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Chapter

Fashion Footprint: How Clothes Are Destroying our Planet and the Growing Impacts of Fast Fashion

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Abstract

From agriculture and petrochemical production to manufacturing, logistics, and retail, the textile and fashion industry is the second most polluting industry in the world, responsible for between 8 to 10% of total carbon emissions and 20% of global wastewater, with a predicted increase of 50% in greenhouse gas emissions by 2030. To gain a better understanding of the state of the academic literature on the environmental impact of fast fashion, we systematically identified and analysed 30 publications published between January 2000 and December 2022. In the end, we discovered that there is a growing research interest in fast fashion, especially in relation to its devastating environmental impacts, which range from the cultivation of raw fibres to the recycling of fashion waste. Subsequently, we provide a summary of the key findings, including the carbon and water footprints, as well as some sustainable practices believed to reduce the industry's negative environmental impacts.

Keywords: fast fashion, climate change, greenhouse gas emissions, global warming, environmental impact, sustainable fashion, fashion footprint, textile industry

1. Introduction

In recent years, discussions of global warming and the resulting issue of climate change have become increasingly popular in political and scientific discourses. It is not only the most talked-about topic of the day, but also the focal point of political and social campaigns in countries across the globe. Today, one of the most obvious ways in which the clothes we wear contribute to global warming is by littering developing countries, which lack the infrastructure to properly manage such waste, with the massive amount of fast fashion waste consumed in countries of the Global North, referred to in the following text as the West [1]. Individually, determining the most efficient approach to addressing climate issues can be overwhelming. That is, at the individual level, climate action involves changing habits and routines by making choices that have less harmful effects on the environment [1]. In addition, individuals may demonstrate an interest in how they can influence system-wide changes within organisations. Notwithstanding its intricacies, the clothing and fashion sector represents a highly consequential industry that affords us all the opportunities to exert a

positive influence on the environment [2]. According to a recent report, the industry is responsible for between 8 and 10 percent of global emissions, a figure that exceeds the combined emissions of aviation and shipping [1]. In addition to the predicted increase of 50% in the industry's carbon footprint by 2030, the industry emits 1.2 billion tons of CO₂ annually [3].

Consequently, this chapter provides a welcome opportunity to discuss the environmental cost of fast fashion, establishing how the clothes we wear significantly contribute to global warming and the issue of climate change as a whole, from the cultivation of raw fibres to the recycling of textile waste, including the vast quantities dumped in developing countries, particularly those in Africa, where these clothes end up in landfills and are burned on open frames, emitting twice as much greenhouse gas as other well-known sources [4, 5]. Although rising temperatures are associated with the vast majority, if not all, extreme weather events, such as droughts, floods, and heatwaves, the effect our clothing has on rising temperatures and thus global warming has not been adequately brought to the public's attention; therefore, the industry continues to flood the market with what has been labelled cheaply-produced-disposable clothing [3, 6].

2. What is fast fashion and why is it a problem?

Nine years ago, the issue of where our clothes come from went from being a matter of curiosity to something more urgent. It was on April 24, 2013, when the Rana Plaza disaster occurred on the outskirts of Dhaka in Bangladesh; more than 1130 individuals perished when the factory in which they worked collapsed [4]. Today, worse than this is the potential for the industry to contribute to a serious global catastrophe that could wipe out the entire human race if 'precautionary measures' are not taken to regulate its operations [3, 7]. According to a recent study, not only does the global apparel industry contribute more to climate change than international aviation and shipping combined, but the purchase of a single white cotton shirt produces the same amount of emissions as driving 35 miles in a car [3]. Given the veracity of these findings, we have no choice but to reevaluate the environmental impact of the industry in terms of the responsibility of corporations to protect the environment.

To begin, the term "fast fashion" refers to affordable yet fashionable garments that are cheaply produced and quickly abandoned in favour of new styles [8, 9]. Internationally, while China is the world's top textile exporter and leads the fashion industry, the U.S and the EU consume more than half of the industry's output, and Africa, particularly East and West African nations, is drowned under the weight of second-hand goods dumped at their shores [6, 9]. Despite the fact that clothes are an integral part of our daily lives, many people fail to consider their origins and how they ended up in their closets. In other words, from the cultivation of fibres that will become textiles to the dying processes and final consumption, the clothes we wear impact our environment at every step [3, 8]. Today, these effects are exacerbated by the rapid production of inexpensive clothing that mimics the ever-changing trends of high-fashion brands. According to one report, the industry is the second-most polluting, just behind the oil/fossil fuel industry [5].

