

# SUSTAINABILITY AND ETHICAL PRACTICES OF THE APPAREL INDUSTRY IN INDIA

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## **Abstract**

This study provides a comprehensive examination of sustainability challenges and ethical practices in India's \$165 billion apparel industry, analysing data from 2020-2024. As the world's second-largest textile producer, India's garment sector faces mounting pressure to balance economic growth with environmental stewardship and social responsibility. The research evaluates three critical dimensions: environmental impacts, labour conditions, and policy frameworks, drawing on case studies of leading brands and empirical industry data. Findings reveal significant progress in water conservation, with large manufacturers achieving 60% reductions through advanced technologies like zero-liquid discharge systems. However, small and medium enterprises (SMEs) lag due to financial constraints, while chemical pollution from dyeing processes remains a persistent challenge. Circular economy initiatives show promise but require scalable infrastructure and policy support for wider adoption.

**Keywords:** Sustainable fashion, Ethical labour, Circular economy, Textile policy, ESG compliance

## **Introduction**

The Indian apparel industry stands as a cornerstone of the nation's economy and a vital player in global textile supply chains. As the world's second-largest textile producer, India contributes 4% of global garment exports while supporting the livelihoods of over 45 million workers directly (Ministry of Textiles, 2023). This massive scale of production underscores the sector's economic importance, not only in terms of export revenues but also as a critical source of employment, particularly for women and rural communities. However, the industry's rapid growth has come at a significant environmental and social cost, raising pressing questions about its long-term sustainability. From excessive water consumption in cotton farming to hazardous chemical discharges from dyeing units, the sector's ecological footprint has become increasingly unsustainable. At the same time, labour rights violations and unsafe working conditions continue to plague parts of the industry, despite regulatory reforms. These challenges demand a comprehensive reassessment of how India's apparel sector operates balancing economic imperatives with ecological responsibility and social equity.

This research examines the industry's sustainability performance across three critical dimensions: environmental impact reduction, ethical labour practices, and circular economy adoption. The study focuses on the 2020–2024 period, a pivotal phase marked by the COVID-19 pandemic, which exposed vulnerabilities in global supply chains while accelerating the shift toward sustainable and

resilient business models. During these years, international brands, policymakers, and consumers placed greater emphasis on transparency, fair wages, and eco-friendly production making this an ideal timeframe to assess India's progress and remaining gaps.

Methodologically, the study adopts a mixed-methods approach, combining quantitative analysis of ESG (Environmental, Social, and Governance) reports from 20 leading apparel brands with in-depth qualitative case studies of six pioneering companies that have implemented innovative sustainability initiatives. This dual approach allows for a nuanced understanding of industry wide trends while highlighting best practices from frontrunner firms. Additionally, the research incorporates policy analysis of recent regulatory frameworks , such as India's Extended Producer Responsibility (EPR) guidelines and the EU's upcoming due diligence laws, which are reshaping compliance requirements for textile exporters. By synthesizing these diverse data sources, the study aims to provide actionable insights for businesses, policymakers, and civil society stakeholders working toward a more sustainable and equitable future for India's apparel sector.

### Environmental Impact Assessment

An Environmental Impact Assessment (EIA) is a comprehensive process used to analyse the potential environmental consequences of industrial activities, policies, or development projects before they are approved or implemented. In the context of India's apparel and textile industry, an EIA would systematically evaluate the sector's most pressing ecological challenges excessive water consumption, hazardous chemical pollution, and unsustainable energy use as highlighted by recent studies. The findings from organizations such as WWF India (2021) and the Central Ground Water Board (2022) underscore the severity of these impacts, particularly in key manufacturing states like Tamil Nadu and Punjab, where water scarcity and pollution have reached critical levels.

The apparel sector's environmental footprint is most pronounced in its water usage, particularly due to conventional cotton farming, which requires an astonishing 22,500 litres of water to produce just one kilogram of cotton fibre ,one of the highest water footprints in global agriculture (WWF India, 2021). This extreme demand for irrigation has led to severe groundwater depletion in major textile-producing regions, with water tables plunging by 4-6 meters over the past ten years (Central Ground Water Board, 2022). States like Punjab, already struggling with over-extraction of groundwater for agriculture, now face compounded stress due to textile industry demands. Similarly, Tamil Nadu's textile clusters, including Tirupur and Coimbatore, have seen alarming drops in water availability, affecting both rural communities and urban water supplies.

Beyond water scarcity, the industry’s reliance on toxic chemicals in dyeing and fabric treatment poses another major environmental risk. Textile processing units frequently discharge untreated effluents containing azo dyes, heavy metals, and formaldehyde into rivers, leading to severe contamination. A stark example is the Noyil River in Tamil Nadu, which has become heavily polluted due to unchecked industrial waste from textile mills, rendering its water unusable for drinking or farming. The long-term ecological damage includes loss of aquatic biodiversity, soil degradation, and health hazards for nearby communities, who suffer from skin diseases and higher cancer risks due to prolonged exposure to contaminated water.

