindh in discussions on the textile trade of the time often gets overshadowed by the much more glamorous textiles of Bengal. While the latter was the source of luxurious fabrics, including diverse varieties of muslin and other fine cottons, the current region of Pakistan specialised in coarser varieties that were more affordable for common people. Textiles were categorised by type of fibre, thread count (*chaunsi*, *painsi*, *chhissi* etc.), yarn count, weave type (*sadabafi*, *khesbafi* etc.),

4. Moulherat C., Tengberg M., Haquet J.-F., Mille B. (2002). First evidence of cotton at Neolithic Mehrgarh, Pakistan: Analysis of mineralized fibres from a copper bead. *J. Archaeol. Sci.* 29, 1393–1401. <https://doi.org/10.1006/jasc.2001.0779>

5. Nath, A. (2019). Harappan textiles and tools of trade from Rakhigarhi, Haryana. *Textiles and Clothing Research Centre e-journal*, 3(5), 3–10.

6. Erman, A., & Grapow, H. (1926–1961). *Wörterbuch der ägyptischen Sprache*. Berlin: Akademie-Verlag.

7. Gelb, I. (1952). *Glossary of Old Akkadian*. The University of Chicago Press.

8. Montanari, F. (2024). *The Brill Dictionary of Ancient Greek*. Brill.

9. Wilson, K. (1979). *A history of textiles*. Scribner.

10. Roy, T., & Riello, G. (2009). *How India clothed the world: The world of South Asian textiles, 1500–1850*. Brill.

texture type, colour, pattern, final dimensions and/or function. The main centres of commercial cotton fabric production in Punjab and Sindh were Lahore, Sialkot, Gujrat, Rawalpindi, Hyderabad and Thatta.

Textiles have also held great cultural and religious significance in South Asia, featuring prominently in rites of passage, ceremonies and rituals with certain fabrics being exclusively manufactured for such purposes. In the past, spinning wheels were presented as ritual gifts by parents to their daughters on their wedding day. Textiles and textile related activities such as spinning and weaving were widely celebrated in the pre-modern literatures of Punjab and Sindh and became important literary metaphors for life.

Some traditions native to the region regard fabrics as sacred, attributing to them an inherent spiritual purity. As such, they are not to be cut, pierced or printed upon, and are best worn in an unstitched form by draping and knotting if necessary. For instance, Muslim men wear an *ihram* - a plain, undyed, unstitched cloth - for pilgrimage to Mecca, while Hindus, Jains and Buddhists wear only unstitched cloth during rituals and festivals. To this day, unstitched garments such as *saris*, *lungis*,

dhotis and turbans are preferred by monks, priests and sages across religions.

The 19th century, however, marked a turning point. While South Asian textile trade played a crucial role in fuelling the Industrial Revolution in Britain and catalysing its imperial and colonial expansion, it also ushered the decline of the indigenous textile industry at home. Britain emerged as the dominant force in global textile production, moving much of the industry to Europe and North America and relegating South Asia to a supplier of cheap raw materials and a captive market for its products. This shift also gave rise to the modern, West-centred fashion industry.

While global fashion is still dominated by the West, production of clothing and textiles has once again shifted to countries of the Global South, which now act as suppliers for big fashion brands. Pakistan is one such major supplier providing cotton, yarn, fabrics and ready-made garments to these brands. With sustainability becoming the zeitgeist of today's global fashion industry, Pakistan has a major opportunity to reclaim its historical space by foregrounding its inherently sustainable fashion, textile and design traditions.

Khaddar, also known as *khamta* in Pashto, refers to a broad category of coarse, plain-weave fabrics made from unicoloured threads. These fabrics, with their distinctive rough texture, are crafted from low yarn counts, resulting in a hardy material used for a variety of garments or left unstitched to form *chaddars* (large cloth wraps). The diversity within the *khaddar* family is immense, ranging from the coarsest, loosest weaves to somewhat finer, thicker versions like *gazi*, *garha*, *dhotar*, *eksuti*, *dedsuti*, *dosuti*, *tinsuti* and *chausuti*. Some varieties, such as *lattha* and *reja*, were noted for their rigidity and strength. Other lesser-known *khaddars* included *dhussar* and *suf*, each with their own unique characteristics.

Khaddar that was dyed after weaving in natural red was known by different regional names: *shaalu* or *saalu* in Punjab and KPK, and *shaaluru* in Sindh. A wider version of the same fabric was called *kharwa* or *lassa*. When dyed in indigo, it was referred to as *nila*. *Khaddar* varieties with minimal decorative patterns carried specific names - *chob* was a *shaalu* with an embroidered edge, and *silaara* was a short, undyed *garha* adorned with coloured lines. These patterned versions often held ritualistic significance, weaving culture and ceremony together.

Bafta and *ghatti* were among the finer varieties of fabrics from Punjab, with *chautahi* and *dotahi* being patterned variants of the latter. These fabrics, however, were not as commonly produced as the *khaddar* varieties.

Among the most recognised patterned textiles, *susi*, *lungi* and *khes* stand out for their vibrant colours and intricate designs. A *susi* is a fabric with longitudinal stripes of various colours, traditionally sewn into *shalwars* and *pajamas*, or worn wrapped around the waist in unstitched form. Today, *susi* is also used for home textiles and a variety of stitched garments. The *lungi*, a checked fabric often bordered for emphasis, is traditionally worn as a wrap-around garment by both men and women in Punjab and Sindh, or as a turban in Khyber Pakhtunkhwa. *Doria* and *kani* are two other patterned fabrics with bold designs. *Doria* features stripes while *kani* is recognised for its striking red border, often crafted from silk.

Perhaps the most distinctive of all is *khes*, a double, twill, or plain-weave cloth adorned with geometric patterns such as stripes or checks. It comes in various regional types, including *saada*, *gumti*, *majnu*, *patpatti* (white and red checks) and *tukridar* (white and blue checks). Some rare versions of *khes* were even made from silk. Traditionally worn as a *chaddar* or more commonly today as home textiles, *khes* is celebrated for both its aesthetic and functional qualities.

Historically, cities like Multan, Lahore and Thatta were renowned centres for silk weaving, though their influence began to wane during the colonial era. With sericulture underdeveloped locally, raw silk was imported from other regions such as Benares, Mumbai, China and Muscat. The region produced famous silk fabrics, including *dariyai* (plain silk), *gulbadan* (striped silk) and *dhupchan* (shot silk). Popular blended fabrics like *garbhi* and *mashru*, combining cotton and silk, enjoyed widespread use with wool occasionally mixed into the former. *Muska* or *chaukula*, a lesser-known cotton-silk blend, also appeared in local markets.

Woollen fabrics, on the other hand, thrived in the hilly areas of Punjab and Sindh. Two popular types of woollen shawls, *kambal* and *bhura*, were woven from sheep's wool. *Kambal*, a coarse and hard fabric, was often used by people from lower income brackets, while *bhura*, a striped variant, added more variety. Another fine woollen creation was *loi*, a soft shawl made from dyed or undyed wool.

Pattu or *patti*, similar to *khaddar* but made from coarse wool, was woven in the mountainous regions of Khyber Pakhtunkhwa, Azad Jammu Kashmir and Gilgit Baltistan. Traditionally, it was woven in smaller pieces (*patti*), four or more of which were then joined together to form a larger piece (*pattu*). These fabrics were used to make coats, jackets, trousers and shawls.

Perhaps the most iconic woollen fabric to emerge from the region was *pashmina*, renowned for its softness and warmth. While it is native to Kashmir, *pashmina* weaving flourished beyond its borders, particularly in the 19th and 20th centuries. Kashmiri weavers settled in places like Jalalpur, Gujrat and Lahore, where they continued their craft, cementing *pashmina*'s place in the region's rich textile heritage.

In all, the diverse range of fabrics from *khaddar* to *pashmina* reveals the intricate connection between material, culture and tradition that has defined the region's textile legacy for centuries. These textiles not only tell the story of craftsmanship but also of the economic, social and cultural exchanges that shaped the fabric of South Asian life.



Evolution of Contemporary Fashion

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Evolution of Contemporary Fashion

The fashion industry in Pakistan began to take shape as a fully developed sector in the early 2000s. It is mainly concentrated in its two largest cities, with major labels, fashion houses, designers, fashion councils and leading fashion education institutes all based in Karachi and Lahore. These cities also host the country's most significant fashion events. The industry is highly specialised, primarily serving a domestic audience as well as the Pakistani diaspora in the Middle East and the West. To a lesser extent, it also appeals to South Asian countries like Bangladesh and India, where traditional Pakistani attire is similarly worn and appreciated.

Fashion designers, who described themselves and/or were recognised as such, first started appearing in Pakistan in the 1960s - much earlier than anywhere else in South Asia. The fashion ecosystem at that time comprised of a few self-made designer-entrepreneurs who either ran their own boutiques or operated from home, the tailors and *karigars* they employed, and a limited number of retail stores and outlets to which they usually supplied. They catered to a niche audience from the upper echelons of society in Karachi and Lahore. The pioneers of Pakistani fashion were all women – Sughra Kazmi, Maheen Khan, Zeenat Ahmed, Sehry Saigol, Seema Aziz and Noorjehan Bilgrami.

Fashion retail brands began to emerge in the late 1970s and 1980s, with early pioneers like Firdous and Bareeze focusing on offering high-quality fabrics with distinctive designs. Ready-to-wear brands such as Generation soon followed.

By the 2000s, the Pakistani fashion industry experienced rapid growth, evolving from a predominantly boutique-oriented, small-scale cotton sector into a large-scale retail industry that significantly contributed to the economy. This expansion was driven by the rise of a new middle class¹¹, the spread of consumer culture, the advent of the internet and social media and the increasing globalisation of values and trends.

Styles and Trends

Today, fashion trends are shaped by models, celebrities, fashion bloggers and social media influencers. Gen Z, Millennials and women in general are drivers of the fashion industry. Despite the growth of ready-to-wear options, more than half of Pakistan's population still prefers to have their garments stitched by local tailors, known as *darzis*. This includes most rural men and women, a large proportion of the pre-Millennial urban population, and a significant number of Millennial women. These garments are either designed at home or co-created with the *darzi*.

The *shalwar kameez* or *kurta pajama* remains the most common attire in Pakistan today. Worn by all genders, this traditional outfit consists of loose trousers that taper to the ankle (the *shalwar* or *pajama*) paired with a long tunic (the *kameez* or

11. www.isas.nus.edu.sg/papers/pakistans-new-middle-class

kurta). Variations of the *shalwar kameez* and *kurta pajama* are seen across the regions and cultures of Pakistan. This versatile ensemble serves as both everyday and formal wear, suitable for the office as well as ceremonial occasions. Other traditional garments, often reserved for special events, include women's *gharara/sharara* (trousers), *lehenga* (skirt), *choli* (blouse), and men's *sherwani* (long coat). These are available both as ready-to-wear garments from fashion brands, typically categorised under the broad label "eastern", and as custom-stitched outfits using unstitched fabric purchased from bazaars or fashion retailers.

The *ghaghra*, another traditional women's skirt, has largely fallen out of common use and is now made exclusively at home or by a *darzi*. Similarly, traditional unstitched garments like men's *dhoti* and *lungi* and women's *laacha* are becoming rare. The *sari*, another traditional unstitched dress, is mostly worn in Karachi, where it remains popular for formal occasions. As everyday wear, the *sari* is now largely worn by older generations of Muhajir women, while in Punjab, it is only occasionally worn by younger urban women.

In terms of western wear, the category includes men's formal attire as well as contemporary streetwear and sportswear. Urban men often wear shirts and trousers for work, while casual attire including jeans, t-shirts and polos is popular among Millennials and Gen Z. In rural areas, only about half of Gen Z males adopt these styles.

Brands

Prominent brands in Pakistan offering ready-to-wear eastern apparel for women include Generation, Khaadi, Ethnic, J., Beechtree, Limelight, Zara Shajahan, Gul Ahmed, Al Karam, Sapphire, Nishat Linen and the Bareeze Group. Most of these brands also provide unstitched fabric and ready-to-wear men's eastern apparel. Notable designers specialising in semi-formal eastern wear for women include Maheen Khan, Farah Talib Aziz, Asim Jofa and Maria B.

For men's formal western wear, leading brands include Royal Tag, Monarch, Charcoal and Diners.



The western street-fashion segment is primarily dominated by Outfitters, Breakout, Cougar, Lama and Engine, which cater to all genders.

In the realm of haute couture, major labels in Pakistan are Faraz Manan, Deepak Perwani, Bunto Kazmi, Hussain Rehar, Mohsin Naveed Ranjha, Kammar Rokni, Iqbal Hussain, HSY, Fahad Hussayn, Elan, Zainab Chottani, Shamaeel Ansari, Sania Maskatiya and Umar Sayeed.

The Fashion Economy: At Home and Abroad

Reliable data on the revenue generated by Pakistan's fashion industry remains elusive.

Government reports indicate that ready-made garments contribute approximately £2 billion in annual export revenue¹²; however, there is no corresponding information on domestic market revenue. A significant portion of these exported garments is for global labels that outsource their manufacturing to Pakistan, which does not accurately reflect the contributions of Pakistani brands. According to private market share reports, the overall revenue for the apparel retail industry in Pakistan is estimated at around £4.2 billion¹³.

Predominantly home-oriented, Pakistan's fashion industry rarely sets trends on the global stage. While some brands have gained international recognition, these tend to be smaller labels that prioritise sustainable practices. In the northern and northwestern regions of India, the segment known as "Pakistani suits" has gained popularity; however, these garments are often imitations of original Pakistani designs, produced by local Indian brands rather than by Pakistan's domestic labels.

Despite these challenges, several haute couture designers and fashion houses have successfully established an international presence, particularly in India and the Middle East. Notable figures include Faraz Manan and Deepak Perwani. Faraz Manan's outfits are highly sought after by Indian celebrities and members of royal families in the Middle East. Meanwhile, Deepak Perwani operates what is arguably the longest-running - and possibly the only - Pakistani designer retail outlet in India. Among the masses, Zara Shahjahan has emerged as a well-known name in India's traditional womenswear market.

Several major brands, including Khaadi, J., Gul Ahmed, Al Karam, Amir Adnan and ChenOne maintain international retail outlets that primarily cater to the Pakistani diaspora, with some limited outreach to other South Asian communities. Many of these brands also boast a significant e-commerce presence targeting diaspora populations.

Brands that have made an international impact often operate exclusively through e-commerce and adopt sustainable practices. Znali and Rastah have gained traction in the United States and the United Kingdom, with cultural icons frequently spotted wearing their designs. Unlike many other Pakistani labels whose international audience is largely confined to the South Asian diaspora, Znali and Rastah have successfully crossed cultural barriers to establish a presence among non-South Asians.

The e-commerce market is rapidly emerging as a vital platform for businesses in Pakistan, with fashion comprising a significant portion of this industry - accounting for 20.4% of the market share¹⁴. Brands such as J., Khaadi, Sapphire, Gul Ahmed and Limelight maintain a substantial online and offline retail presence in the country. Zara Shahjahan primarily serves its customers through e-commerce channels.

Additionally, many micro and small brands have successfully established an online presence on platforms like Instagram. The COVID-19 pandemic sparked a trend of home-based, primarily female entrepreneurs launching fashion businesses that emphasise sustainability. The e-commerce sector holds the potential to play a pivotal role in shaping a well-defined, sustainable fashion industry in Pakistan, moving away from reliance on mass-producing labels.

Fashion Weeks

Fashion shows have been held in Pakistan since the 1980s. They were first organised by independent designers or as part of trade shows by trade councils, chambers of commerce and the Trade Development Authority of Pakistan (TDAP). They became a more regular occurrence after the Pakistan Fashion Design Council and Fashion Pakistan Council were established. These platforms have held annual fashion weeks since 2009 and are responsible for regularising fashion events.

12. Pakistan Bureau of Statistics, Economic Survey of Pakistan.

13. www.researchandmarkets.com/reports/5717589/pakistan-apparel-retail-market-summary
www.statista.com/outlook/cmo/apparel/pakistan

14. www.insights.datadarbar.io/e-commerce-report/State%20of%20B2C%20E-Commerce%20in%20Pakistan.pdf

**DO WE REALLY NEED TO
BUY NEW CLOTHES?**



They must be credited for managing this despite threats from religious fundamentalists and terrorist organisations.

Fashion Media

Magazines such as Mirror, SHE and Woman's Own have been instrumental in shaping women's fashion in Pakistan, especially during the early decades of the country's fashion scene. These publications dedicated significant space to women's fashion and played a crucial role in propagating trends. Another publication, Libas, launched in 1987 by Sehyr Saigol in both Lahore and London, quickly became a widely read fashion magazine, attracting subscribers from South Asia and the British South Asian community. This success paved the way for a plethora of other exclusive fashion magazines in Pakistan, including Fashion Collection, Diva, Sunday, Paperazzi, Hello and HUM TV's style360 GLAM.

While the circulation of many of these magazines was primarily limited to the upper class and, to a lesser extent, the upper middle class, some managed to achieve reasonable distribution in major and small cities across Pakistan, even beyond metropolitan areas. For instance, the Jang Group's MAG The Weekly gained popularity in smaller cities

and towns. Additionally, fashion content expended its reach through representation in family magazines and Urdu digests.

The Hum Network has played a significant historical role in shaping the contemporary fashion landscape in Pakistan by democratising fashion and making it accessible to the masses. The network launched Style 360, the first channel dedicated entirely to fashion and lifestyle. It featured well-organised programming, including shopping guides, craft-related shows and home décor segments. Although Style 360 is no longer operational, Hum TV, the network's main channel, continues to provide substantial coverage of fashion, frequently airing fashion events and organising fashion weeks, shows and awards for designers and models. HUM also organises specialised bridal couture weeks in Lahore. These events however lack the participation of fashion critics and tend to be social events of a commercial nature.

The ARY Group launched a fashion channel which contributed to bringing business to the fashion industry but has since ceased operations. The decline of fashion media in Pakistan can be attributed to increasing conservatism in societal attitudes, as well as a shift in focus away from print and specialised television formats.



Understanding Sustainability from a Pakistani Lens

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Understanding Sustainability from a Pakistani Lens

Today, most people lead precarious lives. We breathe unhealthy air, consume compromised food and drink impure water. Nature's balance has been disrupted across much of the planet and a large portion of the global population faces exploitation, stress and shortages of water, energy and other life-sustaining resources. Despite these challenges we continue to produce and consume relentlessly. The way we manufacture, use and discard clothing has played a significant role in this deterioration.

How did we arrive at this point? In the early 20th century, as Western countries embraced industrial and mass production of textiles and clothing, the traditional systems of slow, minimal production began fading away. By the end of the century fast fashion¹⁵ had firmly taken hold, bringing with it environmental, social and ethical concerns. This shift gave rise to the concept of sustainability, which became a central part of the global dialogue around fashion and consumerism.

Sustainability can be defined in numerous ways, but at its core, it is about “creating and maintaining conditions under which humans and nature can exist in productive harmony to support present and future generations”¹⁶. There are also various dimensions to sustainability – environmental, social, cultural and economic – that must be

addressed holistically. However, discussions around sustainability often centre on the environment, overshadowing the other equally important aspects. This one-dimensional view limits true progress as the different facets of sustainability are co-dependent. For a brand to be genuinely sustainable, it must implement strategies that address all these areas.



15. Fast fashion refers to the production of inexpensive and low-quality clothing and its purchase and disposal at a lightning speed to match quickly changing fashion trends.

16. McGill University. (n.d.). What is sustainability? [PDF]. McGill Office of Sustainability www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf

Environmental Sustainability

Achieved by minimising the consumption of non-renewable resources, limiting the use of renewable resources to levels that do not exceed their natural replenishment rates, and reducing pollution to levels that nature can absorb and recover from.

Social Sustainability

Involves fostering a healthy society where human rights - personal, labour and cultural - are respected. It means ensuring basic needs such as nutritious food, clean water, shelter, healthcare and education are met. In business, this translates to fair wages, job security, safe working conditions, non-discrimination and a commitment to workers' well-being. It also includes corporate social responsibility initiatives that benefit local communities and broader society.

Cultural Sustainability

Entails preserving and promoting positive cultural heritage and practices, ensuring they evolve with modernity while retaining their essence. This helps maintain the identity of communities and passes down cultural knowledge and values to future generations.

Economic Sustainability

Refers to the ability of individuals and communities to sustain a stable level of economic production indefinitely. For businesses, it means adopting environmentally, socially and culturally responsible practices that are also financially viable.

The sustainable fashion movement emerged in response to growing awareness. Campaigns were initiated, organisations established, alliances and coalitions formed, action plans drafted, and impact indexes and standards were created. What began as a counterculture trend evolved into a full-scale movement by the early 2000s and now represents the zeitgeist of global fashion.

While some brands have genuinely embraced eco-friendly and people-centred practices, many others engage in greenwashing - using the sustainability

label without real commitment to the cause. Sustainability has become a buzzword, and for many businesses, especially those in export markets, efforts are often limited to symbolic gestures such as obtaining certifications and joining sustainability groups without addressing deeper issues like mass production and overconsumption. With increasing scrutiny from consumers, governments and international organisations, sustainability can no longer be ignored or superficially addressed.

How Sustainable is Pakistani Fashion?

Fashion across the globe is largely unsustainable and Pakistan is no exception. While many export-oriented Pakistani brands adopt certain sustainable practices responding to market pressure from international consumers and regulations in countries in Europe and North America, these efforts often lean toward greenwashing. Sustainability, for the most part, remains a low priority in the domestic market with only a few exceptions.

In the past two decades, while Pakistan's role as a key supplier to the global fashion industry has grown, the country has also become increasingly vulnerable to climate change, experiencing more frequent and severe weather events. This vulnerability has been highlighted by incidents like the tragic fire at Ali Enterprises in Karachi, one of the worst industrial accidents in garment manufacturing history. Such incidents have drawn the attention of climate and labour watchdogs as well as Western fashion brands and retailers, bringing the sustainability practices of Pakistan's fashion industry into question.