While waste production can contribute to a variety of environmental issues, including greenhouse gas emissions, the production of waste from fast fashion is no exception. In other words, while the clothing and textile industry is notorious for contributing significantly to contemporary environmental problems such as climate

change and/or global warming, the advent of fast fashion has exacerbated the problem [7]. In the age of cameras living in our pockets, it seems as though every moment demands us to be “picture-perfect” [8, 9]. This demand for perfection has greatly benefited the fashion industry, especially the niche industry of “fast fashion” [9]. From T-shirts and shoes to accessories, fast fashion brands have emerged as a more affordable alternative to high-end designers such as Louis Vuitton, Gucci, Chanel, Dior, Balenciaga, Armani, and Yves Saint Laurent.

While fast fashion currently dominates the industry in terms of speed, price, and marketing, these companies are not known for their innovative or ground-breaking designs, nor for their ethical business practices [9]. On the other hand, High-end designers such as Louis Vuitton, Gucci, Chanel, and others are known for setting trends and fashion standards while remaining within the limits of their operations, especially in terms of the environment. Thus, given the fashion industry’s limited avenues for innovative designs, as well as the possibility that different companies will mirror similarities in products, there should be a protective line that guards the industry to prevent unnecessary competition at the expense of the environment [6, 9]. The ability of fast fashion brands to produce clothes at a fraction of the cost of their more expensive counterparts has contributed not only to an increase in clothing consumption, but also to an increase in the environmental impacts of clothing.

As consumers actively seek trendy clothing at affordable prices, fast fashion brands such as Zara, H&M, UNIQLO, GAP, Forever 21, Topshop, Esprit, Primark, Fashion Nova, and New Look have imitated the distinctive looks of high-end designers and sold their products at a fraction of the price [8]. Consequently, the current fashion market is characterised by ever-changing trends. In other words, what is fashionable today can change in an instant based on a variety of factors, such as social media effects, celebrity couture looks, and popular culture, among others [8, 9]. The Spanish company and leader in fast fashion, Zara, rose to prominence in the 1990s by delivering twice-weekly shipments of new clothing [9, 10]. The company established the standard for fast fashion when it began producing clothing under its own brand, which imitated the newest fashion trends while being mass-produced. A product was designed and mass-produced rapidly, and it was only available for a limited time. The production and retail methods were based on limited sale periods, in which a product was designed and mass-produced quickly and only sold for a limited time [10].

Today, 30 years after the invention of Zara’s fast fashion marketing strategy, companies such as Forever 21, H&M, Primark, and many others have adopted a similar strategy, now with daily rather than weekly introductions of new clothing [8, 11]. In contrast, higher-end brands such as Louis Vuitton, Gucci, Yves Saint Laurent, and others, release new designs four times a year; consequently, the term “52 season companies” was coined to describe brands that dominate the fast fashion industry. That is, despite its economic benefits, fast fashion is in many ways detrimental to the human environment, as not only does the industry pollute the environment through its manufacturing processes, but the market also generates so much waste that the law must intervene against such a barbaric business model. While some of the largest names in the industry have a physical retail presence, fast fashion is widely known to dominate the e-commerce realm, i.e., online shopping [10, 11]. The perception that wearing an item only a few times is acceptable has led to an increase in discarded items, which has fueled overconsumption and overproduction. Consequently, to reduce the environmental impact of the industry, this misconception must be eradicated. Within the first 15 years of the twenty first century, clothing production doubled, and since the year 2000, most brands have released as many as 24 collections per year, for both the

summer and winter seasons [9]. In the past, there were two clothing-buying seasons (Spring/Summer and Autumn/Winter), but now there are 52 microseasons, one for each week. That is, to remain profitable, fast fashion brands produce vast quantities of clothing, which not only pollute the environment, but requires a substantial amount of resources [11].

Big fashion brands grow in popularity for one simple reason: people want the latest styles, which are frequently pioneered by celebrity actors, musicians, or models [9]. The main issue is that these big fashion brands tend to charge a lot for their clothes, with huge price differences between, say, a jacket from Primark and one from Gucci. Actually, the term 'fast fashion' was coined when some companies realised they could imitate the latest fashion trends from major fashion brands and sell them at a fraction of the price [9, 10]. Why is this an issue? The issue is that large fashion brands rely on a rapid turnover for their expensive items, with a relatively smaller group of wealthy individuals regularly purchasing expensive items. Because fast fashion is constantly seeking to imitate major fashion brands, a similar situation of relying on a quick turnover occurs, although the profit per item is significantly lower [8, 11]. Consequently, fast fashion requires a significantly larger audience to generate revenue. If a much larger audience constantly purchases copies of whatever the most recent fashion trends are, a large quantity of clothing, footwear, etc. must be produced [11]. This partially explains why fast fashion poses a significant environmental threat, as in addition to the pollution caused by the production of such large quantities, the improper management of fashion waste, such as dumping in developing countries, has a detrimental impact on our planet.

