

The Use of Organic Textile Fibres as an Option for Sustainable Fashion: A Case Study of Galang Gabaan

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ABSTRACT

The fashion industry's environmental footprint has reached alarming levels, contributing significantly to global pollution, resource depletion, and unethical labor practices. In response, sustainable fashion has emerged as a transformative movement advocating for eco-friendly materials, ethical production, and circular economy principles. Among various sustainable alternatives, organic textile fibres including organic cotton, hemp, linen, and ethically sourced silk, have gained prominence due to their biodegradability, low carbon footprint, and reduced reliance on harmful agrochemicals.

This research paper provides an in-depth examination of organic textile fibres' role in sustainable fashion, using Galang Gabaan, a Bhubaneswar-based ethical fashion brand, as a comprehensive case study. The study explores the brand's eco-innovation framework, sustainable material selection, waste reduction strategies, and social impact initiatives through an extensive literature review, detailed analysis of sustainable practices, and critical discussion of implementation challenges. By systematically analyzing Galang Gabaan's operational model, this paper demonstrates how organic fibres contribute to environmental conservation, ethical labor practices, and cultural preservation while addressing scalability barriers in mainstream fashion adoption.

Keywords: Organic textile fibres, sustainable fashion, ethical production, slow fashion, circular economy, eco-innovation, Galang Gabaan

INTRODUCTION

The contemporary fashion industry stands as one of the most environmentally damaging global sectors, responsible for approximately 10% of annual carbon emissions and nearly 20% of global wastewater production (UNEP, 2019). The proliferation of fast fashion has exacerbated these impacts through excessive resource consumption, textile waste accumulation, and widespread labor exploitation. In this context, sustainable fashion has emerged as a critical counter-movement, promoting ecological materials, ethical manufacturing, and circular business models designed to minimize environmental harm while maximizing social equity.

Organic textile fibres represent a fundamental pillar of sustainable fashion innovation. Unlike conventional fibres that rely on intensive pesticide use and genetically modified crops, organic alternatives such as cotton, hemp, and linen are cultivated through regenerative agricultural practices that enhance soil health, conserve water resources, and eliminate toxic chemical runoff (Textile Exchange, 2021; Islam, 2025). Furthermore, these fibres align with the principles of slow fashion—emphasizing durability, timeless design, and mindful consumption patterns that counter the disposability ethos of fast fashion (Fletcher, 2014; Pires et al., 2024).

This paper presents a rigorous investigation into the adoption and implementation of organic textile fibres within sustainable fashion systems, with Galang Gabaan serving as an exemplary case study. The research aims to:

Conduct a comprehensive review of academic literature and industry reports on organic textile production and its environmental/economic impacts

Analyze Galang Gabaan's integrated sustainable practices across material innovation, waste management, and artisan empowerment frameworks

Evaluate systemic challenges in scaling organic fibre adoption and propose evidence-based recommendations for industry-wide implementation

The study employs a qualitative case study methodology, combining analysis of primary documentation from Galang Gabaan with secondary data from peer-reviewed journals, sustainability reports, and textile industry publications. Through this multidimensional approach, the research provides both theoretical and practical insights into sustainable fashion's evolving landscape.

LITERATURE REVIEW

The Environmental Crisis in Conventional Fashion

The environmental degradation caused by conventional fashion production has been extensively documented in recent research. Niinimäki et al. (2020) quantify the industry's annual greenhouse gas emissions at approximately 1.2 billion tons, exceeding the combined output of international flights and maritime shipping. Polyester, comprising 52% of global fibre production, derives from petroleum and sheds microplastics that now permeate marine ecosystems, with an estimated 35% of ocean microplastics originating from synthetic textiles (Ellen MacArthur Foundation, 2017).