That said, it's challenging to make sweeping generalisations about Pakistan's fashion ecosystem. Various systems coexist, sometimes overlapping, and each with its own ranking on the sustainability scale. One factor that sets the country apart from others is the persistence of traditional textile and clothing production methods. While these practices are on the brink of extinction, they continue to exist alongside the country's industrial system. Indigenous methods of production are often rooted in traditional ecological knowledge - deep, time-

tested understanding of the relationship between people, plants, animals, natural phenomena and landscapes within specific ecosystems¹⁷.

Each province and region in Pakistan has a rich heritage of indigenous textiles, clothing and designs. These traditional methods are inherently sustainable throughout the entire value chain, from material production to garment manufacturing. They operate on a small scale, are typically local, and do not disrupt ecological balance the way industrial methods do.

Moreover, the culture of purchasing uncut fabric and having clothes custom-stitched by a local *darzi* remains prevalent, especially for ethnic wear and among pre-Millennial generations. While the upstream textile production may be unsustainable, from the design to garment manufacturing stages, these practices tend to be more sustainable. The design choices ensure the longevity of the garments and minimise waste, which is often repurposed or reused.

Does Pakistan Have a Sustainable Fashion Sector?

Sustainable fashion in Pakistan remains a niche space, with only a handful of small or micro-sized brands based in Karachi, Lahore and Islamabad. Some examples include Koel, The Brown Store, Behbud Crafts, The Pink Tree Company, Umar and Imrana and Aangan.

However, Pakistan is also witnessing a subtle mixture of greenwashing and cultural appropriation. Some retail stores that began as handicrafts businesses in collaboration with artisans have shifted their focus to selling indigenous handcrafted clothes. Since these garments are

inherently sustainable in design, they naturally meet many sustainability criteria. Even without explicitly branding themselves as sustainable, these businesses are often perceived as such by conscious consumers. This perception has encouraged the rise of small brands that market themselves as sustainable simply by incorporating indigenous embroidery and prints onto apparel that is otherwise produced unsustainably.

With sustainability becoming a buzzword, several major fashion labels in Pakistan have introduced “sustainable” product lines on a small scale. While a few exceptions exist, many of these lines rely more on the appearance of sustainability than genuine sustainable practices. Strategies like dyeing fabrics with synthetic dyes to mimic natural colours, using minimal or timeless designs or replicating block prints with environmentally harmful screen-printing techniques are common. This form of implicit greenwashing often serves as a marketing strategy for the parent brand, which continues to operate unsustainably.

Special mention should be made of Chapter 2 by Khaadi. When Khaadi was first established, it catered to a niche audience by selling sustainably made, traditional and tradition-inspired apparel. As the brand gained popularity, it shifted toward mass production and began employing less sustainable methods. Khaadi emerged during a period when Pakistan’s fashion industry was just beginning to expand and sustainability wasn’t a primary concern. But as this space grew and other major labels began launching sustainable lines, many customers pointed to Khaadi’s early days as a model of sustainable fashion. In response, Chapter 2 was created to cater to this demand, essentially returning to Khaadi’s original, more sustainable roots.

17. McGill University. (n.d.). What is sustainability? [PDF]. McGill Office of Sustainability www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf



Evaluating Sustainability Across the Fashion Supply and Value Chain

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Evaluating Sustainability Across the Fashion Supply and Value Chain

Fashion has one of the most complex and extensive supply chains of any industry. Its production and consumption span multiple stages, involving a range of industries and sectors. At the heart of this process is design, which holds a central role in the fashion value chain. Design not only defines fashion but also influences every step before and after, while the other stages - though essential to fashion - are often linked to broader applications in other industries.

In Pakistan, the fashion industry stands out for having a relatively integrated and self-reliant supply chain, in contrast to the highly fragmented nature of global fashion supply chains. Most fashion brands in Pakistan manage their own retail operations, allowing them greater control over the entire process. Many brands are also directly involved in spinning, weaving and textile processing, giving them further influence over upstream stages of production.

Except for design, which is exclusively tied to the fashion industry, other sectors in the supply chain serve multiple industries and are not solely focused on fashion.

Many of these suppliers produce textiles and materials for both local fashion brands and international markets, highlighting the interconnectedness of Pakistan's fashion supply chain with global industries.



Fashion Supply and Value Chain

- Material Production
- Yarn and Fabric Production
- Textile Processing
- Design
- Garment Production
- Retail and Marketing
- Garment Use
- End-of-Life

Material Production

Cotton remains the most widely used material in Pakistan's local fashion industry, although the majority of fashion labels utilise cotton blended with various man-made, mostly synthetic, fibres. While a systematic study on textile composition has yet to be conducted, yarn and garment manufacturers, designers and cotton research centres consulted for this research estimate that only about 20% of textiles produced in Pakistan are made from pure cotton. The rest are blends, often mixed with synthetic fibres.

Transparency regarding the materials used in garments is also a significant issue. Although material composition is typically mentioned on garment tags, this is not always consistent. Blended cotton garments are frequently sold as "pure"

cotton. Additionally, fabrics like chiffon, georgette and organza - each of which can be made from various fibres - often do not specify the source material, further contributing to the lack of clarity around textile composition.

Cotton

Cotton has a relatively low energy footprint¹⁸ but holds the highest water footprint of any fashion fibre and requires extensive chemical inputs. For thousands of years, cotton has been an integral part of South Asian fashion, valued for its adaptability, low maintenance and affordability¹⁹. Its appeal extended beyond the region in the 17th century when it became a key textile in European fashion, dominating global markets for over two centuries before being overtaken by polyester.

Pakistan is the world's fourth-largest cotton producer, yielding approximately 2.3 million metric tonnes annually, behind only China, India and the USA. Around 16% of Pakistan's agricultural land is dedicated to cotton, with most of the crop consumed domestically - yet the country still needs to import cotton to meet its demand.

Cotton's sustainability is complex. While it can be a sustainable fabric, the vast majority of cotton produced today is far from it. The unsustainability stems from the excessive use of water, pesticides, fertilisers, overproduction and exploitative labour conditions. Cotton is one of Pakistan's thirstiest crops, using an estimated 12,500 billion litres of water annually²⁰. Producing one kilogram of cotton can take anywhere from 7,000 to 29,000 litres of water. The region where cotton is cultivated depends primarily on the River Indus and its tributaries for irrigation, but many farmers now extract groundwater as a primary source, contributing to severe water depletion. Areas in northeastern Pakistan, in particular, suffer some of the highest rates of groundwater depletion globally.



There is a huge demand for cotton but what a huge cost this land and these people are going to pay in the future for growing this crop. These people are working very hard but I wonder what their future is going to be working with all these pesticides and fertilisers, as most of it is poison.”

“We don't have any earthworms left, we don't have any fireflies left, no biodiversity, only cotton. And if we continue like this, Mother Earth is not going to forgive us. There will come a time when these lands will become barren, they will not produce anything for us, the biodiversity which is so needed will be gone completely and then what future do we have? With all the poison absorbed by the humans we are not going to last very long.

Yes, we need clothes but we can stop changing our shirts that often. There are alternatives to cotton. We have to look into those. All are natural and don't require pesticides, insecticides, weedicides and all those fertilisers. There are natural ways to grow that don't harm the planet in anyway.

- Tofiq Pasha Mooraj



Drip irrigation, a more efficient method, is rarely practiced in the country.

Pesticides and fertilisers have driven cotton production since the Green Revolution of the 1960s. Cotton accounts for 69% of pesticide use in Pakistan, leading to severe ecological disruption²¹.

18. WRAP. (2017). Valuing our clothes: The cost of UK fashion. Waste & Resources Action Programme.

www.wrap.org.uk/sites/files/wrap/valuing-our-clothes-the-cost-of-uk-fashion_WRAP.pdf , www.nature.com/articles/s43017-020-0039-9

19. Moulherat C., Tengberg M., Haquet J.-F., Mille B. (2002). First evidence of cotton at Neolithic Mehrgarh, Pakistan: Analysis of mineralized fibres from a copper bead. *J. Archaeol. Sci.* 29, 1393–1401. <https://doi.org/10.1006/jasc.2001.0779>

20. Estimates shared by researchers at Cotton Research Centre, Multan.

21. Shahid, M., et al. (2016). Pesticides pollution in agricultural soils of Pakistan. In K. Hakeem, J. Akhtar, & M. Sabir (Eds.), *Soil science: Agricultural and environmental perspectives* (pp. 243–261). Springer, Cham. https://doi.org/10.1007/978-3-319-34451-5_9



The misuse and overuse of pesticides, especially legally banned organochlorines, have compounded these issues. Pests have developed resistance and natural predators have been decimated. Since the 1980s, pesticide residues have been detected in groundwater and surface water, and excessive use has reduced soil fertility^{22 23 24 25}.

The contamination has far-reaching consequences, affecting everything from water and air quality to plants, animals and the human food chain. Pesticides have permeated the ecosystems of cotton-growing regions in Punjab and Sindh, disrupting biodiversity. Their impact is evident in

the decline of bird populations²⁶ and the presence of toxic residues found in fish from the River Indus, as well as in locally produced fruits, vegetables and milk. High air concentrations of pesticides add to the health risks faced by local communities, with studies showing elevated levels of cancer and neurological diseases among residents. In 2017, a hospital in Karachi found pesticide traces in the blood of 97% of cancer patients tested²⁷.

Cotton pickers, most of whom are women, are among the most exposed to these toxins. Research shows that their fat tissue²⁸, urine²⁹, blood³⁰ and breast milk³¹ contain significant pesticide

22. Ahad, K., Hayat, Y., Ahmad, I., & Soomro, M.H. (2001). Capillary chromatographic determination of pesticide residues in groundwater of Multan Division. *Nucleus*, 38, 145–149.
23. Tariq, M. I., Afzal, S., & Hussain, I. (2004). Pesticides in shallow groundwater of Bahawalnagar, Muzaffargarh, D.G. Khan, and Rajanpur districts of Punjab, Pakistan. *Environment International*, 30(4), 471–479. <https://doi.org/10.1016/j.envint.2003.09.008>
24. Jabbar, A., Masud, S.Z., Parveen, Z., et al. (1993). Pesticide residues in cropland soils and shallow groundwater in Punjab, Pakistan. *Bulletin of Environmental Contamination and Toxicology*, 51, 268–273. <https://doi.org/10.1007/BF00198891>
25. Ashraf, S., Ch, K.M., Ashraf, I., et al. (2024). A phenomenological inquiry into farmers' experiences growing cotton in Punjab, Pakistan. *Scientific Reports*, 14, 13846. <https://doi.org/10.1038/s41598-024-62950-y>
26. Tariq, M. I., Afzal, S., Hussain, I., & Sultana, N. (2007). Pesticides exposure in Pakistan: A review. *Environment International*, 33(8), 1107–1122. <https://doi.org/10.1016/j.envint.2007.07.012>
27. Attaullah, M., Yousuf, M.J., Shaukat, S., Anjum, S.I., Ansari, M.J., Buner, I.D., Tahir, M., Amin, M., Ahmad, N., & Khan, S.U. (2018). Serum organochlorine pesticide residues and risk of cancer: A case-control study. *Saudi Journal of Biological Sciences*, 25, 1284–1290. <https://doi.org/10.1016/j.sjbs.2017.10.023>
28. Krawinkel, M.B., Plehn, G., Kruse, H., & Kasi, A.M. (1989). Organochlorine residues in Baluchistan, Pakistan: Blood and fat concentrations in humans. *Bulletin of Environmental Contamination and Toxicology*, 43, 821–826. <https://doi.org/10.1007/BF01702050>
29. Khwaja, M.A. (2001). Impact of pesticides on environment and health. *SDPI Research News Bulletin*, 8(2).
30. Parveen, Z., & Masud, S. Z. (2001). Studies of pesticide residues in human blood. *Pakistan Journal of Scientific and Industrial Research*, 44, 137–141.
31. Yasmeen, H., Qadir, A., Mumtaz, M., Eqani, S. A. M. A. S., Syed, J. H., Mahmood, A., Jamil, N., Nazar, F., Ali, H., Ahmad, M. S., Tanveer, Z. I., & Zhang, G. (2017). Risk profile and health vulnerability of female workers who pick cotton by organochlorine pesticides from southern Punjab, Pakistan. *Environmental Toxicology and Chemistry*, 36, 1193–1201. <https://doi.org/10.1002/etc.3633>

contamination. Every year, around 10,000 cotton pickers report health issues from pesticide exposure³², experiencing symptoms ranging from skin and eye irritation to headaches, respiratory problems and gastrointestinal issues^{33 34 35}. These workers also endure unsafe working conditions, meagre wages (as low as PKR 200 per day, less than £1), and are vulnerable to being fired at will. Child labour is also widespread in cotton picking.

In 2010, genetically modified BT cotton was introduced in Pakistan as a solution to pesticide overuse. This cotton produces its own pest-resistant toxins, theoretically reducing the need for chemical pesticides. Initially, BT cotton boosted yields, but over time, pests developed resistance and new pests emerged, causing a return to heavy pesticide use. Today, 97% of cotton grown in Pakistan is BT cotton, which has proven economically unsustainable. Farmers can no longer save seeds for replanting as they must purchase patented seeds each year, adding to their financial burden.

Cotton need not be this unsustainable. One promising solution is the Better Cotton (BC) certification, an international initiative promoting cotton farming with minimal pesticides, efficient water use and fair labour practices without compromising on fibre quality. The organisation claims that it also provides training to sensitise farmers towards adopting a sustainable outlook. To be certified, farmers must register themselves and renew their registration annually. BC-certified cotton, which accounts for 25% of Pakistan's production, mostly caters to international markets and export-oriented local manufacturers. Advocates argue that the benefits of BC certification are beginning to show, and there is an opportunity for Pakistan's government to expand these practices nationwide.

A potentially more sustainable approach is the use of organic cotton. The term 'organic' refers to non-genetically modified cotton that is suited to local conditions, cultivated on detoxified land without synthetic pesticides or fertilisers, and certified by a globally recognised agency. Currently, less than 1% of cotton produced globally is organic, with most of it grown through various international organisations' projects³⁶. The requirement for non-toxic land dictates that no fertilisers or pesticides should have been applied to any crops grown on that land for a period ranging from two to ten years. This condition makes finding suitable land in Punjab or Sindh challenging. Moreover, existing projects have struggled to manage pests and diseases effectively using non-synthetic and natural remedies. Almost 90% of organic cotton is commercially grown in Balochistan, where 'virgin' land is more accessible; however, this is not a long-term viable strategy. Ongoing research aims to establish successful organic cotton farming practices in Pakistan's cotton zones, with the government actively encouraging the development of cotton research centres.

The sustainability movement in Pakistan currently emphasises the promotion of organic and Better Cotton (BC) certified cotton. Stakeholders advocate for a complete transition to organic farming but often overlook the potential of indigenous or Desi cotton. All BC certified or organic cotton in Pakistan primarily consists of American varieties. There is a common misconception that organic cotton equates to Desi cotton.

Today, four main species of cotton are cultivated: American cotton (*Gossypium hirsutum*), Egyptian cotton (*Gossypium barbadense*) and Desi cotton (*Gossypium herbaceum* and *Gossypium arboreum*). Commercial cultivation of American cotton began

32. Waheed, S., Halsall, C., Sweetman, A. J., Jones, K. C., & Malik, R. N. (2017). Pesticides contaminated dust exposure, risk diagnosis, and exposure markers in occupational and residential settings of Lahore, Pakistan. *Environmental Toxicology and Pharmacology*, 56, 375–382. <https://doi.org/10.1016/j.etap.2017.11.003>

33. Krawinkel, M.B., Plehn, G., Kruse, H., & Kasi, A.M. (1989). Organochlorine residues in Baluchistan, Pakistan: Blood and fat concentrations in humans. *Bulletin of Environmental Contamination and Toxicology*, 43, 821–826. <https://doi.org/10.1007/BF01702050>

34. Rizwan, S., Ahmad, I., Ashraf, M., Aziz, S., Yasmine, T., & Sattar, A. (2005). Adverse effect of pesticides on reproductive hormones of women cotton pickers. *Pakistan Journal of Biological Sciences*, 8, 1588–1591.

35. Ahmad, A., Shahid, M., Khalid, S., et al. (2019). Residues of endosulfan in cotton-growing areas of Vehari, Pakistan: An assessment of knowledge and awareness of pesticide use and health risks. *Environmental Science and Pollution Research*, 26, 20079–20091. <https://doi.org/10.1007/s11356-018-3169-6>

36. Estimates shared by research officers at Cotton Research Centre, Multan.

in the 1930s. By the time Pakistan was established in 1947, many cotton farmers had transitioned to American cotton. This was in contrast with British India, where less than 2% of farmers cultivated it. Following the Green Revolution of the 1960s, the proportion of Desi cotton continued to decline, and today, 99% of cotton produced in Pakistan (including 100% of all BC certified and organic cotton) is of the American variety.

The unsustainable characteristics previously discussed - such as sensitivity to soil types, vulnerability to numerous pests and the heavy requirement for pesticides, fertilisers and water - apply primarily to American cotton. In contrast, Desi cotton is biologically engineered to require minimal to no pesticides. When pesticides are necessary, they typically consist of naturally prepared concoctions (like neem oil), varying by region and based on traditional knowledge accumulated over generations. Additionally, naturally occurring insect predators help keep pest populations in check. Older farmers note that the number of pests affecting Desi cotton today is far fewer than in the past. This variety also requires less water and thrives even in drought conditions. Traditionally, cotton was planted less densely and rotated with other crops, a practice that helped maintain optimal soil health. Some Desi cotton varieties are naturally coloured - which could reduce the need for polluting dyeing processes - with documented colours ranging from shades of green, grey and brown³⁷. Native cotton varieties from other countries also offer a diverse palette of colours.

Currently, no brand - large or small - produces garments using indigenous cotton varieties. The interviews we conducted for this report reveal a perception among sustainable fashion enthusiasts in Lahore and Karachi that indigenous cotton seeds are nearly impossible to find. However, researchers at national cotton research centres have indicated that some indigenous seed varieties are stored in seed banks primarily for crossbreeding experiments. A comprehensive cataloguing of

non-hybrid indigenous seed varieties in Pakistan is urgently needed. This project could be pursued in collaboration with cotton research centres that possess the necessary expertise and with the last generation of farmers familiar with these varieties. The outcome could include establishing a seed bank dedicated to indigenous cotton, as current seed banks in Pakistan focus on sourcing from around the world rather than preserving indigenous varieties.

Additionally, Haroonabad and Vehari are among the few places where Desi cotton is still cultivated. The limited number of farmers growing this cotton typically plant it non-commercially on land unsuitable for other crops. They tend to avoid pesticide use and rely on rainwater for irrigation, adhering to traditional practices. The harvested cotton is mostly used as stuffing for *razais* (quilts) and is rarely spun or woven. Few farmers remain knowledgeable about the various types of Desi cotton, their characteristics and cultivation methods. These traditional practices, which are generally environmentally friendly, are based on generations of ecological knowledge. Urgent documentation of this knowledge system is essential to develop sustainable solutions. Initiatives like Better Cotton and Organic Cotton are criticised for failing to collaborate with farmers in documenting, preserving and enhancing traditional sustainable practices, instead imposing new techniques developed in the West.

Unlike American and Egyptian cotton, which have medium to long staples, Desi cotton typically features a short staple that current spinning technology, designed for longer staples, does not accommodate. It is often dismissed as inferior as a result. However, for millennia, the finest fabrics were woven from Desi cotton. Developing suitable technology for Desi cotton rather than disregarding it would be a valuable step toward a genuinely sustainable solution. Some organisations in India are pursuing this goal, and Pakistan could benefit from similar initiatives. Collaboration for technology

37. Kranthi, K.R. (2014). How colourful is the future of naturally coloured cotton?
https://cicr.org.in/wp-content/uploads/PA_11_Coloured_Cotton.pdf

exchange would also be beneficial. Currently, hand-spinning and weaving remain the best methods for fabric development from Desi cotton. Although not feasible on an industrial scale, small sustainable brands could experiment with creating garments from Desi cotton.

Polyester and Other Synthetic Fibres

Polyester is the primary synthetic fibre used in Pakistan. While it is not as dominant as in other parts of the world, it ranks as the second most used material after cotton and is frequently blended with cotton, wool and viscose. Its advantages over cotton include a lower price, durability and ease of maintenance; however, its usage is environmentally, socially, culturally and ethically unsustainable.

While polyester production and maintenance consume significantly less water than cotton, it poses various detriments to humans and the environment. Polyester is essentially an ultra-processed petroleum product, produced by melting PET plastic and extruding it through spinnerets to create long fibres. PET itself is made by reacting terephthalic acid (TA) with ethylene glycol, both derived from crude oil. The entire production process is highly energy-intensive, utilising numerous toxic chemicals and heavy metals while emitting harmful pollutants that can damage the environment. Workers in these production facilities may face lifelong health issues, including nervous and reproductive impairments, cancer or genetic damage due to continuous exposure to hazardous substances³⁸. Communities living near these plants may also suffer adverse effects.

To minimise transport-related environmental costs, most polyester used in Pakistan's textile industry is produced domestically in Punjab (Faisalabad, Sheikhpura), Sindh (Karachi), and Balochistan (Hub). The remainder is imported from China, Thailand and Indonesia. Among the

primary raw materials for polyester production, TA is manufactured in Karachi (using petrol-derivatives imported from the Middle East), while ME is imported from Middle Eastern countries. In contrast to cotton, polyester involves a lengthy transportation network.

Polyester is known to shed micro and nano plastic particles throughout its lifecycle. Washing polyester garments releases these particles into water bodies, contaminating aquatic ecosystems and entering the human food chain³⁹. Workers involved in spinning, weaving and textile processing, as well as those handling textile waste, inhale micro-fibrous particles. They can also be ingested through seafood, table salt and drinking water. Though less significant, even direct contact with polyester fabrics can lead to human contamination⁴⁰. These microplastics may cause cancer, nerve damage and metabolic disorders, and the same risks apply to blends of cotton, wool and viscose that contain polyester.

Polyester is non-biodegradable, taking between twenty to two hundred years to decompose. Most polyester textiles ultimately end up in landfills. Nevertheless, it is also the most recycled synthetic material. In addition to recycling polyester textile waste, PET plastic bottles and wrappers can be processed to create polyester fibre. However, only a small percentage of polyester produced or used in Pakistan is recycled, and this primarily involves PET plastic bottles rather than discarded polyester textiles⁴¹.

