

# SUSTAINABLE TEXTILE INNOVATIONS: A SOLUTION TO TEXTILE'S ENVIRONMENTAL ADVERSE IMPACTS

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## ABSTRACT

The paper focusses on the sustainable innovations took place in textile industry that will be beneficial for our environment. Textile and fashion industry majorly contributes in the economic development of a country. On contrary, it does a huge water wastage, water pollution, soil pollution, air pollution on a larger extent. Development of textile fibers which are sustainable and long lasting such as Hemp, fibers from fruits, leather alternatives such as Mycotex, Pinatex are discussed in the research work. These innovations can bring a new trend of utilizing more sustainable fashion rather than using a fast fashion product. The study also emphasis on different measures that can be adopted to minimize the adverse effect of textile production on earth such as reselling old clothes,

*Keywords-Sustainability, textile, environmental impact, innovations, fashion*

## I. INTRODUCTION

Sustainability is making a high impact on human lives in the present scenario due to the adverse effect of the human requirements and its waste. Textile is the basic necessity for all. It is not just used for the survival but now its in our lifestyle and we enjoy wearing various types and style of textiles. This industry plays a crucial role in the economic development but unfortunately, at the same time, textile and fashion industry is one of the most polluting industries in the world. The pollution produced from textile industry is hazardous and have a worse impact on our planet.

There is an urgent need to bring a change in the textile industries. Sustainable textile derives from environment friendly sources such as recycling fabrics, fibers grown through a sustainable process, producing long lasting textiles, using more natural options for designing or dyeing fabric. Older generations were more environmental awared (consciously or unconsciously). There are many such habits rooted in our past generations as well as in present generations such as taking care of clothes

properly to make them long lasting, recycling old garments, using the discarded fabric in other household work, donating second hand clothes to needy person, reselling or reuse. These practices can bring a change on ground level but a big step is needed to be taken to make our earth more healthy.

Innovations in the textile world will be responsible for the future impact on the environment as past innovations and development are responsible for present scenario. 80% of textile waste including fibers, fabric or garments goes into the dump each year. The fashion and textile industry produces 10% of the global carbon emissions and it is predicted that it will reach to a quarter of the world's carbon budget.

Fast fashion, chemical usage, excessive water wastage, overstocking, overproduction all result of being fashion forward but far away from being environment conscious. So, moving towards a sustainable lifestyle is essential and this needs to be considered on the priority. Many textile industries, on the contrary, working towards groundbreaking sustainable innovations. The research paper majorly focusses on some of the important sustainable textile innovations which can bring a revolution in the fashion and apparel industry in the coming future. The data is gathered through secondary sources using data collection tools of group discussions, case studies and observation.

## **II. SUSTAINABLE TEXTILE INNOVATIONS**

“The most optimal choice for you will be the one that will allow you to waste less, purchase fewer, and wear your items for longer.”

- The Good Trade

Sustainable textile and sustainable fashion are movement to revolutionize apparel world by reducing the environmental impact of fashion. It helps in reducing air pollution, water pollution and improving overall ecosystem. Measures to reform fashion industry towards sustainability need to be employed very seriously. One such measure is sustainable textile production and innovations.

The following are some mind-blowing textile innovations bringing a change in textile industry and will change the whole production process in future.

### **i. Replacing Hemp in place of Cotton fiber-**

Hemp is an environmentally friendly fiber. It comes from fast growing plant which requires little water without any harmful pesticides, herbicides or fertilizers. According to a report of National Geographic, Cotton needs 2,700 liters of water to make one cotton shirt. This much water is consumed by one person in two and a half years. The plant produces 200 percent more hemp than cotton on the same land.

It is a lustrous fiber which can be used in place of cotton to a greater extent in the future. It is a stronger fiber than linen and jute. In concern with the environment, it prevents soil erosion, improves soil quality by replenishing vital nutrients.

### **ii. More use of Nettle fiber-**

Nettle is a sustainable and biodegradable fiber which is more desired over plastic-based fibres such as polyester and nylon. It is one of the unique fibre which is the most breathable and maintains the temperature of the fabric as it keeps garment cool in the summer and warm in winter.

It is believed that Nettle fiber, yarns or fabric is the future of textile world. As industries are also considering environmental impact of textile production, there is a new trend of using nettle fibers. Even through Advanced knitting technologies, high quality nettle fibers are produced.

Historically, nettle fiber is not a new fiber. It was in use before 16<sup>th</sup> century but declined due to more production of cotton fiber as it was easier to harvest. Fortunately, now Nettle fiber is a labelled sustainable material of the future.

### **iii. Banana Fiber-**

Banana fiber out of its stems are extracted and spun into a yarn since the early 13<sup>th</sup> century. It is now revived back in the fashion industry. Different products such as Sarees, teabags, currency notes or car tyres are created using banana fiber.

The production of banana fiber is a tough task as it takes a long process to extract the banana fiber from its stem. The layer is boiled into an alkaline solution to make it smooth and soft. Next, the fibers are joined together to bind a long thread and spinning is done. Later, the yarn is dyed or weaved.