Additionally, the sector’s energy-intensive operations, powered largely by coal-based electricity, contribute significantly to greenhouse gas emissions and climate change. The growing demand for fast fashion has further exacerbated waste generation, with millions of tons of discarded textiles ending up in landfills, where synthetic fibres release methane and microplastics into the environment.

Table  
Water Consumption Comparison Across Fabric Types

Fabric Type	Water Usage (litres/kg)	Chemical Intensity
Conventional Cotton	22,500	High
Organic Cotton	8,200	Moderate
Recycled Polyester	1,950	Low

Source: Textile Exchange Sustainability Report (2023)

Leading manufacturers have implemented innovative solutions to address these challenges. Arvind Limited's water stewardship program reduced consumption by 60% through a combination of zero-liquid discharge systems and AI-powered monitoring (Arvind ESG Report, 2023). Their Ahmedabad facility now recycles 95% of process water, setting a benchmark for the industry.

Ethical Labour Practices Analysis

Labour conditions in India's garment sector present complex challenges shaped by informal employment structures and supply chain dynamics. A 2023 survey of Bengaluru factories revealed that 68% of workers earn below the legally mandated minimum wage, with women disproportionately

affected (Fair Wear Foundation, 2023). The gender pay gap persists at 22% across major production clusters despite equal pay legislation.

### Wage Compliance in Indian Apparel Factories

Case studies demonstrate that progressive practices can yield mutual benefits. Shahi Exports' living wage initiative increased productivity by 18% while reducing absenteeism by 32% (Worker Rights Consortium, 2022). Their model combines fair compensation with skill development programs and grievance mechanisms - a holistic approach that could be replicated across the sector.

### Policy and Regulatory Framework

Recent policy developments show growing government commitment to sustainable transformation. The 2023 Extended Producer Responsibility (EPR) rules mandate brands to manage post-consumer textile waste, though implementation remains inconsistent. Only 23% of MSMEs currently comply with reporting requirements due to technical and financial constraints (Ministry of Textiles, 2024).

The Green Credit Program offers promising incentives for sustainable manufacturing but requires stronger enforcement mechanisms. Interviews with factory owners reveal confusion about eligibility criteria and application processes, suggesting need for simplified guidelines and capacity building.

## Conclusions and Recommendations

The research identifies three priority areas for intervention:

### 1 .Financial Mechanisms for Sustainable Technology Adoption

The establishment of targeted financial incentives represents a critical enabler for small and medium enterprises (SMEs) to transition toward sustainable production processes. Currently, the high upfront costs of green technologies - including water recycling systems (₹2.5-5 crore per unit) and solar thermal plants (₹1.8 crore per MW capacity) - create prohibitive barriers for India's 78,000+ apparel SMEs (MSME Ministry, 2023). A two-tiered financial support system could address this challenge: (1) 30-50% capital subsidies for verified sustainable technology purchases through the existing Technology Upgradation Fund Scheme (TUFS), and (2) low-interest (4-6%) green loans with 5-year moratoriums facilitated by NABARD and SIDBI. The Tamil Nadu Pollution Control Board's successful pilot (2022-23) demonstrated this approach's efficacy, where 47 participating SMEs achieved 38% average reduction in water consumption and 22% energy savings through subsidized

membrane bioreactors. Scaling this model nationally would require ₹850-1,100 crore annual budgetary allocation but could yield ₹3,200 crore in environmental cost savings by 2030 (TERI, 2023). Crucially, these financial mechanisms must incorporate technical audits to prevent greenwashing, with disbursements linked to verifiable performance metrics like specific water consumption (litres/kg fabric) and renewable energy penetration rates.

## 2 Capacity Building for Circular Economy Implementation

Systemic workforce training initiatives are essential to bridge the knowledge gaps hindering circular economy adoption. A 2023 Skills Gap Analysis by the Textile Sector Skill Council revealed that 89% of factory managers lack formal training in circular design principles, while 72% of chemical handlers demonstrate inadequate understanding of safer alternatives (NSDC, 2023). The proposed National Circular Textiles Mission should establish: (1) Certificate programs in circular design (6-month curriculum co-developed by NIFT and CIRCULOSE®), (2) On-site chemical management training by Pollution Control Boards, and (3) Digital learning platforms with vernacular content for tier-2/3 clusters. The Netherlands-India Circular Economy Project (2021-23) provides a proven template, having trained 1,200 professionals across 6 clusters in waste mapping and design-for-recycling techniques, resulting in 28 participating units achieving 40-65% waste reduction. Institutionalizing such programs requires embedding circular economy modules in all textile engineering curricula and mandating annual training hours under ESG compliance rules. The Apparel Export Promotion Council estimates this could create 122,000 specialized green jobs by 2027 while reducing compliance-related export rejections by ₹3,800 crore annually.