To gain a better understanding of the academic literature on the environmental impact of the industry, we systematically identified and analysed 30 publications published between January 2000 and December 2022, from an analysis of 115 papers in order to compile a comprehensive collection of articles pertinent to the topic of study. Drawing on text analysis, the systematic review process involved four essential steps. Originally, the literature to be reviewed was identified using a topic-specific Google Scholar search. The objective was to conduct a search that was large enough to be exhaustive but also completely focused on the topics at hand. The following is the search query that was used to retrieve the primary dataset:

Clothing OR Apparel OR Textile OR Fashion OR Fabric OR Cloth* AND (Impact OR Sustainab* OR Environment* OR Effect OR Climate OR Pollution OR Emission* OR Greenhouse, CO₂ OR Landfill*).

The search was conducted on April 5, 2023, yielding a total of 225,000 articles for analysis. Next, the titles and abstracts were screened for relevance to the scope of the review using inclusion and exclusion criteria. Articles were excluded if they were unrelated to fast fashion, centred solely on solid waste treatment methods, or made no connection between the textile industry and greenhouse gas emissions or environmental impacts. Out of the 115 papers initially deemed relevant, a total of 30 were selected for analysis: 10 from Heinonline, 15 from Web of Science, and 5 from highly cited papers on ResearchGate, i.e., resulting in a dataset of 30 relevant articles. Finally, the content of the selected studies was analysed for major themes related to fast fashion, such as waste pollution, Greenhouse gas emissions, environmental impact, the effect of landfills, sustainability, climate change, global warming, waste trafficking, i.e., the dumping of second-hand clothes in developing countries, and recommendations to slow the negative environmental impacts of fast fashion, such as the transition to Circular Economy and the promotion of sustainable fashion.

3. Discussion

Through this systematic review we found that the negative effects of fast fashion on the environment are manifested through carbon emissions, water consumption, and energy footprints, particularly in the use phase of clothing, the saturation of international clothing markets, and an increase in the end-of-life textile waste, the majority of which are dumped in Global South countries, particularly those in Africa, emitting twice as much greenhouse gas as other well-known sources through the Greenhouse gas effect of landfills and the open incineration of damaged clothes [7, 8]. We discovered that, in comparison to other stressors on climate change, such as the oil/fossil fuel industry and transportation (air, water, and land), research interest in the effects of fast fashion on global environmental sustainability has increased in the last 5 years (74% of articles published) [8]. While the term “textile industry” referred to the production of both raw materials such as yarn and finished products such as