Companies often market themselves as environmentally sustainable based on their use of recycled polyester, which is a common topic in sustainability discussions and student projects in fashion and design. It is essential to recognise that heating recovered PET material and processing it into polyester fibre remains energy-intensive, produces toxins and releases microplastics. Although this process delays discarded PET's

38. International Labour Organization. (2023). *Hazardous Exposure to Plastics in the World of Work*.

39. De Falco, F., Di Pace, E., Cocca, M., et al. (2019). The contribution of washing processes of synthetic clothes to microplastic pollution. *Scientific Reports*, 9, 6633. <https://doi.org/10.1038/s41598-019-43023-x>

40. Aravin Prince Periyasamy, A., & Ali Tehrani-Bagha. (2022). A review on microplastic emission from textile materials and its reduction techniques. *Polymer Degradation and Stability*, 199, 109901. <https://doi.org/10.1016/j.polymdegradstab.2022.109901>

41. PACRA. (2023, February). *Polyester - PACRA research*. https://pacra.com/sector_research/Polyester%20-%20PACRA%20Research%20-%20Feb'23_1675958464.pdf

arrival in landfills, it continues to harm both human health and the environment, representing a form of greenwashing that should be discouraged.

Alternative Fibres

Pakistan is home to a range of eco-friendly plant-based alternatives for fibre and fabric production, yet their rich potential remains largely untapped. These materials have low water and carbon footprints, require little to no pesticides or fertilisers, and can even improve soil quality without disrupting natural ecosystems. Some are already being used in the production of fashion accessories such as bags and hats, as well as in decorative textiles, geo-textiles and non-textile products. All these materials are biodegradable and naturally possess textural and performance qualities that would typically require environmentally harmful finishing processes when using mainstream fabrics like cotton or polyester. Additionally, they often come in aesthetically pleasing natural colours, eliminating the need for dyeing.

What sets these alternatives apart is their ability to blend with other fibres (including cotton) while still retaining their biodegradability - unlike conventional blends that harm the environment. Despite these benefits, awareness among Pakistani designers remains limited and there seems to be little interest in exploring or experimenting with these sustainable options. The sustainable brands we investigated as part of this research showed little inclination to innovate with these materials, signalling a missed opportunity in the country's fashion industry.

Hemp⁴²: is one of the most sustainable fibres, being carbon negative, water-efficient and requiring little to no pesticides, fertilisers or chemicals. It also demands low capital investment. Pakistan is naturally rich in cannabis, which grows widely across the country, particularly in the mountainous regions of Khyber Pakhtunkhwa, Azad Jammu Kashmir and Gilgit Baltistan. A recent study



identified 78 different varieties of the plant in Azad Jammu Kashmir alone⁴³.

Although the cultivation and use of cannabis was criminalised in the 1980s due to pressure from the United States, local administrations have largely turned a blind eye. As a result, commercial cultivation has continued, especially in Khyber Pakhtunkhwa and Balochistan, with an estimated 28,000 hectares dedicated to the plant⁴⁴.

Cannabis has been cultivated in this region for over 3,000 years. It is even mentioned as a sacred plant in the Atharva Veda, composed around 1200 BCE in Punjab. In Punjab and Sindh, the edible form known as *bhang* has been traditionally used in festivals, fairs and spiritual rituals, and it remains integral to Sufi and Hindu ceremonies. Recreational use, particularly in the form of *charas* (a resin derivative),

42. Hemp refers to cannabis varieties which have low concentrations (less 0.3 percent) of the intoxicating component THC.

43. Jehangir, S., Khan, S.M., Ahmed, Z., Ejaz, U., Qurat Ul Ain, Lho, L.H., Han, H., & Raposo, A. (2024). Distribution of Cannabis sativa L. in the Western Himalayas: A tale of the ecological factors behind its continuous invasiveness. *Global Ecology and Conservation*, 49. <https://doi.org/10.1016/j.gecco.2023.e02779>

44. www.aljazeera.com/news/2024/5/8/pakistan-bets-on-a-cannabis-high-as-its-economy-struggles

is common among the youth. In the mountainous areas of Pakistan, cannabis has long been valued for non-intoxicant purposes - its various parts used for fodder, oil, condiments, pickles and chutneys, as well as medicinal applications such as pain relief, sedation, digestion aids and treatments for urinary and genital diseases.

Despite a long tradition of hemp cultivation for fibre in neighbouring China and Central Asia, its use for fabric in South Asia has been relatively recent. In the past few decades, small businesses in Nepal, Uttarakhand and Himachal Pradesh have started producing hemp-based fabric and apparel, but in Pakistan such initiatives have been limited to hobbyists and researchers due to legal restrictions.

In February 2024, the Pakistan government passed an ordinance legalising the licensed cultivation and sale of cannabis strictly for industrial and medical purposes. The Cannabis Control and Regulatory Authority (CCRA) has been established to manage production and curb recreational use, though it is not yet fully operational, with regulations still in development. This presents a valuable opportunity for Pakistan's fashion and textile industries to explore hemp-based fabric production.

Hemp has a short growing cycle of 70-90 days and grows densely, requiring only half the land needed for cotton to produce the same amount of fibre. It thrives on natural rainfall, is drought-resistant and can grow in polluted soils. Its adaptability to various climates makes it ideal for surviving climate change. Remarkably, hemp absorbs more carbon dioxide than it emits, possessing the highest carbon absorption capacity among crops.

Being naturally resistant to pests and diseases, hemp outcompetes weeds by monopolising soil resources and grows so quickly that it minimises the need for herbicides. Its ability to repel insects also made it a traditional pesticide in some cultures. While some hemp varieties may need fertilisers, they require far less than other crops. Additionally, hemp improves soil quality, making it an excellent

choice for land detoxification, especially in organic cotton farming.

Though indoor cultivation can be energy-intensive due to the need for lighting and air conditioning, this is not such a concern in Pakistan where the climate allows for open-air hemp cultivation. However, the harvesting and processing of hemp requires significant labour, with no mechanisation yet developed that preserves fibre quality. While its long fibres are ideal for hand spinning they are too tough for modern rotor-spinning technology.

Hemp fibre comes in a range of natural colours, including creamy white, brown, grey, black and green, and its high absorbency makes it ideal for natural dyes. It is breathable, anti-bacterial and UV-resistant, which eliminates the need for chemical finishes⁴⁵. Its strength, durability and availability in various textures and weights make it highly desirable for sustainable fashion.

Jute: is one of the most affordable and widely available sustainable fibres, with a low water and carbon footprint. Most of the world's jute is produced and consumed in South Asia, with India and Bangladesh accounting for more than 90% of global production. Pakistan was once a major player in the jute industry and heavily dependent on it until the separation of East Pakistan.

While jute is not as widely cultivated in Pakistan as it is in Bengal and eastern India, it has historically been grown in Punjab and Sindh. Land utilisation data shows that jute production in Pakistan began declining rapidly in the mid-1980s and became negligible by the late 1990s⁴⁶. Over 95% of Pakistan's jute was grown in central and southern Punjab, with smaller quantities in Sindh and Khyber Pakhtunkhwa. In some regions of Punjab, it was a traditional practice to plant jute as hedges along crop fields and between mango trees. These plants grew naturally without needing special care or irrigation, serving as fodder for animals while protecting the main crops. Today, jute cultivation in Pakistan is virtually non-existent.

45. Ranalli, P., & Venturi, G. (2004). Hemp as a raw material for industrial applications.

Euphytica, 140, 1–6. <https://doi.org/10.1007/s10681-004-4749-8>

46. Government of Pakistan's Crops Area and Production (District wise) handbooks published between 1980 - 2008.

Despite this, Pakistan still has a profitable jute industry, although it now relies heavily on raw material imports from Bangladesh. As one of the top three importers of jute, Pakistan consumes a significant portion of Bangladesh's jute exports. Currently, there are only five active jute mills in Pakistan, with all but one located in Punjab. In 2011-12, the Pakistan Jute Mills Association, in collaboration with an agricultural research institute in Faisalabad, attempted to revive jute cultivation in Punjab and parts of Sindh but these efforts were unsuccessful.

In Pakistan, jute is primarily used to manufacture gunny sacks for packaging grains and agricultural products, as well as hessian cloth. The industry relies heavily on the federal and provincial governments, which are its main customers. However, the dominance of jute for gunny sacks is now being challenged by synthetic fibre bags, which the government has also started procuring, posing a threat to both the jute industry and cultivation. Government attention and support are crucial to reviving this neglected sector.

Jute is a relatively low-maintenance crop, requiring minimal land, resources and effort for cultivation. It takes only four to five months to harvest and requires little to no pesticides or fertilisers. Irrigation is also unnecessary as the crop can thrive with adequate rainfall, and it even enhances soil fertility for the next planting cycle. Unlike many other crops, burning jute stalks after harvest does not release toxic gases. However, jute harvesting is labour-intensive and processing the fibre can be energy-intensive as well.

Jute is one of the strongest and most durable natural fibres. Its resistance to UV rays, high moisture-absorbing capacity and good insulation against heat and cold make it suitable for various climates. However, jute is coarser than cotton and requires significant processing to minimise spinning issues and to achieve softness. Despite its durability jute can deteriorate quickly when exposed to moist soil, and overcoming this problem often requires finishing processes that involve chemical treatments.

While jute is compatible with a wide range of dyes, its natural golden sheen is often considered elegant, so it can be used undyed. Jute also blends easily with both natural and synthetic fibres, and in fabrics, it is commonly used as a blend. India leads the production of jute-based fabrics and apparel, with jute-silk and jute-cotton blends as well as pure jute being popular for *saris* and *kurtas*.

Although jute-based fabrics are not well-known in Pakistan, the country has the resources and logistics to begin production immediately. There is great potential for both jute cultivation and fabric production for apparel. Encouraging these efforts could significantly boost the country's sustainable textile industry.

Banana: Pakistan produces 155,000 tonnes of bananas annually⁴⁷, with 80% of production coming from Sindh. The remaining 20% is evenly split between Punjab and Khyber Pakhtunkhwa. Additionally, 92% of the banana-growing area is located in Sindh and all current research and experiments on banana fibre production are also based there, primarily at Sindh Agricultural University in Tando Jam and Shah Abdul Latif University in Khairpur.

Banana fibre can be extracted manually or mechanically. Research has shown that the same technology used to spin jute yarns is also suitable for banana yarns⁴⁸. Currently, experimental centres in Pakistan use machines imported from China but the Sindh government could invest in manufacturing these machines locally and setting up banana fibre extraction units across the region. Punjab



47. www.parc.gov.pk/SliderDetail/NjY3YjAwOGFtYjJiZS00ZDc4LTlhODgtZmM4MzA1YjA5MmU0

and Khyber Pakhtunkhwa could follow suit, thus expanding this potential industry.

Bamboo: is one of the easiest sustainable fibres to extract and is mainly used in construction materials, decorations and furniture. Its use in fabric for apparel is a more recent innovation. The largest producers of bamboo are China, India, Myanmar, Indonesia and Vietnam, where it grows natively. In Pakistan, bamboo is primarily cultivated in central and southern Punjab, the result of successfully introducing and adapting various species from Bangladesh, China, Sri Lanka and Thailand in the 1980s⁴⁸. Although bamboo once grew naturally in parts of Pakistan, it was largely eradicated in the 20th century due to grazing, deforestation, fires and drought.

Bamboo grows rapidly, up to four feet a day, and reaches its full height in 3-6 months. Though it takes 4-5 years to fully mature, fibre extraction can begin when the plant is just three months old. Bamboo typically grows without the need for pesticides or fertilisers, improves soil quality and regenerates on its own without replanting.

Recommended Interventions for Material Production

Pilot projects by small labels to produce garments using alternative materials such as Desi cotton, banana fibre, hemp and jute.

Documentation of Desi cotton varieties in Pakistan, along with indigenous knowledge of their characteristics, cultivation practices and protection methods (including the use of traditional pesticides).

Establishment of Desi cotton seed banks to preserve these native varieties.

Development of educational materials in local languages for cotton farmers to promote sustainable practices.

Collaboration with policymakers to ensure effective implementation of Better Cotton (BC) measures until more large-scale sustainable solutions are developed.

While bamboo cultivation is inexpensive, the process of extracting fibre and converting it into fabric can be costly. Fibre extraction can be done either mechanically or chemically. The chemical method, while patented, involves toxic chemicals and is environmentally harmful. On the other hand, the mechanical method is eco-friendly but labour-intensive. Unlike many other natural fibres, bamboo has good spinnability which makes yarn production relatively easy.

Bamboo fabric is durable and possesses qualities that appeal to both designers and consumers. It has a silk-like texture, is softer than cotton, and is wrinkle-free and scratch-resistant. Its natural sheen, bright lustre and excellent colourfastness make it visually attractive. Bamboo fabric also boasts moisture-absorbing, anti-microbial and anti-UV properties.

China is the largest producer of bamboo fabric and apparel, while in South Asia only a few small businesses in India have incorporated bamboo into their designs. Currently, no known designers in Pakistan have experimented with bamboo fabric despite the profitable and growing bamboo agricultural sector offering untapped potential. This opportunity deserves to be explored and utilised.

Other Alternative Fibres

While several globally successful alternative fibres with potential for growth in Pakistan have been discussed, there are many other plants native to the region whose fibres can be sustainably converted into fabric for use in apparel, presenting a valuable opportunity for textile engineers to explore.

One such plant is the crown flower, known locally as *akk*, *aak* or *madaar*. It grows wildly in a variety of climatic conditions, including extreme drought. This self-sustaining plant is commonly found throughout Punjab and Sindh, often cropping up in seemingly random rural areas. Many parts of the plant are toxic and its milky sap was historically used for infanticide. However, during fieldwork in the Thar region of Sindh we discovered its potential as a source of fabric. Local communities showed us bags and rugs woven

48. www.ncdc.in/documents/downloads/06180405202.Sample-DPR_-Banana-Fibre-Extraction-and-Weaving.pdf

49. Siddiqui, K. M. (1994). Cultivation of bamboos in Pakistan. *Pakistan Journal of Forestry*.



from fibres extracted from its stems, along with other items like baskets, mats, roofs and fences. The method used for weaving fabric could be adapted to create apparel, while the technique for producing items like baskets and mats could be employed to make fashion accessories such as hats and bags. Other plant fibres with potential in Pakistan include orange peel and lotus stem.

Yarn and Fabric Production

Fibre is spun into yarn through drawing, twisting and joining, traditionally using manual spinning wheels in South Asia. However, various mechanised spinning technologies for mass production emerged in the 19th century, with Ring, Rotor and Air-jet spinning being the most commonly used today. These machines are extremely energy-intensive and generate an inordinate amount of waste, noise and dust, making this activity the second-highest consumer of energy in the textile value chain⁵⁰.

The transformation of yarn into fabric occurs through weaving or knitting, primarily weaving in Pakistan. Traditionally, weaving utilised various types of indigenously developed hand-operated horizontal frame looms, but mechanised looms became common from the 1960s, marking the rise of mass cotton production.

The textile sector in Pakistan now operates entirely on power looms. Shuttle-less looms are the most prevalent; however, high-end fashion labels mostly use fabric produced from air jet looms. These machines generate intense noise, dust and waste and use a lot of energy. This is the third most energy-intensive stage of the value chain and the highest contributor to noise pollution. Currently, 6,396 looms are operating across Pakistan⁵¹.

Environmental and Health Impact of Yarn and Fabric Production

The spinning and weaving sectors are concentrated in central Punjab and southern Sindh, and these processes usually take place in the same textile mill or in adjacent units, leading to common challenges of pollution, excessive energy use and difficult working conditions. Mill workers face health risks including respiratory issues, weakened eyesight, hearing loss and musculoskeletal injuries. Byssinosis is a widely prevalent lung disease among cotton mill workers of Pakistan⁵². Moreover, heavy moving machinery exposes workers to the risk of accidents. Given these circumstances, it is common for workers to lose their productivity and be forced to take unpaid leave (as they are usually daily wage labourers) for medical treatments which can incur significant expense. People living nearby textile mills are also victims of respiratory issues.



50. Imran, S., Mujtaba, M.A., Zafar, M.M., Hussain, A., Maahmood, A., Umm e Farwa, Korakianitis, T., Kalam, M.A., Fayaz, H., & Saleel, C.A. (2023). Assessing the potential of GHG emissions for the textile sector: A baseline study. *Heliyon*, 9(11). <https://doi.org/10.1016/j.heliyon.2023.e22404>

51. Pakistan Economic Survey 2023-24. Economic Adviser's Wing, Finance Division Government of Pakistan, Islamabad.

52. Islam, T. (2022). Health concerns of textile workers and associated community. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 59. <https://doi.org/10.1177/00469580221088626>

Recommended Interventions for Yarn and Fabric Production

1. **Support and training** for *khaddi* artisans in Punjab and Sindh, following the Amb model.
2. **Adoption of hand-spun yarn** by sustainable brands.
3. **Student internships** with *khaddi* and *charkha* artisans.
4. **Documentation and cataloguing** of regional variation in *khaddi* and *charkha* craft and technology.
5. **Instructor training** for *khaddi* and *charkha* artisans and manufacturers.
6. **Development of eco-friendly motorised *khaddis* and *charkhas*.**

The textile sector is largely unregulated, with minimal safety measures in place and little awareness among workers about health hazards. It is estimated that around 90% of the local textile sector is unorganised⁵³. Most mill owners in Pakistan do not implement safety and prevention measures such as providing safety masks and proper ventilation, or installing exhaust fans, humidifiers and suction machines to pull fibre particles from the air. Local health and safety departments don't seem to be very enthusiastic about implementing regulations, hearing workers complaints or taking mill owners to task. It is unheard of for workers to be paid compensation for the array of health issues they develop because of their occupation and working conditions.

Indigenous Alternatives: Handloom Weaving and Hand-Spinning

Despite the devastating impact of power looms on traditional handlooms (known locally as *khaddi* or *aadata*) in the early 20th century, handloom

weaving persisted as an important aspect of Pakistan's textile landscape. Initially, power looms focused on producing fine fabrics, which were never a regional specialty. But as they began manufacturing coarser and medium-grade fabrics, handlooms faced increasing competition. Even so, they co-existed with power looms across Pakistan well into the early 2000s.

At Pakistan's independence in 1947, an estimated 250,000 functional handlooms were in operation in West Pakistan, supplying a significant portion of local fabric needs. However, rapid industrialisation in subsequent decades shifted the balance. By the 1970s, as large-scale textile mills gave way to smaller power loom setups - often replacing former handloom units - this traditional craft entered a steep decline. A 2000 study by the Small and Medium Industries Development Authority revealed that only 25,000 handlooms remained, a staggering 90% reduction⁵⁴. Most were concentrated in Punjab and Sindh. Although there has been no systematic data collection since, our research indicates that their numbers are likely halved by now, with many sitting idle or in disrepair.

What is also undocumented is the great diversity in handloom technologies that still exist in Pakistan, ranging from basic two bar looms to treadle looms with jacquard attachments, each in horizontal and vertical versions. The most used types today are pit looms and amritsari looms – both versions of treadle looms, frame looms and flat looms.

The shift to power looms was driven mainly by efficiency. Handloom weaving is time-consuming and labour-intensive. A handloom weaver might produce enough fabric for two or three garments in a day while power looms churn out material for twenty or more at a fraction of the cost. Yet this efficiency has come at a cultural cost. Many iconic handloom fabrics such as *khaddar*, *khes* and *pattu* are now produced on power looms, and others have vanished entirely. Traditional unstitched garments like *lungis*, *lachas* and *dhotis* have fallen out of

53. Pakistan Credit Rating Agency (PACRA). (n.d.). *Weaving sector study*. www.pacra.com/sector_research/Weaving_Sector%20Study_Final_Updated_1600274271.pdf

54. Small and Medium Industries Development Authority (SMEDA), Government of Pakistan. (2000). *Study to evaluate the export potential of the handloom sector of Pakistan*.

fashion, though handwoven shawls and wraps retain seasonal appeal. Handwoven fabric is no longer a choice of material for stitched garments.

Economics has also played a role in this decline. Weaving on handlooms is gruelling, with artisans earning as little as PKR 350 (£1) a day for painstaking work. By contrast, power looms offer faster production and higher returns. Even in areas historically resistant to modernisation, the lure of power looms is proving hard to resist. Some regions cling to handlooms only due to power shortages that render mechanical alternatives unusable.

Handloom weaving was traditionally the domain of a specialised caste, known as *julaha* (Punjab), *julaho* (Sindh), *jola* (Balochistan) and *jolagaan* (Khyber Pakhtunkhwa). Other occupational castes like tanners and washermen too practised weaving. Unfortunately, the social stigma associated with these professions has discouraged younger generations from continuing their ancestral craft. Meanwhile, another vital piece of heritage - the hand-spinning wheel, or *charkha* - is nearing extinction. In a few pockets of Sindh *charkhas* still spin yarn for custom orders, but elsewhere they gather dust. While handlooms rely on industrially spun yarn produced in the textile mills of Faisalabad, Lahore or China, the once-ubiquitous *charkha*, operated mostly by women and celebrated in pre-modern literature, is now a relic.

However, there remains a niche market for hand-spun yarn and handwoven fabric among connoisseurs who value its unmatched quality. Artisans catering directly to these buyers, particularly through e-commerce, have managed to preserve their craft. Yet most weavers are trapped in exploitative supply chains dominated by middlemen. A targeted branding and marketing effort highlighting the sustainability of handwoven products could help revive the industry.

Impressions from the Field

Amb Sharif, Sindh

Sindh is the most active centre for handloom production in the country today. The craft has been sustained through a combination of government and NGO support, coupled with a deep-rooted cultural identity that continues to celebrate and preserve this art form.

Amb Sharif, a modest village in Sindh's Khairpur district, exemplifies the enduring tradition of handloom weaving in the region. Despite its small size, housing just over fifty households, the village houses four communal handloom centres and several personal looms. These looms primarily produce textiles for personal use or barter, although some find their way to craft exhibitions and festivals where items like *khes* are in high demand.

