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## An introduction to sustainable textiles

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### Abstract

The terminology of "sustainability" is fairly new having been coined only in the late nineteen eighties. Although the concept of sustainability in the context of textiles is age old and was practiced across cultures. This paper traces the genesis of sustainability and its different facets. It tracks the emergence of challenges in the path of sustainability and the techniques to combat them. The findings of this study are relevant in the current times as the world struggles with increasing textile waste. Waste is generated from all industries but the textiles industry is particularly one of the most polluting industry. Although textiles are one of the largest growing and employment generating sectors but it is also the most polluting. This industry not only consumes vast resources during production but after production the textiles are also often quickly discarded which adds to the landfill sites. The waste textiles dumped at the landfill sites takes eons to decompose and often leads to emission of poisonous gases. The landfill sites also sweeps into the ground and pollutes the ground water level. This paper uses secondary research methods from various books, publications, as well as electronic sources to conduct this research.

**Keywords:** sustainability, textiles, waste, industry, consumers

### 1. Introduction

The need to conserve the environment for maintaining harmonious coexistence of nature and human beings is the meaning of sustainability (EPA, 2016) [7]. Sustainability was first described in the Brundtland Commission of 1987 as permitting the requirements of an entire community to be satisfied without hampering the same requirements to be met by the future community (Brundtland Commission, 2016) [2].

Ancient cultures worldwide followed the earth's natural production cycles. In this natural cycle there were no concepts of waste e.g. earth produces as well as recycled all its products. The waste discarded become the food for another i.e. an apple produced by the tree becomes the food for the animals around. They eat it and throw the remains which become the food for the insects. The remains are food for the earth to grow more fertile. The seeds cannot be consumed and when they touch the earth they create the new apple tree. This is the constant natural cycle of the earth and this is the sustainable cycle (William, 1993) [27]. In the Indian subcontinent, sustainability has been an age old concept practiced from the ancient Vedic times. "*Mata Bhumih Putrohum Prithviah*", is a Sanskrit sloka which when translated means that earth is the mother and mankind is her son. This ancient Indian sloka declares the lasting devotion and respect of humankind to mother earth (Kala & Sharma, 2010) [16].

However in the present times the wise ancient messages of devotion and respect of the earth's natural processes are ignored and there has been a lot of destruction of the earth's natural environment by humankind. This destruction will directly or indirectly create difficulties for the human race to survive. As is evident human beings are dependent on the natural environment to fulfil their needs. If the environment is destroyed then human beings can no longer survive. The basic requirements of the people i.e. clean water, air and earth are slowly but surely getting diminished due to excessive production, consumption and wastage of the present times.

### 1.1 Textile Waste

Textile is the integral part of the fashion industry and there is a quick variation in demand of textiles types and composition. The increase in population, fashion dictates, and spending power of the people directly influences the demand of textiles (Braungart, 2002). According to

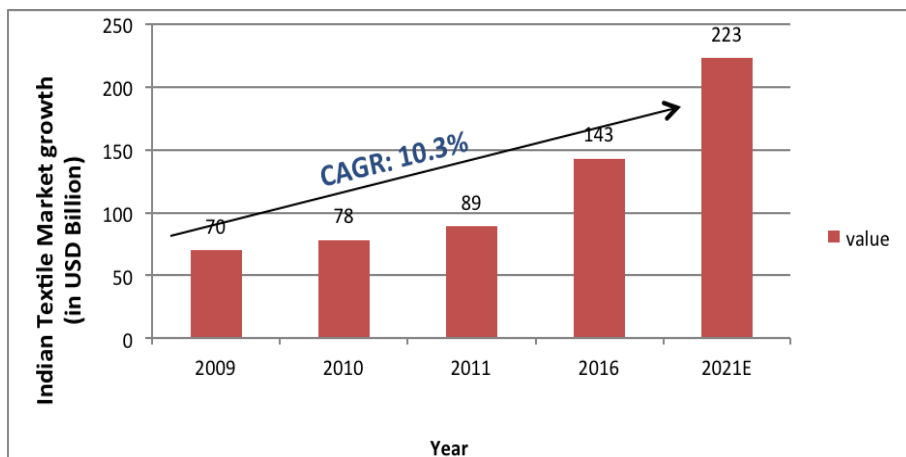
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the Textile Sector Profile report 2017 released by the govt of Gujarat India (Textile Sector the production worth of textiles in India will increase to \$223 billion by 2021(estimated) with

a compound annual growth of 10.3% by 2021 as shown in Figure 1.



Source: (Textile Sector Profile, 2017)

Fig 1: Increase in the production of textiles in India in USD billion by 2021.