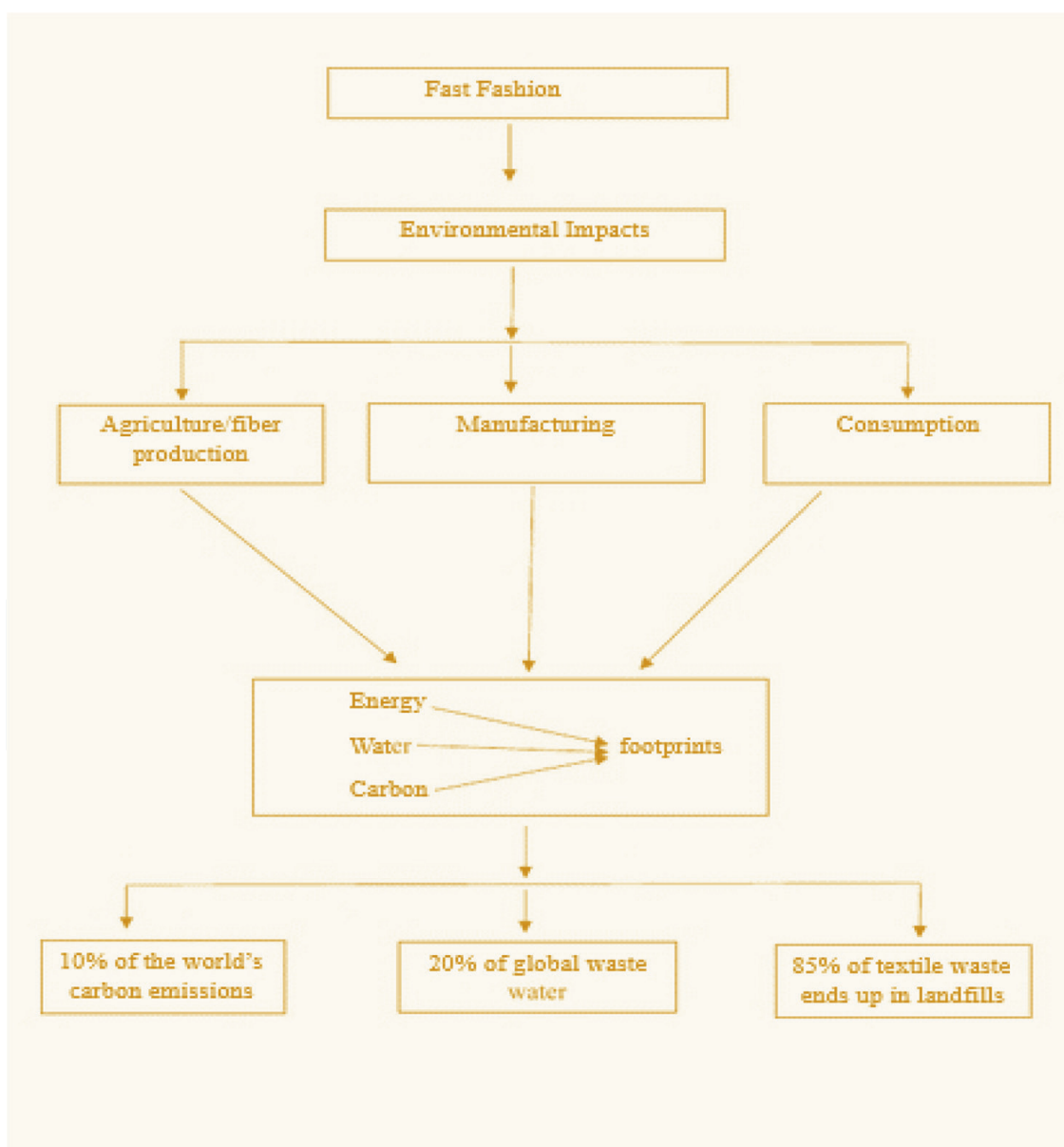


Figure 1.
The environmental impacts of fast fashion.

clothing, the terms “fast fashion industry” and “fashion industry” referred more specifically to issues involving finished garments and articles of clothing (**Figure 1**).

Today, when environmental issues are at the top of the news, major industry players, such as Zara, H&M, and Primark have played significant roles in increasing the industry’s carbon footprint by accelerating fashion cycles [12]. Thus, this review revealed, among other things, that the textile industry not only accounts for 8 to 10% of total carbon emissions, but it also accounts for 20% of global wastewater production [8]. The shortening of fashion cycles creates a constant need for new concepts and designs, as well as the constant need to dispose of “old” items to make room for new ones. Among other things, “sustainability,” “fast fashion,” “textile industry,” “greenhouse gas emissions,” “carbon footprint,” “climate change,” “global warming,” and “waste pollution,” i.e., the dumping of used clothing in developing countries, particularly in Africa, were identified as major emerging topic areas in the literature. As they serve as the foundation for mitigating environmental impacts, concepts relating to sustainability were found to be prevalent in the texts. Elaborated below are some of the most predominant areas of study in this rapidly growing field.

3.1 Energy, water, and carbon footprints

With 1.7 million tons of CO₂ emitted annually, which is 10% of all greenhouse gas emissions, the textile industry is a major contributor to global warming [12, 13]. At the European level, clothing is identified as the fourth most ecologically sensitive consumption category, with food, housing, and transport ranking higher in terms of environmental impact [12]. Currently, there is a notable surge in the demand for clothing, with projections indicating a rise from 62 million tons in 2015 to 102 million tons in 2030 [12, 13]. There are many sources of pollution in textile manufacturing; for instance, wastewater can be produced in agricultural cultivation, textile pre-treatment, cleaning of machines after use, as well as wet or laundering processes [14, 15]. The fast fashion industry relies on mass production, which requires a lot of resources because of the sheer volume of clothing that must be produced. To produce just one cotton T-shirt, for instance, it takes between 10,000 and 20,000 litres of water, or about 3000 litres of water per kilo of raw cotton [3]. Consider this in the context of a global industry that sells around 2 billion cotton t-shirts annually. You can begin to comprehend the staggering quantities of water required to sustain this industry.

