


SUSTAINABILITY IN TEXTILES: A CRITICAL REVIEW OF ECO – FRIENDLY PRACTICES AND MATERIALS

Jyoti Sawant¹ , Ramratan Guru² , Deepika Grewal³ , Dr. Sunil Changdev Talekar⁴ , Swapanali Parveen Kulkarni⁵ 

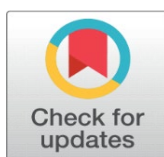
¹ Assistant Professor, School of Fashion Design and Technology, Lovely Professional University, Phagwara, Punjab, India

² Assistant Professor, School of Design, Mody University of Science and Technology, Laxmangarh, Sikar, Rajasthan, India

³ Assistant Professor, Department of Textile Engineering, Giani Zail Singh Campus College of Engineering and Technology, MRSPTU, Bathinda, Punjab, India

⁴ Professor, School of Design, Mody University of Science and Technology, Laxmangarh, Rajasthan, India

⁵ PhD Scholar, Department of Design, Vishwakarma University, Pune, Maharashtra, India



Received 13 January 2024

Accepted 08 July 2024

Published 10 July 2024

Corresponding Author

Jyoti Sawant,
sawantravi976@gmail.com

DOI

[10.29121/shodhkosh.v5.i2.2024.891](https://doi.org/10.29121/shodhkosh.v5.i2.2024.891)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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ABSTRACT

Sustainability in textiles, focusing on eco-friendly practices and materials. The paper examines the multifaceted approaches adopted by the fashion industry to mitigate environmental impact and promote ethical production. It scrutinizes the adoption of eco-conscious practices, such as utilizing organic fibers, recycled materials, and innovative biodegradable textiles. Through an analytical lens, the review evaluates the efficacy of these eco-friendly measures in reducing the industry's carbon footprint, minimizing waste, and conserving natural resources. It delves into the challenges faced in the widespread adoption of sustainable practices, considering issues related to scalability, cost-effectiveness, and consumer adoption. Further more, the review assesses the social and ethical dimensions of sustainable fashion, emphasizing fair labor practices, supply chain transparency, and the empowerment of communities involved in textile production. Drawing upon a comprehensive analysis of scholarly articles, industry reports, and case studies, this review critically examines the progress, limitations, and future prospects of sustainability in fashion and textiles, providing insights for researchers, practitioners, and policymakers in advancing eco-friendly practices within the industry.

Keywords: Sustainability, Textiles, Eco-Friendly, Eco-Fashion

1. INTRODUCTION

The fashion and textile industry stands at a critical juncture, propelled by a growing imperative to embrace sustainability. This review delves into the intricate

tapestry of eco-friendly practices and materials, elucidating their significance and impact within this dynamic landscape [Desore & Narula \(2018\)](#).

At the forefront of this paradigm shift are fashion designers whose approaches play a pivotal role in reshaping the industry. Designers are increasingly championing sustainability by integrating eco-conscious methodologies into their creative processes. Their decisions on material selection, manufacturing techniques, and supply chain management are instrumental in driving sustainable transformations [Patti et al. \(2021\)](#). This review examines the strategies and innovations employed by designers to minimize environmental footprints, embrace ethical production, and steer the industry towards a more sustainable future.

Central to this discourse are the sustainable materials revolutionizing fashion and textiles. From organic cotton and hemp to recycled fibers and innovative biodegradable textiles, a spectrum of eco-friendly materials has emerged [Moorhouse & Moorhouse \(2017\)](#). This review critically evaluates the efficacy of these materials in curbing environmental degradation, analyzing their production processes, durability, and potential scalability within the industry.

By scrutinizing the designer-led approaches and the spectrum of sustainable materials, this review aims to unravel the intricacies, challenges, and prospects of sustainability in fashion and textiles. It seeks to provide a comprehensive understanding for stakeholders, researchers, and industry enthusiasts, offering insights to foster a more eco-conscious and responsible trajectory for the fashion and textile domains [He et al. \(2019\)](#).

Eco-friendly materials form a cornerstone of sustainable fashion. Traditional textiles often rely on resource-intensive processes and materials like conventional cotton, which demands substantial water and chemical usage. However, the industry is gradually embracing alternatives such as organic cotton, hemp, bamboo, and recycled fibers. These materials offer reduced environmental footprints through lower resource consumption, decreased chemical usage, and minimized waste generation.