The generation of waste is expected to grow worldwide to 27 billion tonnes per year by 2050. India will be one of the major contributors of this waste with production of 0.7 kgs per person per day by 2025 (Sunil K., 2017). Most of this waste takes years to degenerate and are harmful for the environment. Several environmental problems are associated with the increase in waste for example air pollution, water pollution (NRDC, 2017), release of harmful chemicals in the soil through landfill sites (C Parvathi, 2009) [3], contamination of the ground water, damage to flora and fauna (Fletcher, 2009) etc. Figure 2 shows the global waste usage in 2015. Less than 1% of fabrics used to manufacture clothing are recycled into new clothing symbolizing a loss of more than USD 100 billion value of materials every year (A New Textiles Economy, 2017).



Source: <https://in.pinterest.com/pin/32228953560054467/> Accessed on 26/01/2018

Fig 3: Mountains of waste clothing.

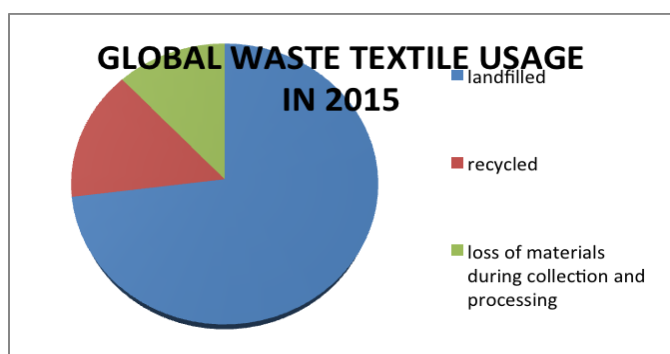


Fig 2: The global waste usage in 2015 (A New Textiles Economy, 2017)

Excessive production results in garments with a short life span. Garments get rejected before they have reached the end of their life cycle due to the change in fashion dictates. This rapid rejection of fabrics generates fabric waste, which are sometimes recycled at downmarket stores but a high percentage of waste clothing often end up in landfills. Figure-3 shows the mountains of waste clothing which often will end in landfills if not recycled. Figure-4 shows textile waste in the landfills. Even in the United Kingdom, which has a functional system of waste segregation, 60% of all the discarded textiles end in landfills. In under developed countries the percentage of waste is much higher. Its sheer volume is not sustainable even if the fabrics are organic.

Textile waste pollutes the environment and landfill sites releasing mixtures of organic and inorganic chemicals characterized by high toxic substances, colour content, suspended solids, salts, heavy metals, and chlorinated organic compounds into the soil and the ground water (fibre2fashion.com, 2017).



Source: <https://inhabitat.com/ecouterre/europe-only-recycles-25-percent-of-textile-waste-says-new-report/> (Accessed on: 22/01/2018)

Fig 4: Textile waste in landfill site.



## 2. History of Sustainable Textiles

The terminology of sustainable textile emerged much recently indicating a textile or a textile product which either uses waste as raw materials or utilizes raw materials without creating wastage. It is easy to recycle, has a long lifespan, emits minimum pollutants during production, uses limited resources (e.g. water, fertilizers, electricity etc.) to grow its raw materials, and can be quickly absorbed back into the earth at the end of its life cycle. The traditional Indian attire i.e. Sari, Dhoti & Angvastram is a good example of sustainable textiles/fashion. In the production of these clothing there is no generation of pre consumer waste and all the raw materials are used to its optimum level. Sustainable textiles techniques have very limited documentation through the ages as they were practiced mainly for self consumption and were rarely practiced commercially (Harris, 2016)<sup>[9]</sup>.

Nevertheless the historical evidence of sustainable textiles can be traced to quilt making back to prehistoric times. The first evidence of a quilt worn by an Egyptian monarch is found engraved on a temple artefact dating back to 35<sup>th</sup> Century BC (Ducey, 2014)<sup>[5]</sup>. In 1924, quilted floor coverings dated 1<sup>st</sup> Century BC were discovered in Mongolia. Quilted garments became popular in the medieval period. Later quilt making flourished in America in the 19<sup>th</sup> C especially during 1825 AD-1875 AD (Johnson, 2019)<sup>[14]</sup>. Quilts were made using the appliqué as well as the patchwork techniques. An example of the appliqué quilt created during this period has been shown in Figure 5. This quilt has been made by a group of women and it demonstrates intricate work and craftsmanship (Johnson, 2019)<sup>[14]</sup>. This quilt was used as a work of art. The building in the middle of this quilt is a representation of the Capitol building in Washington, D.C. (Johnson, 2019)<sup>[14]</sup>. Patchwork quilts have been made for centuries (Johnson, 2019)<sup>[14]</sup>. The intricacy of a quilt depicted the economic status of the family which commissioned it. Although some exquisite quilts were created as works of art, most commonly quilts as shown in Figure 6 were a utility item to keep warm (Wickell, 2019)<sup>[26]</sup>.