To say the least, calculating the carbon footprint of fast fashion is daunting. However, we will begin with the production of a single pair of jeans. From the harvesting of the cotton to the production of the jeans to their final delivery to a store, a substantial amount of carbon emissions must be accounted for. The production of a pair of jeans requires approximately 3700 litres of water [3, 5]. This results in approximately 33 kilogrammes of carbon dioxide equivalent (CO₂e) emissions [3]. And this is only for one pair of jeans; imagine how much water is required for your entire wardrobe. When considered on a global scale, the implications are mind-boggling. Each year, the fashion industry is responsible for: 93 billion cubic metres of water, which is enough to meet the needs of 5 million people; 10% of all carbon emissions, which is more than all international flights and shipping combined; 20% of the world’s wastewater from fabric dyeing and treatment [3, 12]. Based on these reviews, there are no indications of a slowdown in the growth rate of fast fashion, meaning that these statistics will almost certainly worsen. Fast fashion emissions are expected to rise by 50% by 2030 [8, 12].

With constant new trends and ostensibly affordable prices, the temptation to purchase the newest products can be overwhelming. Albeit how does this affect our carbon footprint? Considering the entire lifecycle of a garment, from production to transportation to disposal in landfills, the fashion industry releases 1.2 billion tons of carbon emissions annually [12, 15]. Between 2003 and 2018, clothing utilisation decreased by 36%, with a third of young women believing that a garment is considered 'old' after being worn once or twice [14, 15]. This shift in values has been exacerbated by the use of inexpensive materials in clothing, which reduces their durability and makes them more difficult to repair [15]. The United Kingdom, for instance, spends an annual average of £59.3 million on clothing and exports £8.2 billion worth of clothing [14, 15]. Today, due to the combination of low prices and poor quality, many individuals believe that clothes are disposable. In spite of the fact that 85% of the garments sent to landfills could be recycled, the United Kingdom sends 300,000 tons of clothing to landfills each year due to poor quality, making it the fastest-growing waste economy [14, 16].

Not only is the fashion industry's carbon footprint affected by the amount of waste sent to landfills, but CO₂ emissions during the manufacturing and transportation processes, as well as water pollution from dyeing processes and microfiber pollution, also contribute to the industry's enormous carbon and environmental footprint, highlighting the industry's urgent need for change. For instance, some garments may travel the globe multiple times during the manufacturing process, contributing to an increase in air travel-related emissions [3]. Often, clothing is manufactured in developing nations where pollution regulations are less stringent. Thus, changes such as switching to renewable energy in factories and reducing the use of polyester will have some positive effect on reducing the carbon footprint of the fashion industry. The majority of fashion's environmental impact stems from the use of raw materials: cotton for the fashion industry, for example, uses approximately 2.5% of the world's farmland; synthetic materials like polyester require an estimated 342 million barrels of oil annually; and production processes such as dyeing require 43 million tons of chemicals annually [8, 17]. In summary, the production of clothing consumes a significant quantity of natural resources and generates greenhouse gas emissions that contribute to global warming. According to one study, the fashion industry could account for 26% of carbon emissions by 2050 if nothing changes [14]. Even so, to address the environmental impact of fast fashion, both individual and collective measures aimed at modifying the behaviour of these brands are required.

According to one study, the high carbon footprint of the fast fashion industry may be due to the industry's high energy consumption, which is often influenced by the energy source that is used [3]. In China, for instance, textile production is dependent on coal-based energy, resulting in a 40% greater carbon footprint than textiles produced in Turkey or Europe [3, 9]. High energy requirements and CO₂ emissions are not only associated with textile production processes, but also with textile consumption (mainly laundry) and distribution, especially when air freight is utilised. Nowadays, in addition to fibre type, the method of textile production may also impact energy consumption and environmental effects [3, 8]. For instance, conventional cotton cultivation can generate 3.5 times more CO₂ than organic cotton production, which creates twice as much CO₂ in India as organic cotton cultivation in the United States [3, 15]. As natural fibres have a smaller carbon footprint than synthetic fibres, it is thought that one effective way to reduce CO₂ emissions related to fibre production would be to replace polyester with natural fibres [3]. Albeit it is believed that the lower carbon footprint of natural fibres during production is later offset by the higher

energy requirements of washing, drying, and ironing compared to synthetics during the usage phase [3, 17]. Thus, to lessen the fashion industry's effect on greenhouse gases, production volumes and non-renewable energy use must be lowered; polyester manufacture should be replaced with renewable plant-based textiles; and sustainable shipping and garment usage must be considered [3, 8].