This low-scale, non-commercialised production embodies sustainability, yet its full potential remains untapped. Encouragingly, while older women dominate the craft, recent government incentives such as artist stipends have sparked interest among younger generations to learn and engage with it. Multiple government bodies - such as Culture, Tourism and Antiquities Department, Sindh Rural Support Organisation (SRSO), Sindh Small Industries Corporation (SSIC) and Sartiyoan - as well as non-governmental organisations actively supported by the government have played a major role in sustaining handlooms in the region.

However, challenges do persist. Middlemen usually own the *khaddis* and end up taking 50-75% of the profit margin. Underpaid and frequently underage workers bear the brunt of this exploitation.

Kamalia and Malka Hans, Punjab

Punjab was once the heart of Pakistan's handloom industry, with the largest concentration of handlooms and producing the majority of handloom products in the country. As recently as 2000, the province produced over 60% of the country's handloom fabric. Today, only remnants of this once-thriving industry survive, with handlooms largely confined to part-time, on-demand operation. This decline can be attributed to neglect by government bodies and the tendency among people to quickly adapt to newer fashion trends.

Kamalia, a small town in Toba Tek Singh district and a former hub for *khaddar* weaving, epitomises this downturn. Once home to over two thousand handlooms producing the renowned brown *khaddar* from locally grown Desi cotton, fewer than thirty traditional looms remain⁵⁵. Most have transitioned to power looms and machine-spun threads sourced from Faisalabad.

In Malka Hans, a semi-rural town with about three hundred thousand residents, handlooms are nearly extinct, with just two functional units remaining. Even these were located by our research team with great difficulty. Unlike Sindh, where weaving endures in rural households, Punjab's handloom sector lacks recognition as either a craft or a cottage industry. Artisans face harassment, including threats of commercial taxation, misclassified as industrial production. This hostile environment has driven many to abandon the craft, relegating it to occasional personal use or clandestine work for loyal clients. Artisans often face stigma, deterring younger generations from pursuing the tradition and leaving Punjab's handloom future in jeopardy.

Islampur, Khyber Pakhtunkhwa

In Khyber Pakhtunkhwa, Charsadda and Islampur used to be major centres of handloom production. Charsadda has been a centre for production of *khamta*, a historically and culturally significant cotton shawl worn by Pashtuns. While the town is still associated with its production, except for three, all have switched to power looms. Its story is similar to that of Punjab.

In contrast, Islampur, a village in Swat district, offers an inspiring example of resilience. Known for producing high-quality *khaddar* and woollen winter textiles, Islampur has largely resisted the shift to mechanisation. Even though power looms are beginning to make inroads here too⁵⁶, most artisans continue to weave using hand-spun wool sourced from local shepherds. Despite setbacks during the Taliban insurgency the community revived its industry⁵⁷, and today 70% of the region's residents are engaged in weaving on handlooms⁵⁸.

The textiles of Islampur are celebrated locally and internationally, serving as cultural markers of identity. While some artisans have successfully marketed their products to global buyers, many still struggle with exploitation by intermediaries. Islampur stands as a testament to the potential of traditional crafts to thrive when supported by community resilience and market access.

55. www.tribune.com.pk/story/2138777/millennia-old-brown-cotton-rarity-verge-extinction

56. www.tribune.com.pk/story/1328436/happiness-index-artisans-islampur-weave-peace-comfort-lives

57. www.tribune.com.pk/story/566384/islampur-keeping-cultural-heritage-alive

58. www.thenationalnews.com/weekend/2024/02/02/pakistan-town-fighting-to-keep-hand-weaving-industry-alive

Textile Processing

Before fabric reaches consumers, it undergoes a series of complex processes that enhance its appeal and usability. Historically, fabric processing was focused on colouration, but today there are numerous other processes designed to add value, improve quality and tailor fabric characteristics. Some processes even occur at the yarn stage. These procedures are collectively called 'textile wet processing' and generally fall into three stages: pre-treatment, colouration and finishing.

Pre-treatment: prepares raw fabric to maximise its response to further treatments. Quality in later stages depends heavily on efficient pre-treatment, which removes impurities, increases absorbency and ensures even dye and chemical distribution. Key pre-treatment processes include the following, which result in a clean, white fabric with optimal absorbency and dye receptivity:

- **Scouring:** Removes oils and impurities left from weaving and spinning.
- **Bleaching:** Whitens the fabric by removing natural colours, readying it for dyeing.
- **Desizing:** Removes substances used to aid weaving, enhancing absorbency and reducing chemical use in later stages.
- **Mercerisation:** Treats the fabric with caustic soda to improve lustre, strength and dye absorption.
- **Singeing:** Burns off loose fibres, leaving the fabric smooth and free of protruding threads.

Colouration: achieved through dyeing or printing, brings fabric to life with uniform or patterned colours. Dyeing involves immersing the fabric in dye solutions at high temperatures – a process which consumes unsustainable amounts water and energy. Synthetic dyes, the standard in Pakistan's textile industry, are made from non-renewable resources like coal or petroleum and their by-products, and a host of other toxic chemicals, creating pollution challenges when wastewater from dyeing is untreated.

Much of the global discussion on unsustainability of colouration methods is focused on dyeing, overlooking the equally polluting method of printing which is also water and energy-intensive. There are three major types of mechanised printing – roller, screen and inkjet. Screen printing is the most preferred and prevalent method of printing in the fashion industry but it is also the most polluting of the three. There's a large market for printed fabrics in Pakistan. Lawns - densely printed fabrics with complex designs - lie at the heart of Pakistan's fashion industry, which is amongst the most prolific producers of printed fabric.



Finishing: encompasses all remaining treatments beyond colouration to improve the fabric's appeal and function. These treatments may focus on appearance, feel, performance or durability. Common finishing methods include:

- **Appearance Enhancements:** Calendering, pressing, crepping and optical brightening.
- **Texture Modifications:** Softening, stiffening and weighting.
- **Performance Features:** Waterproofing, oil repellence, stain resistance, fireproofing and antistatic finishing.
- **Durability:** Antimicrobial treatments and mothproofing.
- **Dimensional Stability:** Shrinkage control, crease resistance and heat setting.

Environmental and Health Impact of Textile Processing

Unfortunately, these processes come with heavy environmental costs. Textile wet processing uses enormous quantities of chemicals and energy, often leaving fabrics saturated with residues that need extensive rinsing. This stage alone can require 200 tonnes of water per tonne of fabric⁵⁹ - the highest water usage in the textile value chain after cotton cultivation. Water contamination and toxic wastewater release are severe consequences, especially in Pakistan, where untreated discharge into water bodies remains common. Many communities living nearby and around textile units can't afford to buy water from elsewhere and are forced to use this water exposing them to various risks and diseases. Wastewater is also frequently used to directly irrigate vegetables and crops, whereby these chemicals enter food and groundwater. The latter is also contaminated through percolation from effluent sludge that is dumped in landfills and leaching from disposed clothing which retains these chemicals.

Communities living in these areas also face noise pollution and unceasing bad odour.

As one of the largest generators of liquid effluents which are tough to treat, textile processing is among the most polluting industries on the planet. Despite environmental laws, most industrial units in Pakistan discharge effluents into water bodies without any form of treatment. Currently only 1% of the effluents produced in the country are treated⁶⁰. The chemicals in textile wastewater can be detrimental to aquatic life, reducing oxygen, altering pH and disrupting ecosystems. Moreover, textile wastewater's heavy metals and toxins accumulate in organisms, making their way into the food chain at dangerous concentrations, and eventually reaching humans.



The constant foul smell which lingers in the air is the first thing I noticed when I moved here after getting married. I found it very difficult to adjust in the beginning but got used to the smell with time, although other issues remain. Tap water often comes in shades of brown or black and has a bad taste and smell. We're forced to frequently buy water which adds significant strain to our limited resources. Our neighbours who can't afford to do the same get sick frequently. My siblings stopped visiting me after the first few times due to the conditions here. If we had the means we would move out of this place at the first opportunity.

- Shamim

Resident of an area adjacent to a major textile mill in Faisalabad



59. Choudhury, A.K. Roy. (2017). Sustainable chemical technologies for textile production. In S. Muthu & Subramanian (Eds.), *Sustainable Fibres and Textiles* (pp. 267–322). *The Textile Institute Book Series*. Woodhead Publishing. <https://doi.org/10.1016/B978-0-08-102041-8.00010-X>

60. Parveen, F., & Khan, S. J. (2023). Wastewater treatment in Pakistan: Issues, challenges, and solutions. In M. Ahmad (Ed.), *Water policy in Pakistan (Global Issues in Water Policy, Vol. 30)*. Springer, Cham. https://doi.org/10.1007/978-3-031-36131-9_12

The health risks of chemical exposure are grave for textile workers who often lack protective gear. Skin, respiratory and immune disorders as well as cancer are common among those handling toxic substances in textile plants. Consumers are also affected, as chemicals in fabric can cause sensitivity to chemicals and a range of skin, respiratory and ENT issues when absorbed through clothing^{61 62}.

Sustainable Alternatives

Most of these chemical treatments, apart from colour application, were developed in the last century, and while not essential, they are widespread in large-scale production. Data from our consumer surveys revealed that many Pakistani consumers prefer fabric with minimal chemical processing as they find treated fabrics uncomfortable in the local climate. Since mass-produced fabrics typically undergo extensive processing, consumers who make their own clothes feel compelled to wash new fabric thoroughly to remove residual chemicals.

In the global movement toward sustainability, eco-friendly chemicals that are water-free, reusable, bio-based or biodegradable offer promising alternatives. These innovations are designed to reduce water and energy consumption and lower waste, though adoption in Pakistan's textile sector remains limited.

Natural Dyes: South Asia has a long and vibrant history with natural dyes, which were the only colouring agents known to humankind until synthetic dyes emerged in the late 19th century. Regions like Sindh were renowned for producing the coveted indigo dye, which was once in demand the world over. The indigo industry in Sindh suffered a decline due to colonial economic shifts toward other cash crops and changes in agricultural practices. With modern climate conditions posing challenges, indigo and similar crops have become even more difficult to revive.

Natural dyes were traditionally extracted from plants, and sometime minerals and animals, using simple techniques such as boiling and filtering. Each region in South Asia had unique recipes and sources for creating a rich palette of colours, but much of this knowledge has now faded. In Pakistan today, locating natural dyes is a challenge, although dyes from pomegranate, saffron and walnut can still be found with some effort. Indigo and red madder were also available until recently, with artisans expertly blending these few colours to achieve a variety of hues.

While natural dyes are no longer widely used, some artisans continue to use them in traditional textiles such as the *ajrak*, which is still crafted in Sindh and South Punjab. Koel is one of the few prominent fashion brands exclusively dedicated to natural dyes. Occasionally, large brands claim to use natural dyes, but our research revealed that these products typically contain only a small fraction of natural colourant blended with synthetic dyes. Many artisans also mix synthetic and natural dyes, especially when selling to urban customers who may not appreciate the unique characteristics of natural dyes. While synthetic dyes offer more durability, natural dyes can fade or bleed over time, leading to a common practice of blending dyes to achieve affordability and resilience.

Despite attempts to revive the indigo industry, restoring such crops has proven difficult. Noorjehan Bilgrami, founder of Koel, recalls seeing indigo traditionally grown as recently as 1987, but efforts to revive cultivation faced economic obstacles. A 2011 project by WWF and Goth Sudhar Sangat in Sindh aimed to renew indigo farming but was similarly unsustainable. Research on natural dyes in Pakistan remains scattered, underscoring the need for more structured documentation to preserve and expand this traditional knowledge.

61. Iadaresta, F., Manniello, M.D., Östman, C., Crescenzi, C., Holmbäck, J., & Russo, P. (2018). Chemicals from textiles to skin: An in vitro permeation study of benzothiazole. *Environmental Science and Pollution Research International*, 25(25), 24629–24638. <https://doi.org/10.1007/s11356-018-2448-6>

62. McNeely, E., Staffa, S.J., Mordukhovich, I., & Coull, B. (2018). Symptoms related to new flight attendant uniforms. *BMC Public Health*, 17(1), 972. <https://doi.org/10.1186/s12889-017-4982-4>



As natural dyes are unlikely to fully replace synthetics, small sustainable brands can lead by example by integrating them more fully into their



Customers from cities always complain that the colours of my products don't remain the same or that they fade away quickly. That's when I started buying synthetic dyes and mixing them with home-made natural ones. Initially I reserved this practice only for urban customers as people in villages usually don't have an issue. But now I've made this a regular practice as it saves cost and effort. Some of my friends have gone a step further and stopped using natural dyes altogether.

- Allah Baksh

Traditional textile artisan from Hala



lines. This shift, however, requires sustained funding in the initial years to be viable. Standardising natural dyes and educating consumers on their unique qualities could help revitalise this traditional, sustainable practice in modern fashion.

Block-Printing: A sustainable and culturally significant printing technique is block-printing, the traditional method of stamping designs onto fabrics using hand-carved wooden blocks. Block printing is labour-intensive and uses minimal water, with natural dyes historically used in this process. This technique produces intricate and evocative designs like those in *ajrak* textiles. Although simpler block-printing styles were once widespread across the country, they have almost disappeared.

While the richness of designs produced by block-prints has ensured their popularity, the methods used to achieve these patterns have become unsustainable. Larger fashion labels tend to use screen printing to replicate block-printed designs



for fast fashion. However, block-printing is still embraced by sustainable fashion brands in Pakistan, who often use it for small-batch, hand-crafted textiles, though synthetic dyes are now more common in this art.

Digital Printing: Inkjet digital printing presents a relatively sustainable option for mass-scale textile production, consuming approximately half the water, energy and chemicals required for traditional rotary screen printing. However, many designers we consulted expressed reservations about its aesthetic appeal, describing digital prints as lacking the vibrancy and brilliance of screen printing. Achieving precise colour matches is challenging, and replicating fluorescent or metallic shades remains nearly impossible. Additional drawbacks include lower durability and limited compatibility with certain synthetic fabrics.

Although global technological advancements have addressed some of these limitations, Pakistan's textile printers largely lag behind, operating with outdated equipment. Our survey of printers across the country revealed that only about 10% of Pakistan's printed textiles are produced using

digital printing. This method is predominantly used to create inexpensive replicas of popular designs. Reputed designers typically reserve digital printing for limited-edition, intricate designs where the cost of creating custom screen-printing stencils would be prohibitive.

Design

The design phase of the fashion supply and value chain is crucial for sustainability. While the activities in this stage may not directly create significant environmental impact - aside from generating some fabric waste - the plans and decisions made here play a vital role in shaping various aspects of sustainable fashion and affect the entire supply chain.

Recommended Interventions for Textile Processing

1. **Production of natural dyes** in collaboration with farmers.
2. **Recording knowledge** about extraction and application of natural dyes.
3. **Marketing training** for natural dye artisans.
4. **Using natural dyes** in digital printing.
5. **Block printing** workshops.

Ideally, these predominantly creative decisions should rest with the designers. However, in practice, only couture designers as well as those from micro- and small-sized companies enjoy such independence. In contrast, large- and medium-sized mass-producing companies typically have dedicated departments with multiple designers reporting to a head designer. In these settings, impactful decisions are largely influenced by company policies and production targets.

The design process begins with essential research, followed by the conceptualisation of a dress or collection. Designers create sketches and identify the necessary materials, trimmings, textile



I don't remember exactly when we switched to buying printed fabrics but until about fifteen years ago a pheriwala (hawker) used to visit our locality once every month, carrying with him a variety of printing blocks. Some of us would get a kameez, dupatta or unstitched fabrics printed. Others would get bedsheets and quilt covers printed. As the pheriwala did his job, women in the neighbourhood would gather to watch him create magical designs by combining plain looking blocks.

- Jamila

Resident of Divalpur recollecting past practices



processes and additional services. For sustainability, it is imperative to assess the environmental and social impacts of these selections, as well as ethical, cultural and economic implications. Our interviews with designers across the brand spectrum revealed that this practice is largely non-existent in Pakistan. The few designers who consider such approaches often find their strategies dismissed by mass-production brands as either excessive or irrelevant. These brands remain predominantly driven by market trends and consumer preferences, with little regard for alternative practices.

Designing out Fabric Waste

Although the focus on sustainability in garment ingredients is limited in Pakistan, sustainable practices do exist in the design output process. While systematic research on the impact of garment design strategies is scarce, some sustainable brands employ methods that minimise waste during production and enhance garment longevity.

Traditionally, Pakistani garments were designed to minimise fabric waste through careful planning of cuts. For instance, *kurtas* are often designed with sleeves requiring geometric cuts (as opposed to non-geometric cuts which are popular today and generate much waste), while garments like the *ghagra* require no cutting at all. Additionally, unstitched garments such as *saris*, *dhotis*, *lungis* and *dupattas* have been integral to indigenous fashion. These pieces not only eliminate fabric waste but also hold cultural and ritual significance, with unstitched clothing often symbolising purity in various South Asian religious traditions. Notably, even the clothing relics from the Indus Valley civilisation were unstitched.

Contemporary design sensibilities of mainstream brands, however, tend to involve patterns that leave large fabric leftovers, generating significant fabric waste especially during mass production. One exception is Generation, which incorporates fabric leftovers into its design process, ensuring that waste is repurposed into additional products or embellishments. Small sustainable brands in Pakistan also favour the use of geometric patterns that reduce fabric waste and prioritise minimal cutting.

Designing for Longevity

Prioritising timeless designs or aesthetics ensures that garments remain in style and don't become prematurely discardable. Plain garments and those with minimalistic designs have consistently remained fashionable. Avoiding excessive prints or keeping designs simple also promotes



Talk about sustainability is very recent in Pakistan's fashion industry. I did not encounter any training or discussion on sustainability either during my time as a fashion design student at university or when I joined the industry six years back. If you are looking to document sustainable practices in Pakistan's fashion industry, you will hardly find any. While you may find the word 'sustainability' being thrown around by many well-known brands today, in reality none of them are truly sustainable.

Sajal Nasir

Fashion Designer



environmental sustainability. An even more sustainable option than minimal printing is to use embroidery or block prints. Embroidered designs often enhance the garment's durability by holding the fabric together.

Among the sustainable lines of larger labels, Chapter 2 consistently adheres to a minimal or no-print approach, focusing mainly on plain garments. When designs are used, they are limited to simple geometric motifs. Similarly, Jehan prefers plain garments, while The Brown Store, a small sustainable brand, follows a strict no-print policy. Umar and Imrana, Znali and AOMI also focus predominantly on plain designs. Koel, while incorporating printed designs, confines itself to block-prints, and Behbud exclusively

uses embroidery for its designs. Aangan, which previously featured nostalgic floral and chintz prints, is transitioning toward minimal block-prints and embroidery.

Another approach to extending a garment's lifespan is designing for multifunctionality, where a single garment can serve multiple purposes, fit different body shapes or create various looks. Our research indicated that no Pakistani brand, including sustainable ones, has explored multi-functional garments. However, unstitched garments in South Asia, such as the *saafah*, *dupatta* and *lungi/dhoti/laacha*, have traditionally been multi-functional. The *saafah* in Punjab, for instance, can be used as a turban, bandana, mask, towel, loincloth, or even as an accessory draped over the shoulder. The versatility of the *dupatta* has been documented and celebrated by Generation in their book, '*100 Ways of Using a Dupatta*'. This rich heritage of multifunctional garments offers great potential for designers to innovate in sustainable fashion.

Multi-sized garments, which adjust to accommodate various body sizes, are another sustainable design solution. These garments not only conserve fabric by reducing wasted material but also eliminate the need for new clothes as body sizes change over time. South Asia has a tradition of using strings and

knots in upper garments to accommodate multiple sizes and forms. Despite this heritage, modern designers have yet to draw on these practices or innovate in this direction.

Multi-part garments, which are detachable and can be washed separately, are another potential solution for conserving resources like water and reducing detergent use. However, this concept has not gained traction in Pakistan. Jehaan is the only brand that announced an experiment with this idea a few years ago, but no product updates have been released since. Many of these sustainable design solutions are often practiced by the made-to-order sector. Major brands also sell unstitched fabric, which supports sustainable practices. Made-to-order garments represent a significant market in Pakistan and contribute to sustainability efforts.

“

I don't believe in 'fashion', I believe in timelessness. The concepts and current buzz words of 'sustainability', 'eco-friendliness' and 'recycling' are not new, they have always been an intrinsic part of our existence, our traditions and our culture. We need to believe in what we have and to learn from it to realise its true value.

Noorjehan Bilgrami

”



Garment Production

This is the final stage of the fashion value chain, where fabric is cut, assembled into garments and trimmed with various additions according to the design mandate. However, there are several critical steps between sketching or conceptualising a garment and cutting the fabric, each with potential environmental impact.

The majority of garment production units in Pakistan are small-scale CMT⁶³ enterprises, which employ a significant portion of the garment workforce. In addition to supplying garments to local fashion brands - many of which have their own manufacturing units - Pakistan's apparel industry is a major supplier to international brands such as Marks & Spencer, Tesco, Levi's, H&M, Zara, VF, C&A, Esprit, Inditex, Gap, New Look, Target and Boohoo, serving markets in the United Kingdom, Europe and North America. Pakistan's apparel production hubs are concentrated in and around three major cities: Lahore, Karachi and Faisalabad.

Environmental Impact of Garment Production

Major environmental impacts of garment production are generation of fabric waste and deadstock. The quantum of fabric waste depends on the interplay of multiple factors including characteristics of the garment (type and design), characteristics of the fabric (width, surface design), pattern design, marker making, efficiency of communication between design and production and efficiency of garment assembly. Visits to both independent and brand-owned garment production units revealed that fabric waste is overlooked as long as it remains

below a 50% threshold. This was also confirmed by designers who relay instructions to these units.

There are two major ways in which fabric waste is handled. One common but unsustainable practice is selling fabric scraps to buyers who incinerate them for fuel, a process that, while recovering energy, has a higher carbon footprint compared to reuse or recycling. However, when fabric scraps are of a sufficient size, they are sold to 'cut piece' retailer who resell them to customers. These scraps are often used to embellish garments or skilfully patched together to create new clothing items. Historically, most retail outlets in Pakistan had sections dedicated to selling reusable fabric waste, but with the rise of visual merchandising trends these sections have largely disappeared. Bareeze is the only major brand that continues to prominently sell cut pieces.