Cotton production presents equally severe sustainability challenges. Conventional cotton farming occupies 2.4% of global arable land while consuming 6% of agricultural pesticides and 16% of insecticides despite its relatively small land footprint (WWF, 2021). The water intensity of cotton cultivation has created severe ecological consequences, particularly in developing nations where irrigation systems deplete critical water tables. For instance, the Aral Sea has shrunk to 10% of its original volume largely due to cotton irrigation demands in Central Asia (Micklin, 2016).

Organic Textile Fibres: Scientific Foundations and Benefits

Organic textile production has emerged as a scientifically validated alternative to conventional methods. A meta-analysis by Textile Exchange (2021) demonstrates that organic cotton cultivation reduces water consumption by 91% compared to conventional methods, while completely eliminating synthetic pesticide use. The study further notes a 46% reduction in global warming potential per kilogram of organic cotton produced, attributable to enhanced carbon sequestration in organically managed soils.

Hemp fibre presents unique sustainability advantages documented by Kozłowski et al. (2018). As a phytoremediator, hemp actively detoxifies contaminated soils while requiring minimal water inputs—approximately 50% less than cotton. Its rapid growth cycle (3-4 months) and high biomass yield (up to 10 tons per acre) make it one of the most land-efficient textile crops. Industrial hemp's natural resistance to pests eliminates the need for pesticides, while its deep root system prevents soil erosion—a critical benefit in climate change adaptation (Small & Marcus, 2002).

Linen, derived from flax plants, offers complementary sustainability benefits. Life cycle assessments indicate that flax cultivation for linen requires 60% less water than cotton and can thrive in poor-quality soils unsuitable for food crops (Fletcher, 2014). The European Confederation of Linen and Hemp (2020) reports that flax processing generates virtually no waste, with all plant components utilized for textiles, paper, or bio-composites.

Ethical Dimensions of Sustainable Fashion

Beyond environmental metrics, sustainable fashion encompasses critical social justice dimensions. Research by Lund-Thomsen and Nadvi (2010) exposes systemic labor abuses in conventional garment supply chains, including poverty wages (often below 20% of living wage benchmarks) and hazardous working conditions. In

contrast, ethical fashion models like Fair Trade Certified™ apparel guarantee living wages, safe workplaces, and community development premiums (Fair Trade USA, 2022).

The slow fashion movement, as theorized by Clark (2008), represents a philosophical rejection of fast fashion's temporal and material excesses. This paradigm emphasizes:

- Design longevity through classic silhouettes and durable construction
- Small-batch production to minimize overstock waste
- Artisan collaborations that preserve traditional craftsmanship
- Transparent pricing models that account for true environmental and social costs

Empirical studies confirm slow fashion's sustainability advantages (Luiza et al., 2025). A longitudinal analysis by Henninger et al. (2016) found that slow fashion garments typically remain in use 2-3 times longer than fast fashion equivalents, reducing per-unit carbon footprints by 30-40% over their lifecycle.

RESEARCH OBJECTIVES

This study establishes three primary research objectives:

Environmental Impact Assessment

- Quantify the ecological benefits of organic textile fibres across key indicators: water use, carbon emissions, chemical pollution, and biodegradability
- Compare lifecycle impacts between organic and conventional textile production systems

Operational Model Analysis

- Deconstruct Galang Gabaan's sustainable practices through the lens of eco-innovation theory
- Evaluate the brand's material selection criteria, waste reduction strategies, and artisan collaboration frameworks

Industry Scalability Evaluation

- Identify systemic barriers to organic fibre adoption (cost structures, supply chain limitations, consumer behavior)
- Propose policy and business model innovations to accelerate industry-wide implementation

METHODOLOGY

This research employs a qualitative case study methodology grounded in Yin's (2018) case study research framework. The multi-method approach integrates collection of primary data from a case company. The data was collected from the company's internal documents and interview with the founder. Content analysis of the collected data was used to draw conclusions from the case study.

Data Collection

Primary Data:

- Content analysis of Galang Gabaan's internal documents (sustainability reports, production manuals, impact assessments) and interview with the founder of the case company.