3.2 The impact of low-quality second-hand clothes dumped in developing countries

As a modern business strategy, fast fashion encourages people to view clothing as disposable [18, 19]. According to Bick, the average American, for example, discards over 80 pounds of clothes annually, which accounts for approximately 5% of landfill space [19]. Items that are not immediately transported to landfills often find their way into the second-hand clothing market [6]. However, owing to their substandard quality, they ultimately end up in landfills, exacerbating the environmental crisis and contributing to the greenhouse gas emissions associated with these sites [5, 6]. These days, textile waste presents a considerable environmental challenge on a global scale [6, 16]. The current state of affairs, characterised by the extensive production and consumption of fast fashion products, necessitates a worldwide approach to addressing this challenge. This is particularly crucial given that waste management remains one of the most pressing environmental concerns worldwide [2, 5]. Throughout history, countries located in the Global North have predominantly addressed the issue of fashion waste by exporting surplus clothing to developing nations, with a particular focus on those situated in Africa [1, 6].

Contemporary research indicates, however, that these practices have long since ceased, as the improper disposal of fashion waste in these regions poses a significant ecological risk not only to these societies, but to the global community as a whole. This mismanagement includes the burning of unwanted textiles and the overflowing of landfills, resulting in the emission of greenhouse gases and the contamination of water, particularly from the washing of synthetic materials into our ocean [18, 20]. Consequently, it is imperative that we expand upon current industry efforts and fundamentally rethink the way clothes are manufactured, right down to the fibres that are used [20]. Garments should be designed with durability in mind, ensuring that they do not fall apart at the seams and can be repurposed through recycling even after prolonged use [20, 21]. While the marine environment is the ultimate destination for various anthropogenic pollutants, the problem is exacerbated by microfibers released from synthetic clothing and other textile materials [22]. According to Sunanda, approximately 150 million microfibers are introduced into the Atlantic Ocean on a daily basis due to poor management of textile waste, which includes fibres that are washed away from landfills [22].

According to one study titled "Come on EU! The massive dumping of discarded clothing in Ghana and Chile must stop", Western countries are responsible for exporting significant amounts of fashion waste to low-income countries, particularly those in West Africa, and the reason is simple: Western communities overconsume cheap, low-quality clothing, and they dislike the waste [23]. This practice makes the textile industry and, by extension, fast fashion substantially more polluting than they already are. Made by low-paid workers in China or Bangladesh, consumed in the Global North, rarely worn, and quickly discarded, fashion waste has a number of negative effects on the global environment [9, 24]. Nowadays, clothes are purchased in large quantities online, tried on, returned, and then not resold. The synthetic

materials used to make these garments, most commonly polyester, make them difficult to recycle [3]. Globally, an estimated 92 million tons of textile waste are produced annually, with the equivalent of a dump truck's load of clothing ending up in landfills every second because so little gets recycled [23].

While people are purchasing more clothing than ever before, and the average consumer today buys 60% more clothing than 15 years ago, and only 12% of these items are recycled on a global scale [23, 24]. In the context of clothing consumption, the United Kingdom stands out as the European country with the highest rate of purchases per minute. While the global annual purchase of clothing is estimated to be around 56 million tons, it is projected to rise to 93 million tons by 2030 and 160 million tons by 2050 [24]. Where does all of this waste end up if only 12% of it is recycled? According to Spijkers, while it has become common practice for Western communities to dump their unwanted clothing in developing nations in an effort to reduce pollution, such practices are merely a relocation of the problem and never a solution, as environmental issues affect all nations equally regardless of their geographic origins [25]. According to two recent studies, for instance, the Kantamanto market in Accra, Ghana, is currently the largest second-hand clothing market in West Africa [1, 23]. Each week, 20 million items of second-hand clothing arrive here; yet 40% are rejected from the market due to their poor quality [6, 26]. Unsold clothing is frequently abandoned in sewers and landfills before being washed into the ocean, where it is washed up on beaches by the waves and buried in the sand, in addition to the large quantities that are taken away to destroy marine life and food sources [23].