**Fig 5:** An appliqué' quilt from Pennsylvania, USA created around 1845-1850AD. (American Folk Art Museum, 2010)



**Source:** <https://www.thesprucecrafts.com/what-is-patchwork-2821590> Accessed on: 22/01/2019

**Fig 6:** Patchwork Quilt.

During the pre-industrial revolution era i.e. mid 18<sup>th</sup> C, there was very limited pre consumer textile waste due to limited textile productions. In this period post consumer textile wastes which included worn out textiles were made into new products, thus enhancing the textile life span (Braungart, 2002). During the early 19<sup>th</sup> C World Wars, there was a shortage of textiles as most of the textile factories, by order of law, produced fabrics only for military and industrial uses (Kendra, 2009). In this duration fabrics were in short supply worldwide. People began to repurpose old fabrics into new products. At this time the feed sacks or commodity bags began to be commonly used into dresses, towels, undergarments etc. across rural America. In America, feedbag suppliers were in great stress to manufacture feed bags which were not only colourful but also printed in the latest trends. Despite the popularity of this sustainable practice, it has been omitted from the documentations of the histories of American fashions. There is very less available information about the look of the commodity bag dresses, and the steps the tailor had to take to repurpose the bags (Jennifer B., 2015).

Kantha textiles from the Bengal region of India and Bangladesh are examples of original repurposed art and was first mentioned in a book by Kaviraj around 500 years ago (Clothroads, 2018). Rural womenfolk of Bengal created Kantha textiles from old and torn saris by placing them on top of each other forming several layers of worn out saris. These layers were then stitched together using mostly the basic running stitch and also in some parts stitches like herringbone, satin etc were used. Traditionally, the end products of Kantha were quilts suitable for the light Bengal winters.



**Fig 7:** A Kantha quilt depicting motifs derived from fishes, flowers and birds (Dutta S., 2016)

The Kanthas were embroidered beautifully and many times the base fabric was not visible due to the dense embroidery. Most of the motifs were inspired from the local flora and fauna or the scenes from the great Indian epics of 'The Ramayana' and 'The Mahabharata'. Figure 7 depicts kantha motifs derived from fishes, flowers and birds. The threads used were also drawn from the borders of the old saris. The Kanthas made thus were almost always for self consumption or reserved as a special gift for a close family member. The Kanthas were a highly prized possession not because of the cost involved in creating it but because of the painstaking labour that was put in to transform a discarded sari into a piece of art. This technique added decades of new life into the worn out saris (Fletcher, 2009).

### 2.1 Sustainable Textiles

The sustainability challenge of the textile and fashion industry is linked to globalization of businesses. Due to stiff competition the global textile brands have outsourced its manufacturing to the developing countries. The developing countries have put economic growth before environmental preservation although the textile industry ostensibly has many rules and regulations to uphold sustainability and environmental concerns.

Most governments of the developing countries are unable to formalize and implement the rules and regulations laid by them (Magnus & Michele, 2016)<sup>[19]</sup>. There are also several certifications e.g. eco certifications, code of conduct etc. which are formed to regulate the production processes of the industries. Nevertheless these have proven to be insignificant and therefore hopeless in the context of addressing sustainable issues. In reality the governments of these countries support only the economic growth and there are no regulations to protect the environment (Magnus & Michele, 2016)<sup>[19]</sup>.

Appeal to the consumers by environmental scientists and researchers to limit the use of textiles have also been largely ineffective. Although people are slowly becoming aware of not only the human rights concerns of the textile industry but also its negative influence on the environment. Each stage of textile production e.g. harvesting, sorting, dyeing, spinning etc relies heavily on chemicals, water and energy usage. Apart from this, climate changes also result from large accumulated consumptions and fast fashion. Fast fashion is a phenomenon where clothes change rapidly as a result of change in fashion (Kate & Lynda, 2012)<sup>[17]</sup>. This is largely responsible for the large waste production of this industry. Fast fashion is identified by cheap quality, quick replacement and quick disposal of fabrics. Thus textile industry is one of the most polluting industries of the world.