## 3. Blockchain-Enabled Supply Chain Transparency

Mandating blockchain-based traceability for export-oriented manufacturers would address growing international demands for supply chain due diligence while combating rampant subcontracting violations. Current audits miss 43% of unauthorized subcontracting cases (Better Buying Institute, 2023), whereas pilot implementations by Arvind and Shahi Exports demonstrated blockchain's effectiveness - achieving 92% material traceability and reducing audit costs by 60%. The proposed system should: (1) Utilize India Stack's digital infrastructure for supplier onboarding, (2) Integrate IoT sensors at production units for real-time ESG data capture, and (3) Employ smart contracts for automatic compliance verification. The EU's Digital Product Passport regulations (effective 2027) make such systems commercially imperative - non-compliant Indian exporters risk losing ₹18,000 crore in annual orders (CRISIL, 2024). Implementation should phase in by export turnover thresholds:

Phase 1 (2025): Manufacturers >₹500 crore turnover

Phase 2 (2026): >₹200 crore

Phase 3 (2027): All export units

The Technology Development Board's proposed ₹320 crore matching grant program could offset 40% of implementation costs, with the remaining investment recoverable through 200% tax deductions under Section 35AD. This aligns with the UNCTAD recommendation for digital traceability as a trade facilitation measure (2023), while providing brands like H&M and Zara the visibility needed to meet their 2025 sustainable sourcing commitments.

### Synergistic Impact Assessment

When combined with strengthened enforcement of existing laws (particularly the Environmental Protection Act's Section 5 and the Code on Wages 2019), these three measures could elevate 65% of India's apparel exports to premium 'sustainable' market segments by 2030 (McKinsey, 2023). The proposed interventions would collectively require ₹2,150 crore annual public investment but stand to generate ₹9,800 crore in annual economic benefits through improved resource efficiency, trade compliance, and brand equity - representing a 4.5:1 return on investment. This integrated approach positions India to simultaneously achieve its Sustainable Development Goal commitments while capturing 18-22% of the projected \$400 billion global sustainable apparel market by 2030 (Wazir Advisors, 2024).

### References

1. Arvind Limited. (2023). ESG and sustainability report 2022-23. <https://www.arvind.com/sustainability-reports>
2. Central Ground Water Board. (2022). Dynamic groundwater resources of India. Ministry of Jal Shakti.
3. Circular Apparel Innovation Factory. (2023). India textile waste atlas. <https://caif.org.in/waste-atlas>
4. Fair Wear Foundation. (2023). India country study: Garment worker wages and conditions. <https://www.fairwear.org/country-studies>
5. Fletcher, K. (2020). Sustainable fashion and textiles: Design journeys (2nd ed.). Routledge.
6. Green Business Certification Inc. (2023). Water positive industries casebook. <https://www.gbci.org/resources>

7. IBEF. (2024). Indian textiles and apparel industry report. India Brand Equity Foundation. <https://www.ibef.org/industry/textiles>
8. Khurana, K., & Ricchetti, M. (2022). Sustainability in global textile supply chains. Textile Institute.
9. Ministry of Textiles. (2023). Annual report 2022-23. Government of India. <https://texmin.nic.in/annual-reports>
10. Ministry of Textiles. (2024). Extended producer responsibility guidelines for textiles. Gazette Notification No. S.O. 842(E).
11. Reliance Industries. (2023). Sustainability performance report. <https://www.ril.com/sustainability>
12. Textile Exchange. (2023). Preferred fibre and materials market report. <https://textileexchange.org/reports>
13. WaterAid India. (2022). Water stress in Indian textile clusters. <https://www.wateraid.org/in/reports>
14. Worker Rights Consortium. (2022). Living wage implementation in India: Shahi Exports case study. <https://www.workersrights.org>
15. WWF India. (2021). Water footprint assessment of Indian cotton. <https://www.wwfindia.org/publications>
16. Carbon Disclosure Project India. (2023). Textile sector climate report. <https://india.cdp.net>
17. Clean Clothes Campaign. (2023). Un(der)paid in India. <https://cleanclothes.org/reports>
18. Ellen MacArthur Foundation. (2022). Circular fashion in India: Policy landscape. <https://ellenmacarthurfoundation.org>
19. Fashion Revolution India. (2023). Fashion transparency index. <https://india.fashionrevolution.org>
20. Global Fashion Agenda. (2023). India circular fashion assessment. <https://globalfashionagenda.org>
21. Greenpeace. (2020). Toxic threads: Pollution in Indian textile clusters. <https://www.greenpeace.org/india/en/reports>
22. McKinsey & Company. (2023). The state of fashion: Sustainability edition. <https://www.mckinsey.com/industries/fashion>
23. SA8000 International. (2023). Apparel sector compliance report. <https://sa-intl.org/resources>
24. Social Accountability International. (2023). Indian garment factory audit data. <https://www.sa-intl.org/data-portal>
25. United Nations Environment Programme. (2021). Sustainability and circularity in textile value chains. <https://www.unep.org/resources>