Using Ghana as a case study, it is estimated that 10,000 articles of second-hand clothing arrive in Accra, Ghana's capital, every 5 minutes from the United Kingdom alone [1, 6]. However, due to defects and poor quality, a substantial amount is typically consigned to landfills. While this chapter addresses the grave environmental impact of these clothes, traders in the second-hand clothing business in Accra lament the recent decline in their business as more and more of their stock is dumped as waste due to low quality [1, 6]. In 2013, the government commissioned a massive landfill in Kpone with a daily capacity of 700 tons in an effort to address this issue. The Accra Metropolitan Assembly (AMA) was tasked with collecting up to 70 tons of waste (unsold second-hand clothing) every day from the Kantamanto market alone [6]. The procedure was initiated in 2016, and 4 years later, Kpone was overflowing with textile waste. Due to a lack of funds, the Accra Metropolitan Assembly was unable to continue with this project [6]. Today, in addition to the massive volumes dumped in landfills and burned in open flames, a significant portion of these garments are routinely dumped in sewers and carried into rivers, ultimately ending up in the ocean, posing a grave threat to the marine ecosystem and significantly contributing to rising sea levels [1, 23].

While the focus has always been on the health risks associated with these practices, this chapter focuses on the ecological repercussions of these practices, specifically how they contribute to the issue of climate change and global warming through the Greenhouse gas effects of these sites and the vast amount of CO₂ emitted through open burning. Today, despite the lack of significant progress, countries such as Ghana are seeking international cooperation to prohibit the export of second-hand clothes given its negative environmental effects. Today, the dumping of low-quality second-hand clothing is a major problem not just in West Africa, but also in East African countries such as Tanzania and Kenya [27]. When consumers donate their used clothes to a charity, a take-back box at a brand's store, or a recycling station, they often hope that the clothes will be resold or recycled into new garments. Nonetheless, due to damage and poor quality, only a tiny proportion (between 10 and 30 percent)

are typically resold in the locations where they are first collected. Consequently, some are downcycled into lower grade materials such as rags, and more than half are exported for resale [27].

To learn more about what happens to these second-hand clothes, in their study, Greenpeace, an independent international campaigning network dedicated to safeguarding the environment, travelled to Kenya and Tanzania, two of the world's top five net importers, to speak with traders in the second-hand clothing business to find out more about the fate of these clothes after they are exported [27]. According to Greenpeace, the Global North has found a way around its textile waste problem by exporting used clothing to countries in the Global South, forcing them to deal with the consequences of fast fashion despite lacking the infrastructure to do so [27]. As they descended from the Gikomba market to the Nairobi River, the researchers were shocked to discover that they were literally walking on textile waste [27]. The waste was accumulating along the riverbanks, falling into the water, and flowing downstream to the ocean. According to their observations, the Gikomba market in Nairobi is covered in layers of textile waste. In attempt to address this issue, the locals burn these textiles on open fires, primarily in the evening, causing severe air pollution that affects not only the residents of these communities, but also the entire global community via the massive amounts of CO₂ emissions.

Similar to the situation in Ghana, where 30 to 40% of these second-hand textiles have no market value, 150 to 200 tons of waste (60 to 75 truckloads) are abandoned, burned, or transported daily to Dandora and other overflowing dump sites in Nairobi [27]. According to Wohlgemuth, the fast fashion industry has reduced clothing to the status of disposable cups [27]. Thus, slowing down fast fashion is the only option to reduce the flood of textile waste being dumped on the Global South. Global fashion brands must drastically alter their linear business models and begin creating fewer clothes that are higher quality, longer lasting, repairable, and reusable [14, 27]. In addition, there must be a shift away from the neo-colonial attitude of Global North countries that use Global South countries as dumping grounds for their unwanted waste, while doing little or nothing to support or develop the clean manufacturing of local textiles, employing the same high standards and best practices required in Europe.

The aforementioned findings demonstrate unequivocally that it is insufficient for global fashion brands to concentrate just on cleaning up their supply chains. The clothing and fashion business must intensify its efforts to reduce the enormous end-of-life consequences of its products. That said, according to Wohlgemuth, the global fashion industry will be unable to rectify its negative environmental impact in the absence of laws [27]. An evaluation of 29 leading brands, including H&M, Nike, Adidas, G-Star, and Primark, reveals that voluntary commitments are insufficient to slow down the rising volumes of textiles and alter the destructive trajectory of fast fashion, with the majority of impacts being felt in countries of the Global South, where clothes are made and dumped [9]. Although it is expected that trade policies and regulations will be the most effective solutions for bringing about widespread change in the clothing and fashion industry, consumers, particularly those in high income countries, have a responsibility to support companies and practices that reduce the negative environmental impacts of fast fashion.