The persistence of Pakistan's *darzi* system and the culture of home-sewing among the older generation further supports sustainable practices in fabric waste management. Tailors and home sewers not only minimise waste through careful cutting but also remain the primary customers of cut piece fabric.



63. Garment manufacturers can be categorised based on the level of value addition they provide. Cut Make Trim (CMT) manufacturers assemble garments from pre-supplied fabric and trims. Other categories include full package suppliers (FPS) who additionally source material based on the designs provided by the buyer, original design manufactures (ODM) who also provide design services and original brand manufacturers (OBM) who manufacture, produce and sell garments under their own brand name handling the entire process.

Deadstock, or unsold new garments, is another issue that plagues the fashion industry globally, often leading to incineration. However, this problem is less prevalent in Pakistan as local brands tend not to overproduce to the extent that large amounts of stock remain unsold. Unsold collections are typically offered at discounted rates or sold to smaller retailers. Defective or returned products are often sold at factory outlets at reduced prices, making brand-name clothing accessible to urban youth who are brand conscious but price sensitive. Factory outlets that sell rejected garments from international brands are also popular, contributing to the reduction of garment waste. Incineration of deadstock is practically unheard of in Pakistan.

Labels

Labels are a crucial component of ready-made garments, serving multiple purposes beyond branding. They provide essential information regarding size, material composition, manufacturer details, country of origin, care instructions, and enhance the garment's visual appeal. Labels are typically attached to the neck seam, side seam, inner pocket, left or right shoulder, and the front or back of lower garments. Unfortunately, they are often made from non-eco-friendly synthetic materials such as PVC, damask, semi-damask, satin, taffeta, polyester and rayon. Even the most sustainable brands tend to overlook labelling practices. However, Aangan, one of Pakistan's fashion brands, has innovated by eliminating traditional labels, opting instead to embroider their logo directly on to the garment.

Hangtags share the same functions as labels, including conveying size, material and care instructions, while also providing information on price and promotional messages. While not all brands utilise hangtags, the trend has shifted from using PVC plastic to more sustainable options like kraft paper, canvas or cotton, paired with strings made from natural fibres. However, a common issue is the excessive use of multiple hangtags for a single garment, despite the fact that all necessary information could be consolidated onto a single tag.

Packaging

Packaging is a vital step in the value chain, protecting products from damage and facilitating their transport and storage. It also plays a role in hygiene, safety, legal compliance and branding. In Pakistan, packaging materials include plastic, paper, cardboard and fabric.

There are three categories of packaging: primary, secondary and tertiary. Each category serves to distribute raw materials, components, semi-manufactured or finished goods, either from manufacturer to manufacturer (B2B) or to final customers at retail (B2C).

Primary Packaging: is the first level of protection that directly contacts the product. Plastic has long been the default choice in both B2B and B2C sectors. However, in recent years many brand-owned retail outlets and multi-brand stores have moved away from plastic garment covers, opting instead to place items directly in shopping bags. Despite this shift, garments are often still wrapped in thin, single-use plastic for online retail and smaller independent stores. Formal and bridal wear typically continues to be packaged in thicker plastic garment covers, regardless of the retail mode.

Secondary Packaging: secures one or more primary packages to facilitate handling and transport. Cardboard boxes are the most commonly used materials for secondary packaging in B2B services, while plastic has been prevalent in B2C. However, recent government regulations aimed at reducing single-use plastics have prompted many retailers to switch to paper bags, encouraging customers to bring their own reusable bags. Prior to the rise of consumer culture in the 2000s, it was common for people to use bags made from fabric waste or worn-out clothing. Generation has recently promoted cloth bags made from fabric waste produced in its production units, although this initiative faced sustainability challenges. In contrast, Sapphire consistently provides cloth bags for purchases. Smaller independent retailers continue to issue plastic bags, while PR packages sent to influencers often feature excessive and decorative packaging made from unsustainable materials.

Tertiary Packaging: serves as the final layer - primarily for storage, transport and distribution of bulk materials - with multiple secondary packages. In the B2B sector, tertiary packaging usually employs plastic, although jute was once preferred and its revival is encouraged. In B2C, plastic is commonly used for online orders by delivery companies.

Overall, plastic is the most widely used and cost-effective packaging material, known for its efficiency, durability, lightweight nature, versatility and resistance to water. However, it poses significant environmental challenges. Before plastic became commonplace, traditional packaging methods relied on biodegradable materials such as paper, fabric, wood, glass and metal.

In Pakistan, approximately 55 million plastic bags are used annually, making packaging the fashion industry's second-largest contributor to plastic pollution, following synthetic clothing. The country generates around 4 million tonnes of plastic waste each year⁶⁴, ranking among the top ten plastic pollution hotspots globally. Unfortunately, Pakistan's waste management system is inadequate, with only 3% of plastic waste being recycled⁶⁵. The remainder clogs landfills and water bodies or is incinerated, leading to air pollution and detrimental effects on the environment, biodiversity and human health.

While plastic use is unavoidable in many areas along the supply chain, efforts should be made to eliminate it wherever possible. Current practices show a lack of motivation for reusing primary plastic packaging, which is often discarded rather than stored. Implementing regulatory measures could encourage sustainable practices. Switching to biodegradable and compostable plastics may not be effective without an improved waste management infrastructure, as both require controlled conditions for breakdown.

Despite some progress in reducing plastic use, such as the transition to paper bags by many Pakistani fashion brands and the introduction of cloth

bags by Generation and Sapphire for secondary packaging, single-use plastics are still prevalent in B2B operations. Lama claims to use biodegradable plastic, while Aangan is the only known fashion brand in Pakistan to have eliminated plastic entirely from its operations.

Retail and Marketing

Retail Practices

Most fashion retail outlets in Pakistan, including those of sustainable brands, fail to adopt eco-friendly practices. These stores are not resource-efficient, often lacking proper ventilation and natural light. Additionally, they make excessive use of unsustainable materials. Two particularly concerning practices were observed:

Excessive Lighting: Many stores keep their lights on unnecessarily during daylight hours and even overnight, contributing to increased carbon emissions and light pollution.

Wasteful Visual Merchandising: In brand-owned retail stores, visual displays and elaborate interior decors are frequently replaced with each new collection. These displays typically use unsustainable materials, which are discarded once removed.

While the working conditions of sales staff in retail outlets are relatively better than those in textile and garment factories, many female sales staff reported that they are pressured to conform to certain cultural and class stereotypes imposed by employers. This often includes wearing Western clothing or removing hijabs. Ironically, the same brands often enforce the opposite dress code for their female corporate employees, who are expected to wear "modest" clothing such as Eastern wear or hijab. In both cases, only women are subject to these policies. Sales staff, typically from lower or lower-middle-class backgrounds, are also frequent targets of verbal abuse and classism.

64. www.unhabitat.org.pk/world-environment-day-2023-solutions-to-plastic-waste

65. www.dawn.com/news/1734827

Marketing Practices

The environmental and social impacts of marketing in the fashion industry are often overlooked in discussions on sustainability. In Pakistan, fashion brands rely heavily on print, billboard and digital advertising, as well as expensive video campaigns.

A growing trend among fashion brands is the production of lavish video ad campaigns for nearly every collection. These campaigns involve costly, resource-heavy sets and travel to foreign locations - despite the brands having a minimal audience or market presence there - leading to unnecessary resource wastage and significant carbon footprints.

The widespread use of illuminated billboards and digital displays in cities also raises concerns. These marketing tools, though considered essential by many brands, rely on unsustainable materials, consume large amounts of electricity and contribute to light pollution.

Additionally, Pakistan's fashion industry, like its global counterparts, plays a significant role in promoting negative body image. The industry perpetuates unrealistic beauty standards by exclusively featuring models and influencers who adhere to certain body ideals, which do not represent the broader population. Only a handful of brands, such as Znali and Generation, have broken away from this norm. Generation, in particular, regularly uses its platform to run educational campaigns on social issues.

Garment Use

Washing

Key sustainability concerns in how we launder our garments involve washing machines, dryers, detergents and dry-cleaning and ironing methods. Washing machines consume significant amounts of energy and water, but Pakistan fares relatively well here compared to Western countries. While washing machines are common, manual washing remains widely practiced, especially for delicate or valuable garments. Hot water washing, which adds to energy use, is also uncommon in Pakistan.

The problem of detergents, however, remains.

Conventional detergents contain toxic synthetic chemicals, including phosphates and nonylphenol ethoxylate which are banned in many countries but remain widely used in Pakistan. These chemicals pollute soil and water bodies, harming aquatic life by breaking down fish mucous layers and making them vulnerable to bacteria, parasites and pesticide absorption. Some detergents cause algal blooms, which deplete oxygen and suffocate aquatic organisms. For humans, frequent contact with these detergents can irritate the skin, eyes and respiratory system. Additionally, most detergents contain microplastics, which further damage ecosystems and have previously been discussed regarding pesticide use in cotton cultivation.

Eco-friendly, plant-based detergents with reduced harmful chemicals are available globally, and there are detergent options suited to various fabric types. However, Pakistan's detergent market offers limited alternatives, leading most consumers to use harmful detergents that also damage garments over time. In rural communities where market access is limited, detergent-producing plants such as *reetha* (soapnut) and *rambans* (American aloe) were traditionally used for laundry. Each region had unique plants used for these purposes, and while this knowledge is fading, it is not completely lost. Documenting these practices with the knowledge of remaining elders would preserve valuable, sustainable washing techniques.

Unlike in the West, energy-intensive tumble drying is uncommon in Pakistan, where people generally prefer line-drying clothes in the sun. Similarly, dry cleaning, which is energy-intensive and uses potentially carcinogenic solvents, is rarely used. However, energy-intensive ironing is widespread, and many traditional laundrymen still use coal-powered irons which rely on a non-renewable resource.

Storage

Proper storage is essential to maintaining garment longevity as moisture and insects are common threats. Households across Pakistan use traditional remedies for these issues, such as placing cloves

or camphor balls among stored clothes to repel insects or placing containers of uncooked rice to absorb moisture. In many cases, clothes are thoroughly sun-dried before and after storage to prevent moisture buildup. While these are common methods, each household may have its own variations. Unfortunately, this knowledge is no longer widely passed down, and many people now use less eco-friendly mothballs, synthetic camphor and silica-based desiccants. The younger generation, in particular, has largely abandoned traditional storage practices.

Maintenance: repair, adaptation and alteration

Historically, garments were high-value items and people invested in only a few key pieces throughout their lives. People stitched and mended them to last as long as possible. While mass-produced fashion has mostly replaced these habits in the West, South Asia has held onto them. Many older women in Pakistan know basic repair skills, and there are still artisans known as *rafoogars* - experts in mending clothes so skilfully that you can hardly tell where the tear once was. It's an art, but it's becoming rarer by the day, with fewer young people interested in wearing mended clothing. Passing down these skills could help preserve an important part of South Asian heritage. Schools could even introduce basic sewing and repair skills as part of the curriculum. Fashion schools too could collaborate with *rafoogars*, offering students a chance to learn and appreciate this age-old craft through courses or internships.

End of Life

In Pakistan, a garment rarely faces the fate of a landfill. The culture of reuse and repurposing here is not only deeply ingrained but could also offer valuable lessons for countries grappling with sustainability challenges, particularly in the West. However, this tradition is beginning to show signs of decline.

When a garment's purpose ends in Pakistan, it often finds a new one: it is passed along, refurbished, repurposed into another garment, or upcycled into something entirely new. Many garments are designed to adapt - skirts turn into *ghararas*, *dupattas* into shirts or kaftans, and outworn

Recommended Interventions for Garment Use

1. **Documentation** of traditional storage-care practices (e.g. natural insect-repellents and desiccants).
2. **Documentation** of soap and detergent yielding plants used in Pakistan.
3. **Development** of a basic garment repairing skills course for schools.
4. **Rafoogari** course or internship for fashion design students
5. **Workshops** on reviving a culture of garment repair.

garments into bags. Even when a piece has truly reached the end of its life, it is seldom discarded. It becomes a kitchen rag, an insulating cloth for hot pots, a patch on a worn garment or stuffing for cushions, quilts and blankets.

During our fieldwork across Sindh, the depth of this zero-waste culture came alive. In village after village, we encountered the same practice: almost every scrap of fabric is saved and cherished. Nowhere is this seen more vividly than in the art of creating *rillis*, traditional patchwork quilts crafted from fabric scraps and worn-out garments. A *rilli* is composed of three layers, each telling its own story. The top layer is a vibrant mosaic, carefully hand-stitched from fabric remnants often collected over years. The middle layer, made of torn and tattered clothing, provides warmth while the backing (*patta* in Sindhi) comes from old, out-of-use cloth.

A *rilli* is not just a quilt but a community's shared heritage. Women gather to create these beautiful pieces over many days, stitching while exchanging stories, sorrows and laughter. In this way each household contributes to the others, knowing they'll receive the same support in return. Today, *rillis* are not only cherished items in Sindhi homes but also an income source for local women who sell them outside the community, sometimes even internationally. However, cultural appropriation is on the rise; some designers abroad, inspired by the *rilli* aesthetic, have created patchwork dresses without



crediting the Sindhi origin. While Pakistani designers who draw on *rilli* always give it due credit, few match the zero-waste ethics that the *rilli* embodies. Beyond *rillis*, Sindh holds other rich upcycling practices. For instance, artisans salvage embroidered patches from damaged clothes, repurposing these intricate pieces to create new clothing or bags which can be found in local bazaars.

Pakistan's bustling resale markets, or *landa bazaars*, are another facet of this textile journey. These flea markets are full of discarded clothing from Europe, America and East Asia, with items sold at minimal prices. Rising inflation, poverty and a belief in the quality of Western brands fuel the demand for second-hand clothes, especially among lower-income groups. However, because customers know these items were already discarded once, they rarely see the value in repurposing or upcycling them and so, when they've outworn their use, they're often thrown away. This shift has led to a new problem: textile landfills, a concept previously foreign to the culture.

Currently, Pakistan imports roughly 1.5 million tonnes of textile waste annually from the European Union. While some of this is genuinely second-hand and ends up in *landa bazaars*, much of it is waste in disguise. Only a few local producers buy and recycle these textiles; the majority ends up in landfills. Recycling infrastructure for textiles is in its infancy here, with most repurposing happening at the household level. And since a large portion of these clothes are blended materials, they're challenging to recycle effectively.

Despite this, textile waste still only makes up about 2% of Pakistan's total annual waste, compared to up to 85% in some Western countries. Countries in Europe and North America, in essence, export the unsustainable aspects of their fashion supply chain to South Asia, with Pakistan as a major recipient. And yet, Pakistan, with its inherent culture of reuse manages to extend the lives of these garments in ways the West is still striving to achieve.



Working Conditions in the Fashion Industry

Labour Rights Violations

Labour rights violations are widespread across Pakistan's fashion value chain. While these infractions primarily affect manual labourers, issues such as gender discrimination persist across all types of work. Unfortunately, the scale of these violations has not garnered the attention it deserves in Pakistan.

White-collar employees typically receive formal contracts with negotiated terms but the same cannot be said for blue-collar workers in manufacturing units. Most are informally employed, often brought in through subcontracting, which leaves them without proof of employment and deprives them of their rights and avenues for recourse. Among the minority who are formally employed, many are on temporary contracts, which further limits their rights and benefits.

The garment manufacturing industry is a significant employer in Pakistan and relies heavily on home-based workers, who are predominantly women. These women, often over 30 and with limited educational qualifications, are among the most vulnerable in the fashion value chain. Typically hired through middlemen they face exploitative conditions and lack direct accountability or support from garment factories.

Home-based workers primarily handle stitching and embellishment tasks such as embroidery and are paid on a per-piece basis. This system forces them to work long hours (10-12 hours daily) to meet tight deadlines for meagre pay. Additionally, they must bear the costs of workspace, energy and machinery, further eroding their earnings.

When compared to other major textile-producing nations like India, China, Indonesia and Bangladesh, Pakistan offers the lowest wages for factory workers. While this low-cost production model gives the country a competitive edge, it comes at a steep cost to workers' livelihoods and rights. A significant portion of garment workers are paid per piece rather than by hour, day or month, making their income precarious and dependent on production targets and order volumes.



Workers' unions exist but represent only a small fraction of the workforce. Many fashion and textile brands actively resist unionisation, denying workers critical rights such as collective bargaining, freedom of association and freedom of speech.

Additionally, workers lack access to reliable monitoring and complaint mechanisms. Government-appointed social and environmental auditors are often complicit with business owners, undermining efforts to address labour rights violations effectively.

Forced labour and child labour remain significant issues in Pakistan's cotton production. While child labour is less common in other stages of the supply chain, it is not entirely absent.

Wage Disparities

The wage gap between blue-collar and white-collar employees is stark. Interviews revealed that blue-collar workers earn between PKR 7,500 (approximately £18) and PKR 30,000 (approximately £85) per month - well below the legal minimum wage, which itself falls short of the estimated living

wage in Pakistan. Most workers are paid in cash, making their earnings difficult to track or regulate.

The legal minimum monthly wage for unskilled workers working 26 days, 8 hours per day and 6 days per week is:

- PKR 37,000 (£103.5) in Sindh
- PKR 32,000 (£90) in Punjab, KPK and Balochistan

Yet, the estimated living wage for rural Pakistan is PKR 40,000 (£113), while in urban areas where most industrial units are located, it rises to PKR 65,000 (£184)⁶⁶. Consequently, the majority of Pakistani workers live below the poverty line⁶⁷.

White-collar salaries range from PKR 40,000 (£113) to PKR 200,000 (£566) per month, with fresh graduates in roles like assistant designers or retail staff earning between PKR 25,000 (£70) and PKR 50,000 (£140). However, these figures still fall below the living wage for urban Pakistan and, in some cases, below the legal minimum wage for unskilled workers. At the top of the pay spectrum, head designers and sales managers can earn up to PKR 500,000 (£1,403) and PKR 1,000,000 (£2,807) per month respectively, while CEOs often draw salaries as high as PKR 2,500,000 (£7,015) - more than 100 times that of entry-level employees and 250 times the wages of cotton pickers.

Despite rising business profits, workers rarely see proportional wage increases. Many are unaware of the selling prices of the products they help create, further entrenching their lack of bargaining power.

Exploitative Work Hours

Both blue- and white-collar employees frequently work overtime without receiving the legally mandated double wage compensation. Legal working hours are capped at 8–9 hours per day (including breaks) and 48 hours per week, with overtime limited to 12 hours per week. However, most blue-collar workers work 10-hour days, with

those in fields like cotton farming and garment production often working up to 12 hours daily during peak seasons. White-collar employees, particularly new hires or those lower in the hierarchy, are often expected to work beyond office hours, responding to calls or emails from home. Blue-collar workers are rarely consulted about overtime, and those who protest are often dismissed.

Leave Policies and Gender Discrimination

White-collar employees can usually avail the 34 days of annual leave mandated by law, which includes 14 vacation days, 10 casual leave days and 12 weeks of maternity leave. However, blue-collar workers, especially informal ones, are often denied these benefits. Pregnant workers are frequently terminated or forced to leave.

Gender discrimination is pervasive across the value chain. Women are often paid less than men for the same work in manufacturing units, while at the corporate level they may receive fewer perks, such as transportation. Women are also more vulnerable to harassment, exploitation and unsafe working conditions.

Health and Safety

Safety remains a critical concern in Pakistan's garment sector as evidenced by the 2012 Ali Enterprises fire in Karachi which claimed 260 lives and injured 55 more. The building was a death trap, with barred windows, locked fire exits and inadequate safety measures including non-functional fire alarms. Despite the attention drawn by this story, over a decade later unsafe working conditions persist in many factories and incidents often going unreported. Employers rarely provide basic protective gear like masks or goggles, exposing workers to severe occupational hazards. Accidents involving heavy machinery are common in yarn and fabric manufacturing units and long-term illnesses like byssinosis often go uncompensated.

66. Global Living Wage Coalition. (2023, June). *Update report: Pakistan rural - Sialkot 2023*. [PDF]. www.globallivingwage.org/wp-content/uploads/2022/05/Update-report-Pakistan-Rural-Sialkot-2023-JUNE.pdf

67. www.dawn.com/news/1844040

Social Security

Fashion brands in Pakistan rarely take responsibility for the social welfare of their workers. Low wages, inflation and lack of benefits force many of them into vulnerable living conditions. Workers in manufacturing units are often migrants from rural areas. Since the high cost of living makes it unaffordable for them to bring their families, they usually live away from their support systems, cramped together with many others in sub-standard accommodation close to factories. Such neighbourhoods tend to be dirty with unmanaged or poorly managed industrial waste. Access to nutritious food, clean water and healthcare remains a significant challenge.

While white collar employees of some businesses are provided bare minimum health insurance, this is not the case with workers who are at a greater risk of falling sick due to unhealthy living conditions and occupational hazards. While some long-established mills provide housing and basic healthcare to workers, this practice is increasingly rare. Few workers receive pensions or allowances for maternity, marriage or non-occupation-related deaths.

Intellectual Property

Globally, it is standard practice for employed designers to develop collections under the name of the fashion brand or house. While this is ethically contentious, the designers usually work within the established aesthetic or signature style of the brand. Pakistan follows this norm but the issue sometimes takes on a deeper dimension here. Hired designers have at times developed unique signature looks for brands, bringing them wider recognition and great success. However, designers are rarely credited in such cases and often see their work claimed by a brand named after its owner.

Moreover, intellectual property rights are also misused by fashion brands when under the guise of innovation they make minor modifications to widely recognised traditional patterns and claim them as original creations. Others exploit the artistry of underpaid, marginalised artisans and then claim ownership of their work. Such practices erode the cultural and financial integrity of those who have preserved these traditions for generations.




The Conscious Consumer Gap: Awareness and Aspirations in Pakistani Fashion

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

The Conscious Consumer Gap: Awareness and Aspirations in Pakistani Fashion



In Pakistan, only a small segment of consumers is aware of the environmental and social costs of fashion. Surveys and focus groups have shown that most people don't consider sustainability when buying clothes, and choices are often driven by affordability, fashion trends and social influence rather than eco-consciousness. In urban areas, Millennials and Gen Z buy an average of seven new outfits a year, with many expressing a desire to buy even more if their budgets allowed. Social media and marketing push this aspiration by showcasing new trends and encouraging frequent shopping - a cycle that especially affects younger people who often compromise on quality to stay in style. Urban youth also revealed a tendency toward "retail therapy", finding emotional comfort in shopping.