Manufacturing processes are another critical aspect of sustainable fashion. Concepts like 'zero-waste design' and 'circular economy' have gained traction, encouraging designers and manufacturers to minimize waste throughout the production cycle [Henry et al. \(2019\)](#). Techniques such as upcycling, where discarded materials are transformed into new products of higher value, showcase the potential for creative and sustainable solutions.

Ethical considerations are pivotal within sustainable fashion. Supply chain transparency and fair labor practices have come under scrutiny, prompting consumers to demand accountability from brands. Initiatives like fair wages, safe working conditions, and reduced carbon emissions during manufacturing are becoming central to sustainable brand identities [Yasin & Sun \(2019\)](#).

Consumer behavior plays a crucial role in shaping the fashion industry's trajectory. The rise of conscious consumerism has led to increased demand for sustainable products. This shift in mindset emphasizes the importance of educating consumers about the environmental and social impacts of their choices, thus encouraging more responsible purchasing decisions.

2. SCOPE OF REVIEW

The principal objective of this research endeavor is to foster heightened consciousness among both consumers and corporations pertaining to the entirety of the fashion product life cycle, advocating for the integration of sustainable

materials. The focal point of this effort involves vigilant oversight over the sourcing and legitimacy of materials, commencing from their raw form and extending through the various stages of production until the eventual receipt by end consumers. By orchestrating this process, the overarching aim is to provoke a paradigm shift among designers and corporate entities, stimulating a reorientation towards sustainability-centric thinking. This transformation is anticipated to catalyze the development of novel product lines that are intrinsically aligned with a visionary pursuit of sustainability within the fashion industry.

1) Sustainability:

Sustainability is a fundamental principle that encompasses every facet of living, guiding practices and choices towards a harmonious coexistence with the environment, society, and economy. From individual actions to global policies, embracing sustainability is crucial for securing a more balanced and resilient future for generations to come.

At its core, sustainable living entails responsible consumption and mindful resource utilization. It starts with everyday choices, such as reducing waste, conserving energy, and minimizing water consumption. These actions, when adopted collectively, contribute significantly to environmental preservation. Simple habits like recycling, using energy-efficient appliances, opting for public transportation or carpooling, and conserving water not only reduce individual ecological footprints but also create a collective impact on global resource management.

Sustainable living extends beyond personal habits to include ethical and conscious consumer choices. Supporting brands and products that prioritize sustainable sourcing, ethical labor practices, and minimal environmental impact drives market demand for responsible production. This, in turn, encourages industries to adopt more sustainable practices and reduces the exploitation of resources and people.

Education and awareness are integral components of sustainable living. Empowering individuals with knowledge about environmental issues, biodiversity conservation, climate change, and sustainable practices fosters a deeper understanding and commitment to preserving the planet. Educational institutions, advocacy groups, and community initiatives play crucial roles in disseminating information and encouraging sustainable behaviors.

In governance and policy-making, sustainability serves as a guiding principle for shaping legislation and regulations. Governments worldwide are increasingly adopting policies that promote renewable energy, conservation of natural resources, emission reduction, and sustainable development. International agreements and frameworks, such as the Paris Agreement and the Sustainable Development Goals (SDGs), set global agendas aimed at achieving a more sustainable and equitable future for all.

Furthermore, sustainable living emphasizes social equity and inclusivity. It recognizes the interconnectedness of environmental, social, and economic aspects, striving to ensure that progress is not at the expense of marginalized communities. Prioritizing fair labor practices, social justice, and access to basic resources like clean water and healthcare are essential components of a sustainable society.

In essence, sustainability is a holistic approach that integrates environmental stewardship, social responsibility, and economic viability. Embracing sustainability in every aspect of life – from personal choices to global initiatives – fosters

resilience, promotes harmony with nature, and supports a more equitable and prosperous world for present and future generations.