Fig. 1 Banana Fiber

**iv. Developing fiber from Coffee ground-**

Now, coffee is not just a drink but a fiber too. New innovation in the textile world is that the fabric are developed using coffee grounds. Its fiber has excellent anti- odour properties, UV ray protection and a quick drying property which will bring a new trend in the upcoming fashion. These coffee grounds beans are collected from giant coffee vendors such as Starbucks and recycled to create a yarn from the coffee fiber.

**v. Leather Alternatives-**

As leather harms our ecological system a lot so there is a high need for its alternatives. Natural fruit fibers are experimented to create a fiber out of it that can be later converted into a fabric. For instance, apple waste extracted from juice is converted into fiber. Similarly, Pineapple by-products can be turned into an organic non-woven fabric which is known as Pinatex. Pinatex requires no additional water as pineapple left-over leaves already contains water content. Around 40,000 tons of leaves are annually generated but not all waste is recycled into a fiber. This is an excellent leather alternative which need to be practiced on a larger scale. These leaves remaincreates a stronger, easy to stitch fibers.



Fig.2 Pinatex Fabric

Another innovation is Mushroom leather which is organic, gluten free and chemically safe. It gives a light velvety and smooth surface along with antibacterial and antiseptic properties. Similarly, MycoTEX is a fabric grown out of a vegetative part of mushroom. This fabric allows reshaping itself, easily repaired, lengthened and fit according to the body shape of the wearer.

**vi. Lotus Fibers-**

Interestingly, Lotus is also used for the development of fabric. The fiber is already been used for constructing luxury or special garments in countries like Thailand and Myanmar. For the creation of lotus fiber, the lotus stems are cut open to extract a long fiber after harvesting. These fibers are cleaned and dried before taking them to the looms.

Now, the question arises. Why only special or luxurious fabric are created using lotus fiber? The answer can be easily assumed that as lotus is naturally soft and smooth so it gives a silky feel. With that, it's a light weight, stain-resistant fiber which creates a more enjoyable fabric.



Fig 3. Lotus fiber extracting process

### **vii. Eucalyptus Yarn-**

Eucalyptus fibers are harvested and converted into a yarn which tends to have a good eco-friendly reputation. One of the Knitting industry, Wool & the Gang, has launched a yarn made from Eucalyptus tree i.e., Tina Tape Yarn.



Fig. 4 Extraction of eucalyptus fabric

### **III. BRANDS PROMOTING SUSTAINABLE TEXTILE PRODUCTS**

Some brands are seriously working on making sustainable textile products which are mentioned below-

- A famous denim brand, Wrangler, launched a sustainable denim line in which dyeing was done through using foam instead of water in order to preserve water from getting polluted.
- The Hemp Trading Company works especially in sustainable textile products and manufactures street wear made up of Hemp, bamboo and organic cotton.

- Boll & Branch, a bedding products brand, is using organic cotton for production.
- Big Frenchies is a sustainable clothing producer made in USA.

#### IV. FINDINGS AND DISCUSSIONS

Many brands, organizations and textile industries are giving emphasis to sustainable production of their products. They are focusing on the development of next-generation textiles, recycling, reuse and upcycling the textile waste, extending the lifecycle of existing textiles for the benefits of people, industry and environment.

Innovation in the reshaping of natural fibers is also in process. Now organic cotton is also grown without using any fertilizers, pesticides or any other chemical processing which is harmful. The natural properties of a fiber are not disturbed. This all is maintained by some innovations, research and traditional practices.

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One of the industry in Finland .i.e., Infinited Fibre company, which creates high-quality textiles fibers from textile wasteproviding a solution to fiber like cotton, nylon, polyester and viscose that fiber looks and feels like cotton. It is used for endless production. They are combining technology, nature and sustainability to develop smart & sustainable textiles.

Sympatex Technologies is a Munich-based functional specialist is dealing with sustainability in the textile industry. They believe in Sustainability meets performance. It explains how although being a glamorous industry, fashion and textile industry is the second dirtiest industry in the world. It is increasing resource scarcity, global warming, water shortage and polluted environment. The clothing industry not only produces a fabric but it also produces an ugly impact on the ecosystem. This impact can be observed in the production process as well as at the end of its life cycle.

They followed the concept of 100% recyclable clothing. Sympatex is also developing eco-friendly polyester that is 100% recyclable. This awareness will create upto 30% less CO2 emissions, 60% less energy consumed and 90% less water consumed. Their motto is Reliable functionality and maximum environment friendliness go hand in hand

There are some certification system for brands, retailers and manufacturers which certified them regarding various sustainable manufacturing process. Sustainable Textile Production (STeP) by OEKO-TEX is a certification system given for every possible production facilities at every stage of production such as production fiber, weaving mills, knitting, spinning to finishing facilities and ready-made textile manufacturers.

**V. CONCLUSION**

The desire to wear appealing and glamorous garments has indirectly badly impacted the environment. A lot of wastage comes from textile industries or products which can be recycled and reuse. Along with this, the above mentioned textile sustainable innovations can be practiced and promoted in the industries. As this is the most polluting industry, these sustainable innovations are yet to bring a revolution in the textile world but the major challenge is to get them into the global market and ensuring that most of the apparel brands are utilizing these fibers into their collections. Various collaborations with eco-friendly firms will work towards making minimum wastage and maximum utilization of the natural resources.

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