In contrast, the pre-Millennial population and those in rural areas, while not consciously focused on sustainability, tend to be more practical in their clothing habits. Many buy fewer, higher-quality items, not because they're informed about sustainability but because they simply prefer longer-lasting garments and are less influenced by social media trends.

A recurring question during our discussions with industry stakeholders was whether there's a market for sustainably made fashion in Pakistan. Many professionals believe that most customers here are not willing to pay more for eco-friendly clothes, so brands feel pressured to stick to lower-cost, unsustainable options. This consumer attitude is largely shaped by constant marketing and social influence. Advertisements and influencers promote fast fashion, reinforcing the idea that repeating outfits or wearing older clothes is undesirable. As a result, many young people shy away from reusing or upcycling clothes, even though these practices are common among their parents.

Our survey, though, revealed a silver lining. Once informed about the environmental impact of fast fashion, over half of the participants (53.4%) showed interest in buying fewer, longer-lasting clothes made with sustainable practices - if such options were available. Many expressed regret at not having been aware of these issues earlier and were open to changing their shopping habits. They did, however, raise concerns about greenwashing, limited availability and a fear of being overcharged for items labelled as "sustainable."



Fashion Education

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Fashion Education

Educational institutions in Pakistan offer degrees in fashion and textile design and engineering, along with vocational training for skills like sewing and embroidery. Well-known schools include the Pakistan Institute of Fashion Design (PIFD), National College of Arts (NCA) and Beaconhouse National University (BNU) in Lahore, as well as the Textile Institute of Pakistan (TIP), Indus Valley School of Art and Architecture (IVSAA) and Asian Institute of Fashion and Design (AIFD) in Karachi, and the National Textile University in Faisalabad.

Our project team interviewed department heads, faculty members and students at these institutions as well as visiting less prominent institutions in places such as Nawabshah and Khairpur. It was found that sustainability is noticeably absent from most curricula. Only IVSAA incorporates sustainability in its courses, while students at other schools, like NCA and BNU, sometimes explore it independently in dissertation projects, though these efforts often go unsupported due to market pressures and job placement concerns.

A major gap exists between the designers trained in these institutions and the artisans practicing traditional, sustainable methods. Interviews with students, new designers and faculty revealed that many believe sustainability is a trend the country could 'learn' from



the West, overlooking the inherently sustainable practices within Pakistan. This gap is partly due to a lack of decolonised curricula. The trend was set by Pakistan's first fashion school PIFD which was affiliated with a Parisian fashion school (L'Ecole de la Chambre Syndicale de la Couture Parisienne) when it was established in 1994. The curriculum was adopted as is with an emphasis on Western fashion while barely paying heed to Pakistan's wealth of traditional knowledge⁶⁸. Other fashion institutes and degree programmes in universities across Pakistan followed the same pattern. This disconnect results

68. Kashif, M., & Mubarik, M. S. (2020). An evolutionary historic perspective of Pakistan's retail fashion industry. *JISR Management and Social Sciences and Economics*, 18(1). <https://doi.org/10.31384/jisrmsse/2020.18.1.5>

in students having little appreciation of indigenous practices or ability to collaborate effectively with artisans.

Vocational training, especially for women, also varies by region. The National Vocational and Technical Training Council (NVTTC) is responsible for overseeing, planning and certifying vocational education in the country. Under its aegis each province has its own council which runs hundreds of vocational training centres. Punjab's centres, overseen by the Punjab Vocational Training Council (PVTTC), mostly cater to male trainees and focus on machine-based skills. In contrast, the Sindh Technical Education and Vocational Training Authority (STEVTAA) has made strides in providing female-focused centres that teach not only basic machine skills but also hand embroidery, *rilli*-making, and other traditional crafts. These centres are more widely available in rural areas of Sindh, allowing female artisans to train in native crafts that support cultural preservation and economic empowerment. Expanding this model to other provinces could help preserve Pakistan's cultural heritage while promoting gender equality in the workforce.

Many artisans we spoke to expressed the need for educational institutions to connect students with traditional crafts more meaningfully. Artisans are occasionally invited to universities to teach, but these sessions are often brief and depend on individual instructors' preferences. Artisans also noted that they are sometimes made to feel inferior or out of place in academic settings. A more effective approach might be to allow them to teach in familiar settings - such as their own workshops - and through mentorship systems like the *ustad-shagird* model, where they could train students over a semester. In Sindh's artisan-rich village of Amb Sharif, locals expressed a strong desire for educational centres within artisan communities to promote and preserve these crafts.

Educational institutions outside major cities are already bridging this gap. For instance, students in the media and communication department at Shah Abdul Latif University in Khairpur have created insightful documentaries on local crafts, including *rilli*-making and women's embroidery. Although



Our children are no longer interested in acquiring these skills. They say that it neither brings good income nor earns them much respect. Some city folk with an interest in these things visit us from time to time. Once in a while we are invited to some university in the city for a few hours. Though there is hope that our generations-old skills can be passed on to these students if not our children, it cannot be acquired this way. It needs a longer and consistent commitment. I'd like to request the government to establish an arts institute in our locality. This will bring recognition to the place and might even stir the interest of our children.

Sahib Dino

Khes Weaver from Amb Sharif (Sobho Dero), Sindh
Recipient of Pride of Performance Award





these works haven't reached larger audiences due to the university's remote location, they provide a high-quality record of traditional knowledge. Similarly, Aror University in Sindh frequently takes fashion students on visits to nearby artisan clusters and plans to incorporate traditional embroidery and rilli in their curriculum.

Recommended Interventions for Fashion Education

1. **Develop sustainability-focused courses** for fashion and textile design programmes, incorporating indigenous practices. This could involve partnerships with UK institutions like the London College of Fashion which already offer courses on sustainable fashion.
2. **Invite traditional artisans into the classroom** to deliver courses or run residency programmes.
3. **Provide grants** for students developing final projects on sustainability, allowing them to explore eco-friendly solutions without financial or market pressures.
4. **Highlight and support sustainability initiatives** in universities outside major cities where students are more connected to traditional practices.



Governance and Legislation

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Governance and Legislation

Ministries and Departments

In Pakistan, the fashion and textile sector is a powerhouse, critical to the country's economy, yet there is no dedicated ministry overseeing it. Matters of textile and fashion are instead managed within the Ministry of Commerce. For trade and export promotion, the Trade Development Authority of Pakistan (housed within the Ministry of Commerce) plays a pivotal role in coordinating with textile manufacturers and exporters.

Broader industry concerns fall to the Ministry of Industries and Production. Sustainability, however, is dispersed among various ministries, each addressing different aspects - environmental concerns under the Ministry of Climate Change, water and energy resources under their respective ministries, and social sustainability involving several entities, from the Ministry of Human Rights to the Ministry of National Health Services. On top of this, the Ministry of National Heritage and Culture advocates for the cultural aspects of sustainability, making for a complex, multilayered web of responsibilities with no single body dedicated to the textile sector's holistic oversight.

Laws and Policies

The constitution remains Pakistan's most crucial legal document, setting out relationships between federal and provincial governments and defining each authority's powers. Federal and provincial

assemblies pass laws and policies are often drafted with expert input from external agencies, although these are more of a guiding framework than legally binding. Since the 18th Amendment of 2010, provinces have gained autonomy on most sustainability-related issues within the textile industry, meaning they wield more legislative power in crafting sustainability measures. Unfortunately, pre-2010 laws passed by the federal government - important ones focused on sustainability - are often outdated or in a state of limbo.

Though Pakistan has some sound legislation to address environmental and social issues in industries like textile, enforcement remains weak due to limited public awareness, scarce resources and lax government oversight. The Textiles and Apparel Policy 2020-2025, drafted by the textile wing of the Ministry of Commerce, addresses export growth and industrial support but lacks a focus on sustainability - ignoring the pressing environmental and social impacts of the sector.

The key environmental protection laws include provincial acts for each region: Punjab, Sindh, Balochistan and Khyber Pakhtunkhwa, modelled after the national Pakistan Environmental Protection Act of 1997. These acts establish Environmental Quality Standards (EQS) for emissions, waste management and noise control and require industries to obtain an Environmental Clearance Certificate based on an Initial Environmental Examination (IEE) and, if necessary, a more detailed Environmental Impact Assessment (EIA). These certificates demand public involvement, allowing local communities and industrial representatives to voice concerns.

After operations commence, regular environmental reporting and self-monitoring are expected. Factories must install effluent treatment plants and reports



on air and water emissions should be submitted periodically. Agencies may conduct unscheduled inspections, and if standards are violated, they can issue Environmental Protection Orders with penalties or, for repeat offenses, impose more severe consequences like imprisonment or factory closure. Unfortunately, though well-structured, enforcement faces challenges with limited resources and personnel, leaving much of the regulatory framework underutilised.

The National Energy Efficiency and Conservation Act of 2016 aims to reduce greenhouse gas emissions and transition industries towards renewable energy. Under this law, the National Energy Efficiency and Conservation Authority (NEECA) and its provincial counterparts, like the

Sindh Energy Efficiency and Conservation Authority (SEECA), have been empowered to set Minimum Energy Performance Standards, encourage energy-efficient machinery, and mandate energy audits in certain sectors. However, progress has been slow, with implementation often stalled at the planning stage and few actions fully rolled out. The Energy Efficiency and Conservation Policy 2023 seeks to set compliance standards and auditing mechanisms, with a special emphasis on the textile sector - a sector where outdated machinery consumes high energy yet remains largely unaddressed. The newly drafted NEEC Action Plan 2023-2030 seeks to enforce energy audits, retrofit outdated machinery and prioritise efficiency improvements in textiles. Whether these objectives will move beyond planning remains uncertain.

Water usage poses a significant challenge, especially with the heavy reliance on unregulated groundwater for cotton irrigation, resulting in unsustainable extraction rates. Policies like the National Water Policy 2018 and Punjab Water Act 2019 mention groundwater sustainability, yet in practice, there is no system for quotas, permits or charges. The result: unchecked groundwater extraction, worsened by subsidies on electricity for tube wells and now the rise of solar-powered wells, making conservation efforts even tougher.

The country has legislation to protect workers in the textile sector, such as the Factories Act 1934 and the Occupational Health and Safety Act 2018, which mandate safe working conditions, fair wages and a minimum leave allowance. Still, the sector is plagued by poor enforcement, with worker rights often overlooked or unmet. A handful of other laws such as the Minimum Wages Ordinance of 1961 and various social security provisions also provide a baseline for

fair treatment, though their reach is limited due to implementation challenges.

For legislation covering environmental and social sustainability, please see Appendix 3.

Recommended Interventions for Governance and Legislation

1. **Public awareness campaigns** around environmental and labour laws.
2. **Including information on legislation** in the curricula of fashion and textile design institutions and vocational education centres.
3. **Lobbying government** to draft a comprehensive sustainability policy for the fashion and textile industry in consultation with stakeholders.



Industry Associations and Certifications

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Industry Associations and Certifications

In the fashion and textile world, industry-wide associations serve as vital guardians of rights and standards. They play a multifaceted role in protecting the interests of businesses, sharing crucial information, developing and implementing health, safety and environmental standards, and shaping public policy. They are also pivotal in collaborating with external entities, making them essential stakeholders in the quest for sustainability.

However, such initiatives are mostly limited to industry-insiders who hold similar views, with no input from academics and environmental and social experts and activists. The workshops and roundtables we hosted in Lahore and Karachi showed the need for more cross-sectoral collaboration, as they brought together stakeholders with diverse views on sustainability who rarely engage with one another. These discussions highlighted the significant communication gap that has hindered progress.

For a list of industry-wide associations, please see Appendix 4.

All Pakistan Textile Mills Association (APTMA)

Among these associations, the All Pakistan Textile Mills Association (APTMA) stands out as the most prominent and influential. As one of Pakistan's largest business associations, APTMA brings together members across the textile supply chain - from spinning

and weaving to apparel manufacturing and retail. APTMA functions as the recognised voice of the textile industry, representing it in negotiations with government and international organisations and offering data, trend reports and policy briefs to keep businesses informed on developments and compliance needs.

APTMA has been particularly active in promoting sustainability, though its motivation is rooted in meeting international market requirements rather than a self-driven commitment to environmental and social impact. Responding to growing global demand, APTMA collaborates with organisations like WWF-Pakistan and Better Cotton, encouraging its members to adopt sustainable practices. The association has even established a dedicated department to guide members through sustainability requirements, track progress and share success stories, highlighting member achievements and liaising with the government to support green policies.

In 2024, APTMA published a textile and apparel policy roadmap for Pakistan's incoming government, urging it to prioritise supply chain transparency and environmental and social sustainability.

According to APTMA, progress in these areas could help Pakistan navigate its current economic challenges and strengthen the textile industry's global competitiveness. However, our observations reveal a gap between APTMA's high-level initiatives and ground realities. During site visits, it was noted that several APTMA-affiliated textile mills were still engaged in harmful environmental practices, discharging pollutants into water bodies and failing to meet labour standards. When questioned, APTMA representatives denied these issues, downplaying the association's responsibility.

While it is important to acknowledge APTMA's efforts, several limitations on their part have also been noted, which also apply in general to apparent efforts taken by other associations and councils:

- **Externally Driven Motivation:** APTMA's approach is largely driven by the desire to meet international sustainability benchmarks rather than a genuine acknowledgment of local environmental and social impacts. Without external pressure it's unclear if the association's sustainability initiatives would continue at the same scale.
- **Imported Models:** Most sustainability frameworks APTMA promotes are designed for Western markets, focusing on compliance with EU, UK and North American standards rather than exploring solutions tailored to Pakistan's context and resources.
- **Potential for Greenwashing:** While the association advertises small sustainable efforts, detailed reports showing measurable impact are lacking, raising concerns about possible greenwashing.
- **Limited Collaboration Outside the Industry:** APTMA's partnerships remain within the textile industry, with minimal input from environmental experts, academics and activists who could offer valuable perspectives.

Fashion Councils

Pakistan has two prominent fashion councils: the Pakistan Fashion Design Council (PFDC) in Lahore and the Fashion Pakistan Council (FPC) in Karachi. The PFDC was established in Lahore in 2006 by Sehryr Saigol, followed by the formation of the FPC in Karachi the following year, with lead designer Maheen Khan as one of its founding members.

Globally, fashion councils play a vital role in their respective industries. They serve as integrative forces, hosting fashion events, promoting and safeguarding designers, nurturing emerging talent, supporting research initiatives and providing guidance to businesses. Additionally, they facilitate networking opportunities, attract investors and clients and represent the industry in collaborations

with external entities such as governments, universities and other industries, both nationally and internationally.

The PFDC and FPC initially guided the industry despite challenges from conservative groups. However, post-COVID their influence has waned, with limited resources and a widening trust gap between the councils and the designers they aim to support. Unlike their international counterparts, they receive no major funding from the industry or the government, limiting their capacity to promote designers or facilitate growth.

This disconnect has led many designers and brands to bypass the councils, relying instead on their networks and social media. As a result, Pakistan's fashion councils no longer play a substantial role in industry regulation or sustainability. Although fashion councils in other countries actively promote sustainable fashion, PFDC and FPC have yet to introduce consistent guidelines or initiatives on sustainability. With their diminished influence it is uncertain if such efforts would be effective even if introduced.

A valuable model to consider is the British Fashion Council (BFC) which has championed sustainable practices in British fashion. A partnership between Pakistan's councils and the BFC could open doors to new sustainable practices and boost Pakistan's efforts in ethical fashion.

Pakistan Crafts Council

The Pakistan Crafts Council was founded to preserve and revitalise Pakistan's rich craft heritage, especially in textiles, while improving artisans' livelihoods. As an associate member of the World Craft Council – Asia Pacific Region, the council benefits from technical and financial support for reviving fading crafts, enhancing quality and promoting cultural exchange. Despite periodic efforts to encourage innovation among artisans, the council's impact remains limited due to scarce resources and manpower.

Historically led by notable designers and entrepreneurs, the council has successfully reached out to many artisans but has struggled

to influence the mainstream fashion and textile sectors. Empowering the Pakistan Crafts Council could revitalise traditional crafts, infuse them with contemporary value and help make sustainable, artisanal fashion an integral part of the country's textile industry.

Certification Programmes and Multi-Stakeholder Initiatives

Certifications are designed to offer a seal of assurance, indicating that specific environmental or social standards - especially labour regulations - have been met by a company or organisation. In the absence of strong legislative standards these certifications play a crucial role, often provided by a range of entities from NGOs to private companies. For brands, certifications are a way to showcase their commitment to sustainability, shaping their reputation as socially and environmentally responsible. For consumers they offer a sense of security, promising that their purchases have minimal impact on the planet and society.

As supply chains span the globe, certifications help conscious businesses verify that their suppliers follow sustainable practices. In Pakistan's fashion and textile sectors many brands use certifications, although their scope varies widely. While a few certifications cover multiple environmental and social aspects across the supply chain, most focus on a single stage or parameter, leaving gaps in the overall sustainability picture.

In the absence of robust regulations or lax enforcement of existing laws, certifications have effectively become the default standard for a brand to claim "sustainability" in international markets. However, this system brings several challenges that, instead of helping, may actually hinder genuine progress toward sustainable fashion. One issue is that power rests in the hands of a few private entities, creating an oligarchic system that can sometimes mask hidden agendas. More concerning, certifications often promote a passive approach

where companies meet the minimum requirements of these programmes rather than actively pursuing improvements.

The reality of Pakistan's fashion and textile industry highlights these limitations. Many brands use certifications primarily for their export lines, deeming them unnecessary for domestic products. Some brands go so far as to display expired or even fake certifications for their domestic market. Meanwhile, most certification schemes set minimal standards, rarely updating them or implementing strict requirements or timelines. With limited third-party verification and no real focus on root issues like overproduction or fossil fuel dependency, these schemes allow companies to overstate their efforts, positioning themselves as leaders in sustainability while continuing unsustainable practices behind the scenes.

A 2023 report by the Changing Markets Foundation reveals how certification schemes fall short on transparency and independence. Many assessments are hidden behind costly paywalls, with little accessible information on companies that fail to meet standards. Some schemes are even funded by membership fees from the very companies they assess, creating a conflict of interest that discourages scrutiny of their primary funders. Most certification schemes and initiatives are also developed by Western organisations, often overlooking indigenous knowledge and local solutions as they push standardised models.

Only one major brand in our study, Generation, has adopted a different approach. Generation follows a self-regulated, voluntary sustainability model focusing on continuous improvement rather than relying solely on certifications. While it uses certifications to identify sustainable suppliers, the brand takes ownership of its sustainability practices and manages these issues internally rather than outsourcing them to certification bodies.

For a detailed list of certification programmes, please refer to Appendix 5.



International Context

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

International Context

As the world's fourth-largest cotton producer and a key textile exporter, Pakistan plays a significant role in the global fashion ecosystem. Its industry supplies to major international brands while relying on imported cotton varieties to meet its manufacturing needs. This dynamic not only underscores Pakistan's deep integration with global supply chains but also positions it as both a contributor to and a beneficiary of the growing emphasis on sustainable fashion worldwide.

This section explores how Pakistan can strategically position itself within the sustainable fashion movement by looking at two countries: India and the United Kingdom. India, a regional neighbour with shared cultural heritage and similar industry challenges, competes with Pakistan in global textile markets. Yet, it has made strides in sustainability through innovative policies and initiatives. Conversely, the UK is a global leader in sustainable fashion, setting benchmarks in ethical practices, technology integration and consumer awareness campaigns. The answers lie in leveraging opportunities, addressing existing challenges and fostering regional and international collaborations.

Country 1: India

India's fashion industry has similarities with Pakistan but has also forged distinct paths. Like Pakistan, fashion as a structured, home-grown industry is relatively young. A shared history and cultural heritage - particularly between North-Western India and Pakistan - result in overlapping traditional and modern fashion trends. However, India's textile and fashion industry has a more integrated supply chain and greater self-sufficiency. Unlike Pakistan, India produces its own man-made fibres, synthetic dyes and textile machinery. It is the world's second-largest producer of cotton, significantly outranking Pakistan, and a major producer of polyester and viscose. As one of the leading global apparel exporters, India has consistently ranked among the top three to six nations in market share over the past few decades. Alongside Bangladesh, it remains a chief competitor to Pakistan in international textile markets.

India's environmental and social challenges within the textile industry operate on a much larger scale. It is one of the top three global emitters of greenhouse gases, with its industrial sector as a major contributor. Textile production centres rank among the most polluted areas in the country. Yet, India's engagement with sustainability exceeds Pakistan's, balancing between its well-preserved, inherently sustainable indigenous textile practices and a contemporary sustainable fashion sector supported by robust government policies, research institutions, NGOs and private initiatives.

Key practices from India that advance its sustainable fashion goals include:

Preservation and Revival of Desi Cotton Cultivation

India has made strides in reviving indigenous Desi cotton varieties. It accounts for about 3% of

cultivation - unlike Pakistan, where Desi cotton is nearly extinct. Many Indian farmers, especially in the South, have reverted to cultivating Desi cotton driven by the financial, health and environmental benefits over American GMO cotton varieties. This revival has been supported by government bodies, research institutions like the Central Institute for Cotton Research (CICR) and NGOs⁶⁹. For instance, state governments such as Haryana incentivise Desi cotton cultivation by offering premium prices⁷⁰.

Alternative Natural Fibres and Fabrics

India has developed niche markets for alternative natural fibres like hemp, jute and wild silk. Hemp-based textiles are produced in Himalayan states where the restricted legal status of hemp farming has spurred innovative small-scale enterprises. West Bengal specialises in jute textiles, while cruelty-free wild silks such as *tussar*, *muga* and *eri* are cultivated sustainably. India also experiments with earth-friendly fibres like banana, bamboo, lotus and orange, creating diverse, sustainable fabric options.

A Thriving Handloom Sector

India's handloom industry stands out as one of the largest in the world, contributing around 17% of the country's total fabric production⁷¹. Over 2.8 million handlooms produce approximately 8 million metres of fabric annually⁷². Most of these handlooms are in rural regions where they are the second largest employment provider after agriculture. Despite competition from power looms, handlooms have thrived due to early and consistent government intervention.