2) Sustainability of Textile Industry:

The interconnection between efficiency and sustainability stands as a foundational premise. The concept of achieving "more with less" epitomizes a pivotal stride toward sustainable practices. Companies and brands that embark upon the path of manufacturing goods of superior quality while minimizing energy consumption and resource inputs are poised not only for natural growth but also for profitable outcomes. This dual advantage underscores the inherent benefits derived from such conscientious endeavors. Within the textile industry, sustainability plays an ever more central role, acting as a propulsive catalyst towards an ethos that champions environmentally mindful and socially responsible modes of textile production. Sustainability in textiles encompasses a wide range of practices aimed at reducing the industry's environmental impact, promoting ethical manufacturing, and fostering a circular economy [Shen et al. \(2017\)](#).

At the heart of sustainable textile production lies the choice of materials. Conventional textile manufacturing heavily relies on resource-intensive materials like conventional cotton, polyester, and nylon, which often involve high energy consumption, water usage, and chemical treatments. However, sustainable textiles prioritize eco-friendly alternatives such as organic cotton, hemp, bamboo, and recycled fibers [Kazancoglu et al. \(2020\)](#).

Organic cotton, grown without synthetic pesticides and fertilizers, significantly reduces environmental harm by preserving soil health, conserving water, and safeguarding biodiversity. Hemp, a highly versatile and fast-growing crop, requires fewer resources and minimal chemical inputs, making it an environmentally friendly choice. Bamboo, known for its rapid growth rate and minimal need for water and pesticides, presents itself as a sustainable option for textile production [Islam et al. \(2021\)](#). Furthermore, recycled fibers sourced from post-consumer waste or industrial scraps reduce the demand for virgin materials and divert textile waste from landfills, contributing to a circular economy.

Innovative advancements have also led to the emergence of alternative materials derived from natural sources. Fabrics crafted from pineapple leaves (Piñatex), orange peels, algae, and mushroom mycelium showcase the potential for sustainable textiles. These biomaterials offer biodegradability, durability, and reduced environmental impact, presenting new avenues for sustainable textile innovation [Saleem & Zaidi \(2020\)](#).

Sustainability in textile production isn't limited to material choices; it extends to manufacturing processes as well. Adopting eco-friendly practices like using low-impact dyes and chemicals, reducing water usage, and implementing energy-efficient technologies significantly minimizes the environmental footprint of textile production. Techniques such as waterless dyeing, where innovative technologies allow for dyeing fabrics without water, and digital printing methods reduce chemical and water usage while enhancing sustainability. The textile industry is increasingly embracing circularity – the concept of creating closed-loop systems that minimize waste and maximize the use of resources. The integration of recycling and upcycling initiatives within the textile sector serves as a pivotal driver in realizing the ideals of a circular economy. These initiatives involve intricate processes that transform discarded fabrics into renewed fibers, yarns, or finished garments. Such practices substantially diminish the reliance on raw materials while

simultaneously diverting textile waste away from landfills, aligning with the overarching goals of sustainability.

Furthermore, sustainability in textiles encapsulates a conscientious emphasis on ethical manufacturing methodologies. Central to this approach is the assurance of fair wages, the provision of safe working conditions, and the steadfast protection of workers' rights across the entire supply chain. Notably, sustainable textile production hinges upon collaborations between brands and manufacturers and certified facilities that espouse and prioritize fair labor practices. These partnerships are instrumental in fostering an industry that is not only environmentally conscious but also ethically and socially responsible [Nimkar \(2018\)](#).

Sustainability within the textile industry extends beyond its environmental advantages; it encompasses a broader scope that resonates with the evolving mindset of consumers. There is a notable shift in consumer consciousness towards a deeper understanding of the ethical and environmental implications stemming from their clothing choices. This heightened awareness has precipitated an escalating demand for textiles that are not only sustainable but also produced in an ethically responsible manner. Brands that prioritize sustainability gain a competitive edge by meeting consumer expectations for eco-friendly and responsible products.

3) Sustainable materials:

The textile fashion industry is increasingly prioritizing sustainability, emphasizing the use of textile fibers that are naturally sustainable and have minimal environmental impact. Examples of these sustainable fibers in the textile sector include organic cotton, bamboo, flax, hemp, jute, ramie, sisal, abaca, among others. The current focus on sustainability is not merely a passing trend but a crucial concept for long-term survival in business.