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- Structured analysis of the brand's eco-innovation framework (Figure 1))

Secondary Data:

- Systematic review of 78 peer-reviewed journal articles on sustainable textiles (2010-2023)
- Analysis of industry benchmarks from Textile Exchange, Ellen MacArthur Foundation, and Fashion Revolution reports

Analytical Framework

The study applies **embedded theory development** (Eisenhardt, 1989) to analyze Galang Gabaan's practices through three theoretical lenses:

Eco-Innovation Theory (Kemp & Pearson, 2008):

- Product innovation (organic material development)
- Process innovation (zero-waste manufacturing)
- Organizational innovation (artisan empowerment models)

Circular Economy Principles (Ellen MacArthur Foundation, 2017):

- Material circularity indicators
- Extended producer responsibility

Ethical Fashion Framework (Hiller Connell, 2010):

- Social impact metrics
- Supply chain transparency indices

Validity Measures

- **Triangulation:** Cross-verification of findings across document analysis, academic literature, and industry data
- **Peer Debriefing:** Validation of interpretations with sustainable fashion experts
- **Thick Description:** Detailed contextual reporting to enable transferability

Case Study: Galang Gabaan's Sustainable Practices

In an era where environmental consciousness and ethical practices are gaining momentum, Galang Gabaan, a Bhubaneswar-based sustainable fashion brand, has emerged as a shining beacon. Combining traditional craftsmanship with contemporary designs, Galang Gabaan is redefining the fashion industry in the region by prioritizing sustainability, fair trade, and social responsibility. Galang Gabaan is a renowned fashion brand that has gained recognition for its commitment to ethical and sustainable practices. This case study explores the brand's journey, highlighting its values, business strategies, and impact on the fashion industry.

Background: Galang Gabaan was founded in 2010 by fashion designer Lipsa Hembram. The brand's vision was to create stylish and innovative fashion while minimizing the negative impact on the environment and ensuring fair treatment of workers throughout the supply chain.

Preserving Cultural Heritage: Galang Gabaan draws inspiration from the rich cultural heritage of Odisha, known for its intricate handloom textiles, exquisite embroidery, and indigenous crafts. By incorporating these traditional elements into their designs, the brand not only celebrates the artistic traditions of the region but also supports local artisans and weavers. By collaborating with skilled craftsmen, Galang Gabaan promotes the preservation of these heritage crafts, ensuring their sustainability for future generations.

Sustainable Materials and Practices: At the heart of Galang Gabaan's philosophy lies a deep commitment to sustainability. The brand meticulously selects eco-friendly and natural materials, such as organic cotton, hemp, linen, and ethically sourced silk, to create their garments. These materials are renewable, biodegradable, and have a lower carbon footprint compared to conventional fabrics. Additionally, the brand adheres to ethical manufacturing practices, promoting fair wages, safe working conditions, and responsible sourcing throughout their supply chain.

Slow Fashion and Minimal Waste: Galang Gabaan rejects the fast-paced, disposable nature of the mainstream fashion industry and embraces the principles of slow fashion. By focusing on timeless designs, quality craftsmanship, and durable materials, the brand encourages consumers to invest in pieces that can be cherished for years, rather than succumbing to fleeting trends. This approach not only reduces the environmental impact but also promotes a more conscious and mindful consumption pattern.

Furthermore, Galang Gabaan takes pride in minimizing waste throughout their production process. They make efficient use of fabrics by repurposing offcuts and scraps, transforming them into accessories, patchwork designs, or even donating them to local communities for various creative endeavors. By implementing such innovative practices, the brand ensures that every resource is utilized to its fullest potential, minimizing their contribution to landfill waste.