Handlooms and spinning wheels were adopted as symbols of India's independence movement, championed by Gandhi and the Indian National Congress as emblems of self-sufficiency in textiles - an industry devastated by British colonial policies. As a result, handlooms garnered government attention and support from the



moment India achieved independence in 1947. It was recognised early on that protectionist and interventionist legislation and policies would be required to sustain the industry. The 'Khadi and Other Handloom Industries Development Act 1953' and the 'Handlooms (Reservation of Articles for Production) Act 1985' are notable laws. While the former was passed to ensure funds, research and marketing support, the latter reserved *saris*, *dhotis*, *gamchas*, *khes* and a few other items exclusively for production by handlooms and provided protection from power looms.

A network of central and state government bodies plays a vital role in developing, promoting and supporting India's handloom sector. Key organisations include the Office of the Development Commissioner for Handlooms (Ministry of Textiles), the All India Handloom Board, the National Handloom Development Corporation and the Handloom and Handicrafts Export Corporation of India. These entities design and implement initiatives like the National Handloom Development Programme, focusing on the welfare and growth of handlooms and their weavers.

These programmes provide weavers with systematic and subsidised access to raw materials,

69. www.downtoearth.org.in/environment/vidarbha-experiment-with-desi-cotton-to-be-extended-to-10-states-41130

70. www.theprint.in/agriculture/scientists-criticise-haryanas-incentive-for-desi-cotton-farming-bjp-obsessed-with-anything-desi/1739403/#:~:text=The%20state%20government%2C%20he%20said,of%20the%20variety%20they%20grow

71. Export-Import Bank of India. (n.d.). *Indian handloom industry: Potential and prospects* (Working paper No. 80). Export-Import Bank of India.

72. Handloom census of India 2019-2020.

particularly yarns and dyes, as well as affordable credit. Periodic loan waivers further ease financial burdens. Training programmes aim to modernise weaving technology while enhancing efficiency, quality and design. To support marketing efforts, the government organises exhibitions, trade fairs and showcases in emporiums dedicated to handloom products. Additionally, e-commerce platforms have been introduced, allowing weavers to sell directly to customers.

Both central and state governments regularly document handloom practices, conduct surveys and carry out censuses to gather data that informs policy planning and programme development. A national handloom census has been conducted every decade since 1987-88, ensuring a consistent understanding of the sector's needs and challenges. Beyond government efforts, cooperatives, self-help groups, NGOs and dedicated research institutions play a significant role in sustaining and advancing the handloom sector.

Active Research on Sustainable Fashion

Indian academia contributes extensively to global sustainable fashion research, addressing innovations across the value chain - from fibre production to garment finishing. In addition, there is wide documentation of indigenous and traditional design and production processes by these institutions.

Bridging Indigenous Artisans and Modern Fashion

Many educational institutions make efforts to integrate traditional artisans into contemporary fashion systems. For instance, the National Institute of Fashion Technology reserves seats for artisans and their children, ensuring their knowledge and practices find relevance in modern markets⁷³.

Innovating Traditional Technologies

While handlooms and spinning wheels are

environmentally sustainable, their prolonged use often poses significant health risks to operators. Repetitive hand and leg movements, awkward postures, lack of back support, restricted freedom of movement, dim lighting and poor ventilation contribute to a range of musculoskeletal disorders (particularly arthritis), chronic pain, physical injuries and weakened eyesight. Addressing these ergonomic challenges requires both customised handloom designs tailored to individual weavers and innovative technological solutions.

Over the past few decades, Indian engineering institutions (notably IITs), NGOs, private organisations and even artisans themselves have developed and implemented various solutions. These projects often receive active support, encouragement, and in some cases, direct collaboration from central and state governments.

Today, several modern versions of spinning wheels and handlooms that balance tradition with innovation exist in India. Some incorporate partial mechanisation - using electrical or mechanical attachments - to ease labour-intensive tasks while preserving the craftsmanship and quality of handloom fabrics and hand-spun yarns. Others remain fully manual but are redesigned to reduce physical strain. For instance, traditional artisan V. Karappan developed an innovative handloom requiring manual power from just one leg, significantly increasing productivity while minimising physical exertion⁷⁴.

An example of a partially mechanised solution is the SunKargha,⁷⁵ a semi-automatic handloom developed by ReshamSutra, a social enterprise dedicated to empowering rural artisans through sustainable technological innovations. The SunKargha, which can operate using human, pedal or solar power, produces fabrics 2-3 times more efficiently than traditional handlooms. ReshamSutra has also introduced improved spinning wheels, many of

73. National Institute of Fashion Technology. (2023). *Seat allocation rules 2023*. National Institute of Fashion Technology. www.nift.ac.in/sites/default/files/inline-files/Seat%20Allocation%20%20Rules%202023.pdf

74. National Innovation Foundation. (n.d.). *Innovative handloom: Karappan's hands-free weaving loom*. National Innovation Foundation. www.nif.org.in/innovation/innovative-handloom/1148#:~:text=Karappan%20decided%20to%20design%20a,requiring%20any%20support%20of%20hands

75. www.reshamsutra.com/machine/sunkargha

which are designed to be energy-efficient and compatible with renewable energy sources. These solutions, although not ideal for mass production, offer a middle ground between energy-intensive power looms and the labour-intensive traditional handlooms with low productivity rates.

Most of these innovations are cost-effective with government subsidies available to encourage adoption. However, despite initiatives like the National Innovation Foundation, Rural Technology Action Group (RuTAG) and the Solar Charkha Mission, widespread adoption remains limited. Some artisans and activists argue that innovation need not always mean mechanisation and that the government's view of traditional handlooms as "stagnant" overlooks the ongoing, organic innovations made by weaving communities in their technologies, designs and social organisation⁷⁶. Nevertheless, mechanisation experiments tailored to local conditions should not be dismissed. Unlike conventional technologies, which often originate in the West and are unsuitable for local fibres like Desi cotton, these solutions are mindful of regional needs.

Geographical Indication (GI) Tags

India protects its regional textile crafts - such as specific handloom products, embroideries and prints - through Geographical Indication (GI) tags. These tags safeguard artisans against plagiarism, cultural appropriation and intellectual property misuse.

Country 2: United Kingdom

As a global fashion powerhouse the United Kingdom has set benchmarks in sustainability through its innovation, education and advocacy efforts. Contributing £62 billion annually to the economy⁷⁷, the UK's fashion industry is the third largest in the world, with London recognised as a premier fashion capital. London Fashion Week, held twice

a year, attracts widespread attention and provides a platform for brands and designers to showcase cutting-edge trends and innovations.

With a fashion ecosystem characterised by strong institutional frameworks, active government support, consumer awareness campaigns and robust academic and industry collaboration, the UK's experience highlights the potential of aligning public and private sector efforts to promote sustainable practices.

Institutional Framework and Industry Support

The UK Fashion and Textiles Association (UKFT) and the British Fashion Council (BFC) play central roles in advancing sustainability. These organisations act as hubs for knowledge sharing, connecting designers, manufacturers, retailers and educators to foster innovation and guide brands transitioning from fast fashion to sustainable practices. They also facilitate international collaborations and provide technical support for adopting sustainable goals.

According to the UK Parliament's 2019 report on sustainability of the fashion industry⁷⁸, major retailers such as ASOS, Burberry, Marks & Spencer (M&S), Primark and Tesco are among the most active in engaging with sustainability initiatives, while others lag behind. This disparity underscores the challenges of transforming a deeply entrenched fast fashion model into one that prioritises ethical and environmental considerations.

Homegrown Initiatives and Global Contributions

The UK is home to several initiatives addressing the environmental and social impacts of fashion. These include organisations that provide training, audits, assessments and certification like Better Cotton (BC) and Ethical Trading Initiative (ETI), organisations that help with research and advocacy like Microfibre Consortium, Make Circular Fashion and Forum for the Future and initiatives like Sustainable Clothing

76. Mamidipudi, A., & Bijker, W. E. (2018). Innovation in Indian handloom weaving. *Technology and Culture*, 59(3), 509-545. <https://doi.org/10.1353/tech.2018.0058>

77. UK Fashion & Textile Association. (n.d.). *Industry footprint report*. UKFT. www.ukft.org/industry-footprint-report/

78. House of Commons Environmental Audit Committee. (2018). *Fixing fashion: Clothing consumption and sustainability* (HC 148). House of Commons. www.publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/1148/1148.pdf

Action Plan (SCAP) and Textile 2030 by Waste and Resources Action Programme (WRAP) that in addition to providing guidance, also regularly document and publish reports on the state of sustainability in the industry. These and other organisations in the UK are also active internationally, helping many countries to achieve their sustainability goals.

Participating in these initiatives has become a hallmark of sustainable branding in the UK, offering recognition and market trust. However, this system also faces criticism. The reliance on certifications risks creating an oligarchic structure, concentrating power among a few entities. Moreover, many companies adopt a passive approach focusing on meeting minimum standards rather than proactively seeking innovative solutions. This can result in greenwashing, where sustainability claims lack genuine depth or impact.

Since 2017, the UK Parliament's Environmental Audit Committee has actively engaged with the fashion industry to develop solutions aligned with sustainable development and environmental protection goals. In 2019, the committee undertook a landmark inquiry into the industry's sustainability practices, culminating in the publication of the influential report 'Fixing Fashion: Clothing Consumption and Sustainability'. Since the report's release the committee has maintained a proactive role, regularly monitoring the government's and industry's progress in implementing its recommendations⁷⁹.

Education, research, and innovation

The UK's academic institutions are integral to its sustainable fashion leadership. Renowned schools like the London College of Fashion incorporate sustainability into their curricula, while specialised research groups - such as the Clothing Sustainability Research Group at Nottingham Trent University - explore cutting-edge solutions. Networks like the

Future Fibres Network (University of Exeter) and Impact+ Network (Northumbria University) drive advancements in sustainable materials, circularity and environmental impact assessment.

The government complements these efforts through strategic investments, such as the £6 million allocation by UK Research and Innovation (UKRI) to foster sustainability in fashion. Industry-led collaborations like the Microfibre Consortium further demonstrate the UK's commitment to addressing pressing global challenges.

Persistent challenges

While the UK's global outreach in the sustainable fashion movement is laudable, its fashion industry continues to grapple with significant challenges. Consumption patterns remain a key issue: the UK is the seventh-highest global consumer of clothing, purchasing an average of 2.1 billion⁸⁰ units annually. The average person purchases 33 items annually⁸¹ and spends more than anywhere else in the world other than Norway⁸². The average adult in the UK owns 118 items in their wardrobe.

This demand fuels waste generation, with 1.4 million tonnes of textile waste recorded in 2022, of which nearly half ended up in landfills or incineration. There has also been a steady increase in the carbon and water footprints of the fashion industry in the past decade. As of 2022, clothes consumed in UK were responsible for a carbon footprint of 29.4 million tonnes of CO₂e and water footprint of 5 billion m³ in 2022⁸³.

The UK fashion industry is heavily reliant on a fragmented supply chain. While designing, distribution and retail occur domestically, the majority of materials and finished products are sourced from Asian countries where labour is cheaper and regulations are often less stringent. Many UK retailers lack transparency regarding

79. Environmental Audit Committee. (2021, July 7). *Is fast fashion still costing the earth? MPs revisit landmark inquiry*. UK Parliament. www.committees.parliament.uk/committee/62/environmental-audit-committee/news/201078/is-fast-fashion-still-costing-the-earth-mps-revisit-landmark-inquiry

80. www.commonobjective.co/article/volume-and-consumption-how-much-does-the-world-buy

81. www.fashionunited.com/global-fashion-industry-statistics

82. www.fashionunited.com/global-fashion-industry-statistics

83. WRAP. (2024). *Textile market situation report 2024*. WRAP.



the origins of their fibres, fabrics or garments and make minimal efforts to trace their supply chains⁸⁴. This disconnect allows them to benefit from lower production costs while deflecting accountability for the environmental and social impacts of production to suppliers abroad.

The once-thriving UK textile manufacturing sector is now a shadow of its former self. With 4,435 textile manufacturing enterprises remaining, most are concentrated in a few regions – North West, East Midlands, London and South East England⁸⁵. These manufacturers primarily cater to local (ultra-) fast fashion retailers, producing collections at an unprecedented speed. Unfortunately, many are reported to violate labour laws, including underpaying workers, denying union recognition and fostering exploitative work environments⁸⁶.

The ethical and strategic case for UK-Pakistan collaboration

After China and Bangladesh, Pakistan is the third-largest destination for UK fashion brands to outsource production. In 2022, the UK imported 137,000 tonnes of consumer textiles worth £1.1 billion from Pakistan⁸⁷. Major retailers such as ASOS, Boohoo, M&S, Tesco and Misguided rely on production facilities in Pakistan. However, several of these brands have been accused of ignoring labour rights violations in their supply chains⁸⁸ and resisting collaborative efforts, such as signing safety accords initiated by the Pakistani government⁸⁹.

Additionally, the UK is a significant contributor to Pakistan's growing textile waste problem, with exported waste creating new environmental challenges.

Historically, the UK textile industry has contributed to the erosion of South Asia's indigenous crafts and sustainable practices. The rise of textile mills during the colonial era led to the overuse of agricultural land for cotton cultivation, soil degradation, declining water tables, pesticide overuse and the near extinction of Desi cotton varieties. These ecological and cultural costs continue to weigh heavily on the region.

Given Pakistan's significant role in the UK's fashion supply chain and the environmental and social toll borne by the former there is a strong ethical imperative for collaboration. Joint efforts can address these shared challenges, foster equitable partnerships and promote sustainable practices that benefit both countries.

Given their intertwined supply chains, the UK and Pakistan share both a responsibility and an opportunity to advance sustainable fashion. In 2022, the UK imported £1.1 billion worth of consumer textiles from Pakistan, making it one of the top destinations for outsourcing after China and Bangladesh. However, the relationship has been marked by ethical concerns including labour rights abuses in Pakistani production units and the unchecked dumping of UK textile waste in Pakistan.

Collaboration between the two countries could involve knowledge sharing, technological exchange and joint initiatives targeting shared challenges such as supply chain transparency, sustainable manufacturing practices and circular economy models. By leveraging the UK's expertise and Pakistan's production capabilities, both countries can make significant strides in promoting sustainability within the global fashion ecosystem.

84. House of Commons Environmental Audit Committee. (2019). *Fixing Fashion: Clothing Consumption and Sustainability*. Sixteenth report of session 2017-19. UK Parliament.

85. WRAP. (2024). *Textile market situation report 2024*. WRAP.

86. House of Commons Environmental Audit Committee. (2019). *Fixing Fashion: Clothing Consumption and Sustainability*. Sixteenth report of session 2017-19. UK Parliament.

87. WRAP. (2024). *Textile market situation report 2024*. WRAP.

88. www.theguardian.com/business/2020/dec/22/boohoo-selling-clothes-made-by-pakistani-workers-who-earned-29p-an-hour

89. www.just-style.com/news/major-fashion-brands-called-out-for-not-signing-pakistan-safety-accord/



Recommendations

Textile / Legacies

Mapping the Sustainable Fashion
Ecosystem in Pakistan

Recommendations

Mass Production and Sustainability

Mass production and sustainability often conflict, yet the current fashion model heavily relies on mass production for affordability and accessibility. Solutions to move towards a more sustainable industry model include:

- Identifying and incorporating techniques that conserve water, energy and other resources.
- Doing away with finishing processes unless absolutely required.
- Using hangtags made of sustainable materials like craft paper and limiting the number of hangtags to one per garment.
- Transitioning away from plastic packaging. The use of jute instead of plastic for tertiary packaging could be revived and universally adopted.
- More resource-efficient retail practices such as reduced lighting during daylight and non-business hours and proper ventilation in outlets to reduce excessive air conditioning.
- Pursuing research on the use of natural pigments for digital printing and screen printing, which is an important aspect of Pakistani fashion.
- Incorporating handloom fabrics and natural dyes where possible.

Supply Chain Transparency

Creating a more transparent supply chain is key to sustainability. Pakistan's fashion industry should aim for traceability, where all steps from raw material sourcing to garment production are documented and publicly accessible. Since the country has a well-integrated and localised supply chain and many prominent brands even operate as vertically integrated companies across multiple stages of the chain, mandating and implementing supply chain transparency as a regulatory measure should be feasible. This would not only improve sustainability but also ensure accountability and offer consumers more confidence in their purchases.

Local and Small-Scale Brands

Local brands that prioritise sustainability can serve as the foundation for a greener fashion ecosystem. Small-scale, independent brands tend to focus on quality and ethical production. They should be recognised, incentivised and aided in reaching international markets and platforms.

Materials

The shift towards natural fibres and biodegradable materials is essential for reducing the fashion industry's environmental footprint.

- Reliance on limited species of cotton should be reduced and the cultivation, spinning and weaving of Desi cotton should be revived and promoted.
- Material diversity can be achieved by encouraging the use of alternative sustainable, plant-based fibres, such as hemp (in KPK, GB,

AJK, and Balochistan), banana (in Sindh) and bamboo and jute (in Punjab).

- Discourage the widespread use of polyester and other synthetic fibres, especially when recycled polyester is mistakenly marketed as a sustainable alternative.
- Mono-materials should be prioritised over blends, with clear and mandatory information on fabric composition provided to consumers, addressing the current lack of transparency.
- Non-sustainable synthetic materials for garment labels should be prohibited.
- A potential solution to enhance traceability is implementation of QR code labelling or digital passports, offering consumers easy access to information on supply chains and material composition.

Designer Practices

Designers can play a critical role in the sustainability transition by choosing to create timeless pieces that are durable and versatile. Instead of following trends they could focus on prioritising garment longevity and silhouettes that minimise fabric waste.

Documentation

Comprehensive documentation is essential for preserving and promoting Pakistan's textile heritage. Extensive nationwide surveys, cataloguing, and visual and textual documentation should be conducted to capture key elements of traditional practices. Universities, NGOs, private organisations like the Pakistan Crafts Council and government entities could lead these documentation efforts. However, traditional practitioners must be involved as co-investigators, ensuring their knowledge is central to the process rather than merely being treated as subjects or collaborators.

The outcomes of these initiatives should extend beyond static records. Culmination phases could include conferences, workshops, gallery exhibitions and other platforms to disseminate the findings. Educational modules based on the documentation can be integrated into fashion and textile degree

programmes to ensure long-term awareness and application of these traditions.

Potential Areas of Investigation Include:

- Varieties of Desi cotton, along with their geographic distribution and cultivation methods.
- Spinning wheels, handlooms and fabric construction techniques.
- Natural dye sources and their extraction methods.
- Block-printing patterns, fabric finishing techniques and design practices for apparel and accessories.
- Cutting and sewing traditions, embroidery stitches and other textile crafts.
- Mending practices like *rafoogari*, clothing care and storage methods.
- Adaptive processes such as recycling and upcycling, exemplified by *rilli* making.
- Plant-based detergents.
- Folklore that celebrates textile traditions.
- Identification of hereditary textile artisan communities.

Textile Museum

There is currently no dedicated textile museum in Pakistan. Establishing such an institution would offer a repository for preserving invaluable private collections, facilitating education and promoting cultural tourism. Similar institutions in the region, like India's Calico Museum and the crafts exhibitions at the Mohatta Palace Museum in Karachi, have demonstrated how such spaces can effectively celebrate and promote textile traditions.

Proposed features:

- Permanent and rotating exhibitions
- Restoration and conservation lab
- Educational programmes
- Textile archives
- Seed bank of indigenous Desi cotton varieties

Fashion Platforms

The Pakistan Fashion Design Council (PFDC) and Fashion Pakistan Council (FPC) should be revived and equipped to push for policy changes, industry standards and public awareness campaigns related to sustainable fashion. They could also spearhead initiatives such as sustainable fashion weeks or awards to help increase the visibility of eco-conscious fashion brands.

Empowering Artisans

To ensure the long-term sustainability of traditional crafts in Pakistan, artisans need to be economically empowered without undue reliance on the government or NGOs. Capacity-building projects should focus on equipping artisans with skills to handle customers directly and market their products effectively while maintaining their craft's integrity.

To support artisans in remote areas, they should be provided with improved internet connectivity. Establishing collectives, cooperatives and self-help groups, alongside providing incubation funds and microfinance loans, would further help develop this sector.

Encouraging hereditary practitioners to share their knowledge with interested individuals from outside their communities, such as aspiring fashion and textile designers, is another important step. This effort could involve collaborations with educational institutions in semester-long internships at artisans' workplaces (*ustad-shagird* model) or courses conducted by artisans in academic settings. To facilitate these collaborations, artisans should participate in tailored teacher training programmes to familiarise themselves with modern teaching methods and technical terminology.

Moreover, universities and other educational institutions should recognise and respect the expertise of artisans, granting them the same status and dignity as other lecturers. It is critical to address the prevailing practice of treating artisans as unskilled daily labourers. This shift in perception would not only uplift the status of artisans but also enrich academic environments with their invaluable traditional knowledge.

Consumer Awareness

Educating consumers about the environmental and social costs of fast fashion is crucial for encouraging responsible consumption. Large-scale public campaigns, workshops and media outreach are needed to increase understanding of sustainable alternatives. This could involve educating both consumers and industry professionals about the negative impact of wasteful consumption, poor working conditions and environmentally damaging practices in the fashion industry.

Education

Sustainability should be incorporated into educational curricula in schools through teaching basic garment-making skills, sustainable material use, clothing care and the environmental effects of fashion. Dedicated courses on sustainability should be introduced as part of fashion and textile degrees offered by universities and educational institutions. They could also be offered as stand-alone certificate and diploma courses.

The National Vocational and Technical Training Council (NVTTC), Punjab Vocational Training Council (PVTTC), Sindh Technical Education and Vocational Training Authority (STEVT), Balochistan Technical and Vocational Training Authority (BTEVT) and Khyber-Pakhtunkhwa System of Technical and Vocational Education and Training (KP-STVET) should offer training in all traditional textile and garment craft forms in their centres.

Research and Innovation

Close collaborations between industry, researchers and academia should be fostered, through the formation of working groups and the provision of funding to support innovation. Representatives from diverse fields - such as fashion and textile design, textile engineering, industrial chemistry, agriculture, mechanical engineering, anthropology and environmental science - should be engaged to ensure a multidisciplinary approach.