While fabric finishing and garment manufacturing consume significant resources such as energy and water, textile industry producers are proactively considering sustainable practices right from the initial stages. Embracing sustainable fibers as raw materials for creating textile fashion products signifies a fundamental approach toward sustainability from the outset. However, there remains considerable confusion regarding the sustainability impacts of textile material production. Generally, natural fibers are often regarded as more sustainable, while synthetic fibers are perceived as less sustainable. This viewpoint is rooted in the belief that natural fibers require fewer resources during production compared to synthetic fibers, and synthetic fibers tend to have greater adverse effects on both people and the environment [Cai & Choi \(2020\)](#).

Certainly, the sustainability analysis involves a more comprehensive understanding. While the production of synthetic fibers demands substantial resources, the cultivation of cotton carries its own significant impacts. Growing cotton necessitates large quantities of pesticides, fertilizers, and water. To produce 1 kg of cotton, approximately 8000 liters of water are required. In comparison, the production of 1 kg of polyester utilizes less water. However, it requires twice the amount of energy compared to producing the same quantity of cotton. As an alternative to conventional cotton, organic cotton or low-chemical cotton presents itself as a sustainable option due to its social and environmental benefits. The production of organic cotton involves the avoidance of synthetic pesticides and

fertilizers, resulting in reduced water consumption. This approach contributes to the promotion of sustainability by mitigating adverse environmental impacts.

The societal and ethical impacts of fibers extend beyond environmental concerns. Presently, the carbon emissions generated during the production of synthetic fibers pose a significant issue. Consequently, there is a growing demand for carbon-neutral fibers, such as those derived from plants like bamboo and Lyocell. These fibers exhibit the unique capability to absorb the same quantity of carbon dioxide from the environment during their growth as they release throughout their production cycles, thereby contributing to maintaining a cleaner atmosphere. In contrast to oil-dependent non-biodegradable synthetic fibers like polyester and nylon, there's a noticeable shift towards renewable and biodegradable synthetic fibers derived from natural resources, such as Lyocell and Poly Lactic Acid (PLA). These natural plant fibers and synthetic fibers produced from natural resources are inherently eco-friendly, consuming fewer resources, and are both recyclable and sustainable in their characteristics. This transition supports a more environmentally conscious approach within the textile industry, promoting sustainability and reduced ecological impact.

4) Significance of sustainability in today's world:

Sustainable fashion and textiles have gained immense significance in today's world due to the pressing need to address the environmental and social impact of the fashion industry. This movement towards sustainability encompasses various practices aimed at reducing the industry's ecological footprint and promoting ethical production methods.

The significance of sustainable fashion lies in its potential to mitigate the adverse effects of the traditional fashion industry, which is known for its resource-intensive processes, high carbon emissions, and extensive waste generation. By embracing eco-friendly materials such as organic cotton, hemp, recycled fibers, and innovative textiles made from natural sources, sustainable fashion aims to minimize environmental degradation. These materials often require fewer resources, less water, and reduced chemical usage compared to conventional fabrics [Gardas et al. \(2018\)](#).

Furthermore, the importance of sustainability in fashion extends beyond materials to encompass ethical considerations and responsible manufacturing practices. This includes ensuring fair wages, safe working conditions, and transparency throughout the supply chain. By prioritizing ethical production, sustainable fashion endeavors to promote social justice and improve working conditions for garment workers worldwide.

In today's world, consumers are increasingly conscious of their purchasing decisions and are demanding transparency from fashion brands. This consumer-driven shift towards sustainable fashion is crucial in driving change within the industry. Brands that prioritize sustainability are gaining popularity among consumers who seek environmentally friendly products and support ethical practices.

Moreover, sustainable fashion aligns with the concept of a circular economy, emphasizing the importance of reducing, reusing, and recycling clothing. Initiatives promoting circularity, such as garment recycling programs, upcycling, and designing for longevity, aim to minimize textile waste and extend the lifespan of fashion items.

Overall, the importance of sustainable fashion and textiles in today's world cannot be overstated. It represents a necessary shift towards a more responsible and environmentally conscious industry that considers the long-term well-being of the planet and its inhabitants. Embracing sustainability in fashion is crucial not only for reducing environmental impact but also for fostering ethical practices, meeting consumer demands, and creating a more sustainable future for the fashion industry and beyond.