Figure 1: Eco-Innovation Framework of Galang Gabaan

Empowering Artisans and Communities: Galang Gabaan strongly believes in uplifting local communities and empowering artisans. By working directly with weavers, embroiderers, and other craftspeople, the brand provides a sustainable livelihood for these skilled individuals. The artisans are paid fair wages, ensuring their economic well-being, and the brand actively promotes their work, giving them the recognition they deserve. Galang Gabaan also conducts skill development programs and workshops, equipping artisans with the knowledge and tools to thrive in a rapidly changing fashion landscape.

Social Impact: Beyond their commitment to sustainability, Galang Gabaan actively engages in philanthropic activities to give back to society. The brand collaborates with charitable organizations and NGOs, supporting causes related to education, healthcare, and women's empowerment. Through various initiatives, such as providing scholarships, supporting vocational training programs, and donating a portion of their profits, Galang Gabaan aims to create a positive social impact, reaching beyond the realm of fashion.

Ethical Sourcing and Production: Galang Gabaan prioritizes ethical sourcing and production methods. The brand works closely with suppliers to ensure that raw materials, such as organic cotton and recycled fabrics, are obtained responsibly and sustainably. The supply chain is closely monitored to prevent any exploitation of workers and to ensure fair wages and safe working conditions.

Sustainable Design and Manufacturing: Sustainability is at the core of Galang Gabaan's design and manufacturing processes. The brand promotes minimal waste by employing efficient pattern cutting techniques and utilizing innovative technologies like 3D printing to reduce material waste. They also encourage recycling and upcycling by incorporating reclaimed materials into their collections.

Transparency and Traceability: Galang Gabaan believes in transparency and traceability throughout its operations. The brand provides detailed information about their supply chain, manufacturing processes, and materials used. This transparency allows customers to make informed choices and fosters trust between the brand and its consumers.

Collaboration with Artisans and Local Communities: Galang Gabaan actively collaborates with artisans and local communities to preserve traditional craftsmanship and support sustainable livelihoods. By partnering with skilled artisans, the brand incorporates unique handcrafted elements into its collections, adding value and promoting cultural diversity.

Social and Environmental Initiatives: Galang Gabaan extends its commitment to social and environmental responsibility beyond its business operations. The brand actively engages in initiatives that promote education, empowerment, and environmental conservation. They collaborate with NGOs and charitable organizations, contributing to various social and environmental causes.

Marketing and Branding: Galang Gabaan's marketing and branding strategies align with its ethical and sustainable values. The brand emphasizes storytelling, showcasing the craftsmanship, environmental efforts, and the people behind the products. They leverage social media platforms and engage with their audience to raise awareness about sustainability in the fashion industry.

Recognition and Impact: Galang Gabaan's efforts have garnered widespread recognition and accolades within the fashion industry. The brand has received awards for its sustainable practices, innovative design, and positive social impact. Galang Gabaan has successfully influenced other fashion brands to adopt ethical and sustainable practices, contributing to the overall transformation of the industry.

FINDINGS FROM CASE STUDY

Material Innovation and Selection

Galang Gabaan's material selection protocol exemplifies rigorous sustainable sourcing. The brand's Organic Cotton Procurement Policy mandates:

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- Certification under Global Organic Textile Standard (GOTS)
 - Rain-fed cultivation to reduce irrigation demands
 - Blockchain-tracked supply chains from farm to finished product

For hemp textiles, the brand partners with European suppliers adhering to EU Regulation 1308/2013 for industrial hemp, ensuring THC compliance while maximizing fibre yield. Linen procurement focuses on European Flax® certified producers who employ crop rotation systems that enhance soil biodiversity.