3.3 Moving towards a more sustainable fashion industry: alternate business models

Our systematic review identified a number of tools that could be used to move towards a more sustainable fashion industry, such as a business model in which

society moves from a linear economy, based on the concept of take–make–dispose, to a circular economy that aims to retain all resources or products in the system for as long as possible to reduce end-of-life textile waste [8]. The circular model optimises the process of reducing waste by maximising resource reuse or producing new resources from waste materials [7, 13]. Among other things, the product service system has been suggested as a prospective business model aimed at reducing the environmental impact of the clothing and fashion industry [27]. In the sharing economy, we see product-service systems as forms of co-consumption. Within this framework, consumers are able to pay for the services rendered by a product without the need to own the product. This proposed system has the potential to reduce resource consumption, specifically water, by improving the quality and durability of clothing. Additionally, it advocates for the adoption of practices such as lending, renting, redesigning, and upgrading to minimise the number of individually owned items. Nevertheless, the question of whether or not this is feasible in terms of clothing warrants further investigation [28, 29].

Ethical fashion, Ecofashion, and sustainable fashion all aim to reduce the negative environmental impact of fast fashion models [28, 29]. Ecofashion is based on designing garments that are better for society and the environment, ethical fashion is based on fair trade and environmental standards, and sustainable fashion focuses on tailoring the clothing life cycle to align with the ideas of sustainable development, taking into account design, material, production conditions, and the consumer [8, 30]. Jacometti provides a summary of the current measures taken by the European Union to create more sustainable practices in the fashion industry by transitioning from a linear to a circular economy [31]. Throughout the literature, numerous studies have emphasised the significance of changes in consumer behaviour that can significantly reduce the environmental impact of the clothing and fashion industry [8, 32]. As the negative environmental impacts of the fashion industry extend beyond the production stage, the utilisation phase of garments is a significant contributor to environmental degradation [8, 33]. This can be seen in the transportation of clothing to retail outlets as well as the subsequent usage phase [16, 34]. As the weekly laundry of a single household could potentially discharge thousands of microfibers, using machines with high efficiency ratings, lower washing temperatures, air drying, using front loading, and full load machines can reduce the energy and carbon footprints of the global apparel industry [30, 35].

4. Conclusion

As discussions of global warming and the resulting issue of climate change have grown in popularity in recent years, this chapter aims to identify fast fashion as a growing threat to the current state of affairs, focusing on how fast fashion contributes to greenhouse gas emissions from the cultivation of raw fibres to the recycling of second-hand clothing, especially the vast quantities dumped in developing countries. Ultimately, the chapter reveals that the rise in fast fashion consumption is influenced by a variety of socio-cultural and economic issues. Consequently, it is crucial to consider not only the environmental impact associated with the production of clothing, but also the reliance on fast fashion, a business model that produces affordable yet fashionable garments that are cheaply produced and quickly abandoned in favour of new trends.

According to the available sources, clothing accounts for between 8 to 10% of total carbon emissions and 20% of global wastewater, a figure that exceeds the combined

emissions of aviation and shipping. In addition to the predicted 50 percent increase in the industry's carbon footprint by 2030, the industry emits 1.2 billion tons of CO₂ annually. Thus, the study highlights the emergence of a new field aimed at bridging the gap between fast fashion, the textile industry, and their environmental impact. That is, in addition to addressing the carbon and water footprints of the global apparel industry, this field seeks to investigate its contribution to climate change and global warming.

We discovered, among other things, that fast fashion's energy and water use, as well as its carbon footprint, contribute significantly to today's environmental issues, notably climate change; however, studies have frequently treated these topics in a broad manner, leaving room for additional study. Thus, we identified "fast fashion," "sustainability," "textile industry," "carbon footprint," and "water footprint" as the five major emerging themes that the literature could explore in greater depth. In addition, to assist the fashion industry in becoming more sustainable and in line with the principles of the circular economy, it is recommended that additional research be conducted on the evaluation of the textile industry's carbon and water footprints, recycling initiatives, and methodologies. That is, to influence the future of the global apparel industry, we recommend that consumers reevaluate their purchasing habits in favour of more sustainable options. This has the potential to incentivise manufacturers to implement environmentally friendly production methods and conform to more stringent regulations concerning the handling of post-consumer waste, particularly that of clothing or textiles.


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