5) Sustainable practices for textile:

The evolution toward sustainable practices within textile production signifies a paradigm shift towards environmental stewardship and ethical responsibility. At the forefront of this movement lies the practice of organic farming, advocating for the abandonment of synthetic pesticides and fertilizers in favor of nurturing fibers like cotton, hemp, and flax through natural alternatives. This not only fosters the growth of these crucial textiles but also heralds a commitment to preserving biodiversity, offering a substantial departure from the environmental impact associated with conventional agricultural methods.

The infusion of creativity and innovation emerges in the concepts of recycling and upcycling, injecting new vitality into the industry by incorporating recycled materials and breathing new life into discarded resources. This transformation into higher-value products markedly reduces reliance on virgin resources and underscores a proactive stance against the mounting challenges of waste accumulation in textile production [Palacios-Mateo et al. \(2021\)](#).

The conservation of water resources stands as a cornerstone in sustainable textile production. The adoption of cutting-edge technologies and processes aimed at minimizing water usage, exemplified by water-efficient dyeing techniques and the implementation of closed-loop water systems, plays a pivotal role in upholding environmental preservation as an integral industry priority.

Concomitantly, the migration towards low-impact dyes and chemicals symbolizes a conscious departure from conventional practices, pivoting toward the utilization of natural, non-toxic, or biodegradable alternatives in dyeing and finishing processes. This transformative approach not only mitigates pollution but also exemplifies a commitment to curbing the detrimental environmental repercussions often linked to traditional chemical usage.

The propulsion towards energy-efficient manufacturing signifies a concerted effort to harness renewable energy sources and optimize production processes, thereby curtailing energy consumption and carbon emissions. This strategic alignment with sustainability objectives represents a fundamental shift towards a more eco-conscious industry.

The establishment of closed-loop systems within the production cycle further underscores this commitment by enabling the continual recycling and reutilization of materials, thereby significantly reducing waste output and diminishing the demand for raw resources.

Delving deeper into the realm of sustainable fiber production, the exploration of alternative materials such as bamboo, hemp, Tencel, and other environmentally friendly options signifies a departure from the resource-intensive nature of traditional textiles, heralding a pivotal stride towards environmental preservation and resource efficiency [Toprak & Anis \(2017\)](#).

The adherence to stringent certifications and standards, exemplified by GOTS, OEKO-TEX, or Cradle to Cradle, serves as a guiding beacon ensuring the

comprehensive adoption of environmentally and socially responsible practices throughout the production chain. This adherence not only instills consumer confidence but also embodies a commitment to sustainable principles.

Furthermore, the reduction of chemical usage through the integration of innovative methodologies, including natural alternatives and cutting-edge technologies like plasma technology, reflects a resolute dedication to mitigating environmental harm within the textile production landscape.

Emphasizing ethical labor practices as a cornerstone, the assurance of fair wages, safe working conditions, and unwavering compliance with labor rights across the supply chain underscores a commitment to social sustainability, fostering an industry that champions equity and responsibility.

Embracing digital innovation and technological advancements, such as 3D knitting, digital printing, and computer-aided design (CAD), not only underscores a commitment to minimizing waste but also heralds a significant leap towards enhancing production efficiency, aligning with the overarching objectives of sustainability [Peters & Simaens \(2020\)](#).

Finally, the implementation of robust traceability and transparency systems, empowering consumers to trace the origins of textiles and verify ethical sourcing, contributes significantly to building trust and confidence in products that uphold environmental and social responsibility.

6) Eco-Fashion in the clothing sector:

In the early 1990s, global communities and businesses began embracing the green movement, seeking eco-friendly alternatives like organic cotton, bamboo fibers, biodegradable detergents, and papers sourced from sustainably managed forests. These products were marketed and sold under the umbrella of 'eco-friendly.' However, over time, customers became dissatisfied as they found that the quality of these eco-friendly products did not align with their prices. Esprit Company notably launched their 'Ecollection,' featuring garments made from organic cotton with natural dyes. Initially, this collection gained substantial market traction, but customers gradually lost interest due to limited color ranges and dull hues. An innovative move was made by PATAGONIA, introducing a fleece jacket crafted from recyclable PET plastic bottles, which proved immensely successful in the market. As a result, numerous other companies followed suit, creating their versions of fleece jackets from PET bottles. However, this also led to the emergence of cheap fleece jackets in the lower-quality market segment, with some manufacturers using different materials that were not actually recycled.