Potential areas of research include:

- Identifying and developing sustainable fabrics from alternative sources beyond the commonly explored hemp, bamboo, banana and jute. Plants like the crown flower, mentioned earlier in this report, offer a promising avenue with many other species yet to be identified.
- Expanding the range of natural dyes, including identifying new sources, experimenting with diverse recipes, improving colour fastness properties and finding eco-friendly mordants. Collaboration between designers, textile engineers and industrial chemists can address the limitations of traditional dyes, such as limited colour options and weaker fastness properties compared to synthetic dyes. Additionally, assessing the environmental impact of scaling up natural dye production is critical. Identifying multiple sources for the same colour can mitigate potential ecological harm from over-reliance on a single dye source.
- Innovation in spinning and weaving technologies, led by engineering institutions with robust mechanical and textile engineering departments. Lessons can be drawn from India, where partial mechanisation of these tools has made processes less labour-intensive without compromising the authenticity and quality of hand-spun yarns and handloom fabrics. Collaboration with artisans, spinners and loom manufacturers can ensure the practicality and acceptance of these innovations.
- Development of technologies tailored to Desi cotton and other native plant-based fibres as conventional spinning and weaving equipment is often better suited to non-native cotton varieties.

Government

Government involvement is necessary for large-scale change. Establishing a dedicated ministry for the textile sector could create significant benefit by providing focused leadership and streamlined policymaking. In the absence of such a ministry, coordinated efforts among existing governmental

bodies - including the Ministries of Climate Change, Commerce, Energy, Water Resources and National Heritage and Culture - are essential. These collaborations should prioritise drafting a comprehensive sustainable fashion and textile policy, designing an environmental and social sustainability evaluation and certification system tailored to local needs and international standards, and facilitating global sustainability certifications for small-scale businesses in these sectors.

While existing legislation requires updates, the government should focus on implementing current laws effectively and empowering relevant regulatory bodies. Even such incremental progress could lead to substantial positive outcomes. For practices and products struggling to compete in today's markets, government intervention through incentives, subsidies and promotional initiatives is crucial for survival and growth.

Other potential areas of government intervention include:

- Cataloguing and granting Geographical Indication (GI) status to traditional crafts and textiles.
- Establishing region-specific and craft-focused textile centres to support artisans, verify authenticity and market their products.
- Encouraging textile tourism by creating craft and textile stores in metropolitan and tourist areas, sourcing directly from artisans and regional centres and organising immersive experiences such as workshops at artisans' workplaces.
- Awareness campaigns and educational programmes targeting workers, employers and students to increase understanding of environmental and labour laws.

International Collaborations

Collaboration between Pakistan and other countries already leading in sustainable fashion could prove beneficial. Sharing knowledge and resources, especially with countries like India, Sri Lanka, Bangladesh and the UK could help create a more

unified global movement towards sustainability in the fashion sector. Such international exchanges could also open up new markets for Pakistani sustainable fashion.

The benefits of cross-border collaborations were evident during our workshops held in Lahore and Karachi where resource persons from India contributed significantly. Although political and historical challenges might seem to hinder partnerships with India, virtual collaborations have proven both feasible and mutually beneficial. These partnerships could take the form of independent initiatives or multinational collectives, potentially facilitated by organisations such as SAARC or the British Council.

Key areas for collaboration with the UK include:

Industry-wide Partnerships: Organisations such as the Pakistan Fashion Design Council (PFDC), Fashion Pakistan Council (FPC) and All Pakistan Textile Mills Association (APTMA) could collaborate with UK-based entities like the UK Fashion and Textiles (UKFT) and British Fashion Council (BFC), both of which are pioneers in sustainable fashion.

Research and Education: UK universities, recognised for cutting-edge research in sustainable fashion, should explore solutions rooted in Pakistan's traditional and indigenous practices. Such research could involve direct engagement with artisans or partnerships with educational institutions in Pakistan, particularly those in smaller cities or near artisanal hubs. These collaborations could extend to joint programmes, student exchanges and courses focusing on sustainable fashion.

Market Potential: Products crafted using traditional and sustainable methods by Pakistani artisans have significant potential in the UK market, where such items are in demand. These products could be promoted through collaborative efforts and featured at UK fashion events.

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Appendices

Appendix 1: Fieldwork

Table I: Fashion and textile industry visits

No.	Name	Location
1	Generation	Lahore, Punjab
2	Royal Tag	Lahore, Punjab
3	Nishat Mills	Bhikhi, Sheikhpura, Punjab
4	Ethnic	Lahore, Punjab
5	Outfitters	Lahore, Punjab
6	Lala Ji Cotton Industries	Chichawatni, Punjab
7	Fazal Cloth Mills	Multan, Punjab
8	The House of Kamiar Rokni	Lahore, Punjab
9	Golmohr	Lahore, Punjab
10	Sonya Battla	Karachi, Sindh

Table II: Fashion brands studied

No.	Name	Location
1	Zara Shahjahan	Lahore, Punjab
2	Limelight	Lahore, Punjab
3	Sapphire	Lahore, Punjab
4	Bareeze	Lahore, Punjab
5	Shahnameh	Lahore, Punjab
6	Nishat Linen	Lahore, Punjab
7	Khaadi	Karachi, Sindh
8	Gul Ahmed	Karachi, Sindh
9	Alkaram	Karachi, Sindh
10	J. (Junaid Jamshed)	Karachi, Punjab

Table III: Designer interviews		
No.	Name	Location
1	Kamiar Rokni	Lahore, Punjab
2	Farheen Raza Jaffery	Lahore, Punjab
3	Syeda Zaira	Lahore, Punjab
4	Kainat Iqbal	Lahore, Punjab
5	Harris Masood	Lahore, Punjab
6	Sajal Nasir	Lahore, Punjab
7	Samar Sheikh	Lahore, Punjab
8	Laila Shah	Karachi, Sindh
9	Umer Rehman	Karachi, Sindh
10	Sonya Battla	Karachi, Sindh
11	Noorjehan Bilgrami	Karachi, Sindh
(Note: seven other designers preferred to be anonymous)		

Table IV: Sustainable fashion brands studied		
No.	Name	Location
1	Behbud Crafts	Islamabad, Pakistan
2	Rastah	Lahore, Punjab
3	Zn Ali	Lahore, Punjab
4	Aomi	Lahore, Punjab
5	Jehan	Lahore, Punjab
6	Jugnu	Lahore, Punjab
7	Studio Meru	Lahore, Punjab
8	Aangan	Lahore, Punjab
9	Haveli Crafts	Hujra Shah Muqeem, Punjab
10	Koel	Karachi, Sindh
11	The Brown Store	Karachi, Sindh
12	The Pink Tree Company	Karachi, Sindh
13	Umer & Imrana	Karachi, Sindh

Table V: Workforce interviews		
1	Individual Workers	Across various locations in Sindh and Punjab
2	Artisans	Across various locations in Sindh and Punjab
3	Labour Education Foundation	Lahore, Punjab

Table VI: Cultural organisations and marketplaces studied

No.	Name	Location
1	Daachi Foundation	Lahore, Punjab
2	Hast o Neest	Lahore, Punjab
3	Lok Sujaag (multimedia)	Lahore, Punjab
4	World Wildlife Fund (WWF)	Lahore, Punjab
5	Kaarvan Crafts	Lahore, Punjab
6	Polly and Other Stories	Lahore, Punjab
7	Sindh Rural Support Organisation (SRSO)	Sukkar, Sindh
8	Sindh Indigenous & Traditional Crafts Company (SITCO)	Khairpur, Sindh
9	Indus Resource Centre (IRC)	Khairpur, Sindh
10	Khazana Crafts	Khairpur, Sindh
11	Ra'ana Liaquat Craftsmen's Colony (RLCC)	Karachi, Sindh
12	The Commons' Karachi	Karachi, Sindh
13	Mashion Bazaar	Karachi, Sindh

Table VII: Field sites and documentation summary

No.	City	Province	Documentation
1	Lahore	Punjab	Industry visits, consumer and retail surveys
2	Sheikhupura	Punjab	Industry visit
3	Faisalabad	Punjab	Industry visit and market survey
4	Sahiwal	Punjab	Cotton farming and traditional embroideries
5	Pakpattan	Punjab	<i>Lungi</i> and <i>khes</i> shops
6	Chichawatni	Punjab	Cotton factories
7	Kamalia	Punjab	<i>Khaddar</i> weaving and <i>khaddar</i> shops
8	Khanewal	Punjab	Cotton suppliers
9	Multan	Punjab	Textile production, block-printing and hand embroidery, Cotton Research Centre
10	Lodhran	Punjab	Cotton farming
11	Bahawalpur	Punjab	Block printing, <i>bandhani</i> and <i>gota</i> work
12	Rahimyarkhan	Punjab	Traditional embroideries
13	Sukkur	Sindh	SRSO, Sartyoon Sang Crafts
14	Khairpur	Sindh	Banaras Colony, Khazanah Crafts, Indus Crafts Resource, University visit
15	Nawabshah	Sindh	Retail survey, University visit
16	Hala	Sindh	Weavers, <i>rilli</i> makers

17	Hyderabad	Sindh	SITCO, retail survey
18	Umerkot	Sindh	Thar Museum Umerkot, Indigenous crafts
19	Mithi	Sindh	<i>Rilli</i> makers, embroiderers and craft shops
20	Badin	Sindh	<i>Susi</i> and <i>khes</i> weaving
21	Thatta	Sindh	Retail survey
22	Karachi	Sindh	Industry leaders, designers, researchers

	Town	Location	Documentation
23	Bhikhi	Sheikhupura, Punjab	Factory workers
24	Phoolnagar	Kasur, Punjab	<i>Kamarband</i> and <i>parandas</i>
25	Malkha Hans	Pakpattan, Punjab	<i>Lungi</i> and <i>loi</i> weavers, tailors
26	Qaboola	Pakpattan, Punjab	<i>Charkha</i> (spinning wheel)
27	Haveli Lakha	Okara, Punjab	<i>Khes</i> vendors
28	Iqbal Nagar	Chichawatni, Punjab	Local craft keepers
29	Yazman	Bahawalpur, Punjab	Cotton Traders
30	Therhi	Khairpur, Sindh	<i>Rilli</i> shops
31	Sobho Dero	Khairpur, Sindh	<i>Khes</i> vendors
32	Ranipur	Khairpur, Sindh	Weavers and shops
33	Bhit Shah	Matari, Sindh	Natural dyeing, <i>ajrak</i> , block-printing
34	Tando Jam	Hyderabad, Sindh	Sindh Agriculture University
35	Tando Allahyar	Sindh	Tailors
36	Nasarpur	Sindh	Local community and their crafts
37	Golarchi	Sindh	<i>Susi</i> shops, Market survey

S.No.	Village	Location	Documentation
1	Thethar	Lahore, Punjab	<i>Susi</i> shops, Market survey
2	Parnawan	Kasur, Punjab	<i>Kamarband</i> and <i>paranda</i> making, embroidery
3	Chak no. 87/9L	Sahiwal, Punjab	Spinning wheels
4	Chak no. 49/SP	Pakpattan, Punjab	<i>Charkha</i> making, embroideries, weaving
5	Wan Dal Singh	Pakpattan, Punjab	Local community
6	Chak no. 30/SP	Pakpattan, Punjab	Block carving, craft keeping
7	Chak no. 132/16L	Mian Channu, Punjab	Cotton farming, indigenous cotton samples
8	Musafir Khana	Bahawalpur, Punjab	Mirror work, embroideries
9	Goth Machi	Khairpur, Sindh	<i>Rilli</i> making women artisans
10	Amb Sharif	Khairpur, Sindh	<i>Khes</i> weavers

11	Daraza Sharif	Khairpur, Sindh	Local community
12	Bago Daro	Khairpur, Sindh	<i>Rilli</i> making women artisans, appliqué work
13	Karimdad Khaskheli	Tando Jam, Sindh	<i>Paranda</i> , <i>rilli</i> , embroideries and accessories
14	Malo Junejo	Umerkot, Sindh	Different types of Sindhi embroidery
15	Hothiar	Mithi, Sindh	<i>Rilli</i> , <i>gaj</i> embroidery, <i>ghagra</i> and draping

Table VIII: Educational and research institutes visited

No.	Name	Location
1	National College of Arts	Lahore, Punjab
2	Pakistan Institute of Fashion Design	Lahore, Punjab
3	Beaconhouse National University	Lahore, Punjab
4	Central Cotton Research Institute	Multan, Punjab
5	Aror University	Sukkur, Sindh
6	Shah Abdul Latif University	Khairpur Mirs, Sindh
7	Shaheed Benazir Bhutto University	Nawabshah, Sindh
8	University of Sindh	Jamshoro, Sindh
9	Sindh Agriculture University	Tando Jam, Sindh
10	Government Girls Vocational School	Bago Daro, Khairpur, Sindh
11	Indus Valley School of Art and Architecture	Karachi, Sindh

Appendix 2: Roundtables and Workshops

Lahore roundtable (November 2023):

Fashion choices and consumption habits

Attended by academics, fashion influencers and sustainability enthusiasts.

Karachi Roundtable (February 2024):

(Industry's challenges and opportunities in indigenous sustainable practices)

Attended by academics, fashion designers, journalists and industry professionals.

Panel Discussion at Lahooti Melo (February 2024):

Learning and Unlearning Sustainable Fashion: Indigenous Practices from Sindh

Abdul Rehman in conversation with Lajavati, Meera and Marvi (Female artisans from Sukkur, Khairpur and Bago Daro)

Lahore workshop (May 2024):

Session 1: Sustainable Fashion v/s Sustainable Business; Challenges in the industry – Tariq Mehboob (CEO Royal Tag)

Session 2: Sustainable Fashion and Labour Struggles – Ayesha Ahmed (rights activist, Labour Education Foundation)

Session 3: Decolonising Fashion; Learning from Indigenous Practices – Uzramma (sustainability expert and founder at Malkha India)

Session 4: Textile and Folk Music – Radhika Sood Nayak (singer, folk literature enthusiast)

Session 5: Challenges of Shifting to Socially and Environmentally Conscious Fashion Practice – Khadija Rehman (Director, Generation)

Session 6: Artisans' Collectives as an Answer to the Conundrum of Financial Sustainability – Meeta Mastani (Bindas Collection India)

Open Discussion: Finding a Way Forward for Sustainable Fashion in Pakistan

(Joined by fashion, textile and art institutes, entrepreneurs, designers, industry leaders, policy makers, and organisations like WWF, Aurat March and Amnesty International among others)

Karachi Workshop (July 2024):

Session 1: Designing Responsibly – Abdul Rehman

Session 2: Sustainable Fashion and Challenges in the Industry – Sonya Battla (designer) in

conversation with Fawad Anwer (MD Al-Karam) and Baber Sultan (Artistic Milliner)

Session 3: In Search of Knowables: Handloom Knowledge Commons – Uzramma (Malkha India)

Session 4: Tasser Cultivation and Challenges with the Cooperatives – Dr Sunanda Kumar (Alternative for Indian Development UK)

Session 5: Growing Responsibly – Amneh Shaikh-Farooqui (Polly & Other Stories) in conversation with Tofiq Pasha Mooraj

Session 6: Creating Sustainable Designers: Curriculums – Asiah Seemab in conversation with Shehnaz Ismail (IVSAA) and Shamoon Haider (Karachi University)

Open Discussion:

(Joined by academics, researchers, industry experts, entrepreneurs, fashion and lifestyle journalists and sustainability enthusiasts)

Appendix 3: Legislation and Policies

Legislation: Environmental Sustainability

Issue	Laws, Policies
Environment (General)	<p>Pakistan National Conservation Strategy 1992</p> <p>National climate change policy 2021</p> <p>Pakistan Climate Change Act 2017</p> <p>Alternative and Renewable Energy policy 2019</p> <p>National Environmental Policy 2005</p> <p>Punjab Environmental Policy 2015</p> <p>Pakistan Environmental Protection Act 1997</p> <p>Punjab Environmental Protection Act 1997</p> <p>Sindh Environmental Protection Act 2014</p> <p>Balochistan Environmental Protection Act 2014</p> <p>Khyber Pakhtunkhwa Environmental Protection Act 2014</p>
Excessive water usage	<p>National Conservation Strategy 1992</p> <p>Nation Water Conservation Strategy for Pakistan (2023-27)</p> <p>National Water Policy (NWP) 2018</p> <p>Punjab Water Act 2019</p>
Excessive non-renewable energy usage (electricity, gas, coal)	<p>National Energy Efficiency and Conservation Act 2015</p> <p>National Energy and Efficiency and Conservation Policy 2023</p> <p>National Energy Efficiency and Conservation Plan 2023-30</p> <p>National Electricity Policy 2021</p> <p>Alternative and Renewable Energy Policy 2019</p> <p>Energy Conservation Building Code 2023</p> <p>Pakistan Standards and Quality Control Authority</p>
GHG/Carbon Emissions	<p>Punjab Environmental Quality Standards 2016 (PEPA 1997)</p> <p>Sindh Environmental Quality Standards 2016 (SEPA 2014)</p>
Air Pollution	<p>Punjab Environmental Quality Standards for Gaseous Emissions 2016 (PEPA 1997)</p> <p>Punjab Environmental Quality Standards for Ambient Air 2016 (PEPA 1997)</p> <p>Sindh Environmental Quality Standards for Ambient Air 2016 (SEPA 2014)</p>
Water Pollution (General)	<p>Canal and Drainage Act 1873</p> <p>Section 277, Pakistan Penal Code 1860</p>
Water effluents	<p>Factories Act 1934 (amend. 2012)</p> <p>Canal and Drainage Act 1873</p> <p>PEPA 1997, SEPA 2014</p> <p>Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents 2016 (PEPA 1997)</p> <p>Sindh Environmental Quality Standards for Municipal and Liquid Industrial Effluents 2016 (SEPA 2014)</p>

Microplastics	Unregulated
Excessive plastic use	Sindh Environmental Protection Act 2014t
Pesticide Poisoning	Agricultural Pesticides Ordinance 1971 Agriculture Pesticides Rules 1973 Punjab Agricultural Pesticide Rules 2018
Other poisons	Punjab Hazardous Substances Rules 2018 Sindh Hazardous Substances Rules 2014
Textile Waste	Solid Waste Management Guidelines 2005
Noise Pollution	Punjab Environmental Quality Standards for Noise 2016 Sindh Environmental Quality Standards for Noise 2016
Odour	Unregulated
Light Pollution	Unregulated
Legislation: Social Sustainability	
Health Impact	Punjab Hazardous Substances Rules 2018 (PEPA 1997) Sindh Hazardous Substances Rules 2014 (SEPA 2014) Occupational Health and Safety Act 2018 Punjab Occupation Health and Safety Act 2019 Employer's Liability Act 1938 Workmen's compensation Act 1923
Working Conditions	Labour Inspection Policy 2006
Wages	Payment of Wages Act 1936 Minimum Wages Ordinance 1961 Employees Cost of Living (Relief) Act 1974
Working Hours	Factories Act 1934
Leave	Factories Act 1934
Unionisation	Punjab Industrial Relations Act 2010 Industrial Relations Act 2012
Gender Discrimination	Protection against Harassment of Women at the Workplace Act 2010 (amend. 2014, 2022)
Child Labour	Children (Pledging of Labour) Act 1932 Employment of Children Act 1992
Forced Labour	Bonded Labour System (Abolition) Act 1992

Social Security	<p>Employees' Old Age Benefits Act 1976</p> <p>Employees' Social Insurance Ordinance 1962</p> <p>Workers Welfare Fund Ordinance 1971</p> <p>Workers Children (Education) Ordinance 1972</p> <p>West Pakistan Maternity Benefits Ordinance 1962</p> <p>Punjab Home-Based Workers Act 2023</p>
Cultural Rights	<p>GI Tag</p> <p>Geographical Indications (Registration and Protection) Act 2020 (GIRPA 20)</p> <p>National Register of Intangible Cultural Heritage</p>

Appendix 4: Industry-wide Associations

The table categorises the most active and relevant industry-wide associations spanning various stages of the value chain.

Fibre Production	Pakistan Cotton Ginners Association
Textile	All Pakistan Textile Mills Association (APTMA) Pakistan Textile Exporters Association Pakistan Cloth Merchants Association Pakistan Jute Mills Association Pakistan Silk and Rayon Mills Association Pakistan Textile Council
Yarn Manufacture	Pakistan Yarn Merchants' Association
Weaving	Pakistan Weaving Mills Association All Pakistan Cotton Power Looms Assn All Pakistan Handloom & Traditional Textiles Manufacturers and Exporters Association
Knitting	Pakistan Knitwear & Sweaters Exporters Association Pakistan Hosiery Manufacturers Assn
Textile Processing	All Pakistan Textile Processing Mills Association (APTPMA)
Designing	Pakistan Fashion Design Council (PFDC) Fashion Pakistan Council (FPC)
Apparel Manufacture	Pakistan Readymade Garments Manufacturers & Exporters Association (PRGMEA) Pakistan Cotton Fashion Apparel Manufacturers & Exporters Assn Pakistan Leather Garments & Manufacturers and Exporters Association Pakistan Denim Manufacturers and Exporters Association
Wholesale and Retail	Chain Store Association of Pakistan (CAP)
Textile Craft	Pakistan Craft Council

Appendix 5: Certification Schemes

Stage/ Impact	Certification
Fibre	Better Cotton Organic Cotton Accelerator Cotton Connect
Apparel Manufacture	Worldwide Responsible Accredited Production (WRAP) (promoting safe, lawful, humane and ethical manufacturing around the world)
Toxic Substances	OEKO-TEX® STANDARD 100 OEKO-TEX® ECO PASSPORT
Occupational Health and Safety	ISO 45001 (International Occupational Health and Safety Management System (OHSAS) specification)
Carbon Footprint/ Waste Management	International Renewable Energy Certificate (NET ZERO) ISO 50001 (an energy management systems standard) ISO 14001:2015 (Waste management, energy consumption, distribution cost reduction)
Ecology and Social Responsibility	Fairtrade International Global Organic Textile Standard (GOTS)

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