Many scholars have proposed that buyers are responsible for the phenomena of fast fashion. They hope to reduce the trend of fast fashion by persuading the buyers to be environmentally conscious so that they can pressurize the manufacturers by threatening to boycott buying their goods if they are not produced through sustainable methods. Consumers can also give incentive to the manufactures producing sustainable textiles by purchasing consistently from them. Consumers must also be made to reject fast fashion goods and aid in decreasing environmental pollution. For example in sectors such as household goods, food, coffee, wood and several other products, many consumers have been coerced into sustainable purchases (Harris, 2016)<sup>[9]</sup>.

### 3. Research methodology

The secondary research methods were adopted to arrive at an

overall understanding of the history of textiles. This included references from journals, books, websites and other electronic sources, reports and miscellaneous sources.

### 4. Results and Discussion

There are several reasons for increasing textile waste and unsustainable practices. One of the major causes of textile waste is the quick accession and rejection of goods (Kate & Lynda, 2012)<sup>[17]</sup>. All the goods that are being produced in a quick span of time are rejected quickly due to the changing tastes and preferences of the people. The existing production processes of textiles must be modified such that maximum amount of waste is recycled or incorporate back as a raw material for production processes. To establish a sustainable manufacturing system it must be remembered to not only take resources from the earth but also return back to the earth so that no harm is caused to the ecological balance (William, 1993)<sup>[27]</sup>.

Secondly due to the globalization of businesses the developing countries have turned into manufacturing units catering to the needs of the rich countries resulting in over exploitation of its own natural resources. Governments are yet to establish successful methods to implement strict laws to prevent the exploitation of natural resources (Magnus & Michele, 2016)<sup>[19]</sup>.

Recently scholars have begun to research on product specific factors that instigate drawbacks for ethical consumption. They have identified factors such as limited understanding, limited accessibility of alternative products, dictates of fashion, societal norms, and status connected with personal appearance, style and visibility (Harris, 2016)<sup>[9]</sup>. This suggests that the perceived beauty and status that is offered by the phenomena of fast fashion to the customers are the major barriers for sustainability. Thus achievement of sustainability is not only the prerogative of the researchers and activists but also the consciousness of the consumers and each and every person on the earth.

Researchers and activists need to convert textile consumers into ethical buyers so that the textile and clothing sector does not lag behind in sustainable development. Recently scholars have begun to research on product specific consumer behaviors that confines the growth of ethical consumption. They have identified factors such as limited understanding of sustainability, limited accessibility of alternative sustainable products, dictates of fashion, societal norms, and status connected with personal appearance, style and visibility as deterrents of ethical buying practices (Harris, 2016)<sup>[9]</sup>. This suggests that the perceived beauty and status that is offered by the phenomena of fast fashion to the customers are the major barriers for sustainability. There is an ongoing debate on what comprises the term 'improved' and how it to be defined. This indicates that answers to the problems of sustainability and its related economic, fair trade and environmental issues can be resolved only through inventive thinking and endeavors by all sections of society as well as government agencies. The sustainability test requires diverse institutions and activists from various fields to work towards a common goal. There is a need for collective responsibility for achieving goals in sustainability. Environment issues involve everyone who is a part of the environment and there are no institutions or human being who is outside this environment (Magnus & Michele, 2016)<sup>[19]</sup>.

Thus achievement of sustainability is not only the prerogative of the researchers and activists but also the consciousness of the consumers and each and every person on the earth.



## 5. Conclusion

This study investigated the drawbacks of the textile industry which not only consumes a lot of natural resources for production but also discharges a lot of pollutants into the environment. In fact this industry is one of the most polluting industries in the world resulting in climate change, contamination of the earth, water, air, consumption of huge amounts of chemicals and energy and leading to global dialogues on human rights issues (Magnus & Michele, 2016)<sup>[19]</sup>. The rapidly increasing production of textiles is raising questions and concerns worldwide on how people will continue to extract from their environments and if this is sustainable. This leads to conflicting views on production and consumption. Several institutes ranging from private to the government funded are involved in finding solutions to the challenges faced. While many technological solutions are invented or put into action to counter some of the challenges but majority of the solutions lie in the awareness and dedicated actions taken by the consumers, organizations, government agencies and manufacturers (Magnus & Michele, 2016)<sup>[19]</sup>. In fact consumers and manufacturers has been identified as the main propagator of sustainable development due to the nature of the problem of the textile industry namely 'Fast Fashion' and which occurs as a result of consumer behavioral changes and manufacturer/marketing influence. Researchers note that textile production is a highly complex process and bringing about sustainable changes in the production as well as the consumption pattern requires a multifaceted approach involving scientific, socialist as well as political approaches. Research also recommends that improved statements from governments, producers and scientists are important to raise awareness and tackle the problem of sustainability.

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