The green movement in the clothing sector gained substantial momentum in the late 20th century and has persisted into the 21st century. It originated from increased awareness of environmental issues, encompassing concerns about pollution, resource depletion, and social issues associated with labor practices within the fashion industry. This ongoing movement reflects a continued effort to address these critical environmental and social challenges within the fashion and textile sectors. In the late 20th century, as information about the negative environmental impact of the clothing industry became more widely known, consumers, activists, and certain fashion brands started advocating for sustainable practices. This movement was fueled by concerns over the excessive use of resources, pollution from textile production, and the exploitation of labor in some manufacturing processes [Kazancoglu et al. \(2020\)](#).

The shift towards sustainability in the clothing sector accelerated in the early 2000s, with increasing public awareness, regulations, and the emergence of eco-conscious consumer behavior. This led to the rise of eco-friendly materials, recycling initiatives, fair trade practices, and ethical fashion movements aimed at reducing the industry's environmental and social footprint.

7) The sustainable methodology adopted by designers:

Fashion designers play a crucial role in adopting sustainable practices. Their choice to use eco-friendly materials, minimize waste, and ensure fair labor practices during clothing production significantly impacts the environment and society. This approach isn't just about enhancing the fashion industry's future; it's about creating a positive impact on both people and the planet. By prioritizing sustainability, designers contribute to a more balanced and environmentally friendly world.

In recent years, as sustainability has become integral to the textile industry, numerous fashion companies have engaged diverse designers to enhance their product market presence effectively. Designers, as trendsetters, envision future consumer perceptions and approaches. Essentially, they serve as the cornerstone of fashion and retail companies, greatly influencing product sales. Drawing inspiration from various sources such as colors, locations, current fashion trends, magazines, catalogs, and their surroundings, designers craft products. Throughout the design process, they advise companies on the entire supply chain, detailing the product's journey from raw materials to the final garment. Hence, it is crucial for designers to embrace a sustainable mindset and advocate for sustainable materials in the company's product range. Fashion designers embracing sustainable methodologies play a pivotal role in shaping both the clothing industry and the planet's future. Their dedication to integrating eco-consciousness into their designs and practices holds profound significance in our contemporary world. [Yasin & Sun \(2019\)](#).

At its core, a sustainable approach in fashion design revolves around minimizing environmental impact and promoting ethical practices throughout the entire production cycle. This means using eco-friendly materials, reducing waste, and ensuring fair treatment of workers involved in the creation of garments.

One of the fundamental aspects of sustainable fashion design involves the choice of materials. Designers opt for organic fibers, recycled fabrics, or other renewable resources, significantly reducing the negative environmental impact associated with traditional textile production. For instance, organic cotton cultivation uses fewer pesticides and promotes healthier soil, water conservation, and biodiversity preservation compared to conventional cotton farming. Similarly, recycled polyester lessens reliance on virgin resources and reduces energy consumption and emissions.

Moreover, a sustainable approach emphasizes the reduction of waste at every stage of production. Designers employ techniques like zero-waste pattern cutting, where patterns are crafted in a way that leaves minimal or no fabric scraps. Additionally, embracing innovative technologies and processes that allow for recycling materials and transforming waste into new clothing items further contributes to a circular fashion economy [He et al. \(2019\)](#).

Fair labor practices are another vital component of sustainable fashion. Designers ensure that the individuals involved in creating their clothing are treated ethically and paid fair wages. This commitment not only supports the well-being of workers but also promotes social justice within the fashion supply chain.

he significance of designers adopting sustainable approaches goes beyond the fashion industry itself. It reflects a shift towards a more responsible and conscientious consumer culture. By advocating for sustainability, designers encourage consumers to make informed choices, supporting brands that prioritize ethical and eco-friendly practices. This, in turn, creates a demand for more sustainable products, fostering a positive cycle of change in the industry.

Furthermore, the impact of sustainable fashion extends to environmental conservation. By reducing the use of toxic chemicals, conserving water, and decreasing carbon emissions, sustainable approaches help mitigate the industry's adverse effects on the environment. This contributes to preserving natural resources and ecosystems, thereby supporting a healthier planet for current and future generations.