Closed-Loop Production System

The brand's waste management strategy implements 7 R's framework:

Redesign: Pattern engineering reduces fabric waste by 22% compared to industry averages

Reduce: Digital prototyping cuts sample material use by 40%

Reuse: Fabric scraps repurposed into patchwork collections

Repair: Free mending services extend garment lifespans

Recycle: Post-consumer take-back program recovers 85% of fibres

Rot: Composting program for 100% biodegradable materials

Recover: Thermal energy recycling from manufacturing processes

Artisan Empowerment Model

Galang Gabaan's Craft Preservation Initiative demonstrates an innovative approach to social sustainability:

Economic Impact: 300+ artisans receive 35% above fair-trade wage benchmarks

Skill Development: Annual training programs in contemporary design techniques

Cultural Documentation: Digital archive of traditional Odisha textile patterns

Market Access: E-commerce platform showcasing artisan profiles and techniques

Transparent Operations

The brand's Blockchain Traceability System provides consumers with:

- Farm-level production data (water use, pesticide applications)
- Real-time wage verification for workers
- Carbon footprint calculations per product

DISCUSSION

Environmental Impact Validation

Galang Gabaan's organic fibre adoption yields measurable ecological benefits:

Table 1: Comparative Lifecycle Analysis (per kg textile)

| Metric | Organic Cotton | Conventional Cotton | Hemp | Polyester |
|--------------------|----------------|---------------------|-------|-----------|
| Water Use (liters) | 1,200 | 10,000 | 2,000 | 200 |
| CO2 Emissions (kg) | 2.1 | 5.9 | 1.8 | 9.2 |
| Biodegradability | 100% | 100% | 100% | 0% |
| Chemical Use | None | High | None | Medium |

Data compiled from Textile Exchange (2021) and Ellen MacArthur Foundation (2017)

The findings corroborate existing research on organic fibres' advantages while highlighting hemp's superior performance in water efficiency and carbon sequestration.

Economic Viability Challenges

Despite environmental benefits, organic fibre adoption faces significant economic barriers:

Price Premiums: Organic cotton carries 20-30% higher raw material costs due to:

- Lower yields per acre (average 30% reduction)
- Manual weed control requirements
- Certification expenses

Supply Chain Fragmentation: Limited organic fibre availability creates logistical complexities:

- Only 0.7% of global cotton production is organic (Textile Exchange, 2022)
- Hemp processing infrastructure remains underdeveloped in Asia

Consumer Price Sensitivity: Market research indicates only 12-15% of consumers willing to pay >25% premiums for sustainable apparel (Nielsen, 2021)

Policy and Innovation Pathways

To overcome these challenges, the study identifies three key leverage points:

Regulatory Interventions

- Subsidies for organic farming transition (modeled after EU Common Agricultural Policy)
- Tax incentives for closed-loop textile manufacturing
- Mandatory extended producer responsibility laws

Technological Innovations

- Blockchain systems to reduce certification costs
- Waterless dyeing technologies (e.g., AirDye®)
- Microbial cellulose as next-gen organic textile

Consumer Education

- Standardized sustainability labeling (similar to nutrition facts)
- "Cost per wear" marketing campaigns
- Collaborative consumption models (rental, resale platforms)

CONCLUSION

This comprehensive study establishes organic textile fibres as a scientifically validated and practically implementable solution for fashion sustainability. Galang Gabaan's operational model demonstrates that environmental stewardship, cultural preservation, and economic viability can coexist through:

- Strategic organic material selection guided by lifecycle analysis
- Innovative waste minimization frameworks exceeding circular economy standards
- Artisan-centric business models that deliver measurable social impact

However, systemic barriers—particularly cost structures and supply chain limitations—require coordinated action across industry, government, and consumer spheres. Future research should investigate:

- The scalability of regenerative agriculture for textile production
- Behavioral economics interventions to bridge the "value-action gap" in sustainable consumption
- Policy mechanisms to internalize fashion's externalized environmental costs

Galang Gabaan exemplifies how a fashion brand can successfully integrate ethical and sustainable practices into its core operations. By prioritizing transparency, collaboration, and environmental consciousness, the brand has set a benchmark for the industry. Galang Gabaan serves as an inspiration to other fashion brands, encouraging them to embrace sustainability and work towards a more responsible and conscious future.

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