3. USE OF TOXIC CHEMICALS INCLUDING HEAVY METALS

Chemicals including heavy metals in textile Industry has resulted in severe environmental pollution and health hazards. Therefore, it is crucial for the textile industry to adopt eco-friendly practices and alternative sources of dyes to minimize the negative impact on the environment and protect the well-being of both the planet and its inhabitants. The use of toxic chemicals, including heavy metals, in the textile industry has not only led to severe environmental pollution but also poses significant health hazards. These chemicals, when released into the water bodies, can contaminate drinking water sources and harm aquatic life. Moreover, they can also have detrimental effects on the health of textile industry workers, as well as consumers who come into contact with these toxic textiles. Around 25% of the chemical compounds produced worldwide are used to a greater or lesser extent in the textile industry globally. As many as 2000 different chemicals are used in textile processing, especially in textile wet processing, many of which are known to be harmful to human (and animal) health.

4. GENERATION OF HUGE WASTE

The textile industry plays a big role in creating environmental waste, generating large amounts of post-consumer waste, industrial byproducts from various stages of production, and hazardous materials from related industries. Properly getting rid of this waste is a challenge because there are not enough advanced recycling technologies that can handle mixed materials. As a result, a lot of this waste either ends up in landfills or gets burned, adding to environmental issues. This problem is made worse by the increasing consumption of textiles, driven by fast fashion trends and the ongoing pandemic. This rise in demand only exacerbates the global textile waste problem. To address this issue, there is a growing need for sustainable approaches in textile waste management, emphasizing the importance of recycling and reducing the environmental impact of textile production and disposal.

5. CONCLUSION

The fashion and textile industry are undergoing a transformative shift toward sustainability, driven by a growing recognition of the need to address environmental and social concerns. This review has explored the multifaceted dimensions of sustainability within this industry, emphasizing the pivotal role of

designers, the emergence of eco-friendly materials, and the significance of consumer behavior in shaping a more responsible and environmentally conscious sector.

Designers have become crucial agents of change by integrating sustainability into their creative processes. Their decisions regarding material selection, manufacturing techniques, and supply chain management are instrumental in steering the industry toward more sustainable practices. Strategies like zero-waste design, circular economy principles, and upcycling showcase innovative approaches that minimize waste and promote eco-conscious solutions. The review has highlighted the importance of sustainable materials in revolutionizing fashion and textiles. Eco-friendly alternatives such as organic cotton, hemp, recycled fibers, and innovative biodegradable textiles offer reduced environmental footprints through lower resource consumption and decreased chemical usage. Assessing these materials' efficacy in curbing environmental degradation, analyzing their production processes, durability, and scalability within the industry, provides insights into their potential contributions to sustainability.

Moreover, the significance of sustainability extends beyond materials to encompass ethical considerations, supply chain transparency, and fair labor practices. Consumer behavior has also undergone a shift, emphasizing the importance of educating individuals about the environmental and social impacts of their choices, thereby encouraging more responsible purchasing decisions. The research project's primary aim is to create awareness among consumers and companies about the value chain of fashion products and the utilization of sustainable materials throughout the product life cycle. By promoting sustainability from sourcing raw materials to the finished product, this initiative aims to change mindsets and foster the development of new, environmentally conscious products. Sustainability, as a guiding principle, encompasses environmental stewardship, social responsibility, and economic viability. It involves responsible consumption, mindful resource utilization, and ethical consumer choices. Governments, international agreements, educational institutions, and advocacy groups all play pivotal roles in promoting sustainability across various domains, fostering a more balanced and resilient future.

In the textile industry specifically, sustainability is intertwined with efficiency. Making more with less, optimizing energy and input usage while ensuring quality production, underscores the industry's commitment to sustainability. The adoption of eco-friendly practices, reduced water usage, low-impact dyes, and the focus on ethical manufacturing practices are pivotal in reducing the industry's environmental impact. The role of fashion designers in embracing sustainability cannot be overstated. Their adoption of eco-friendly materials, reduction of waste, and emphasis on fair labor practices significantly impact the environment and society. This shift toward sustainable fashion design not only promotes ethical practices but also influences consumer behavior and supports environmental conservation. The move towards sustainability in the fashion and textile industry represents a critical step in addressing the environmental and social challenges faced by the sector. By integrating eco-friendly practices, embracing ethical considerations, and fostering consumer awareness, the industry can progress towards a more responsible, equitable, and environmentally conscious future.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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