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## The sustainable fashion

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### **ABSTRACT**

Currently, a healthy lifestyle is a “fashion” among people, which is associated with all kinds of ecological products, such as furniture, cosmetics, food, and clothing. In the textile industry there is the concept of sustainable fashion referring to the whole process from designing to the creation of a finished clothing product. The term also refers to the type of raw material used and the conduct of a responsible product manufacturing sector referring to the working conditions of employees. Currently, the aim is to use organic fibers and products made from them due to the environmentally friendly cultivation, including eliminating the use of fertilizers and chemical substances.

**Keywords:** sustainable fashion, ecological clothing, fibers and organic products

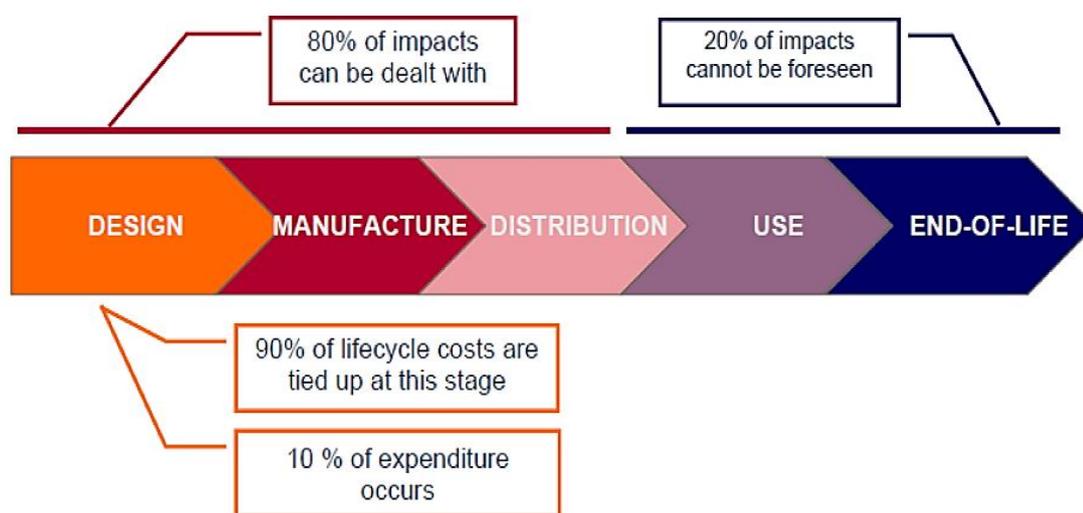
### **1. INTRODUCTION**

The concept of sustainable fashion or ecological fashion is defined as a part of the developing philosophy of design (design) and sustainability trends. Nowadays, when a healthy, sporty lifestyle and a life in harmony with nature are promoted, the phenomena of ecological fashion and environmental protection are extremely popular and reach a wider and wider group of people. The concept of sustainable fashion is current in the dictionary of popular chains, as well as many recognizable and well-known fashion designers. Therefore, the clothing sector faces important challenges in respect of both environmental protection and respect for workers' rights and human rights today [1,2].

The phenomenon of sustainable fashion is perceived mainly through the acquisition of semi-finished products from proven sources, which are eco, the use of materials and the possibility of using socially responsible production methods. Factors characterizing sustainable fashion are not only renewable and natural fibers, but also the process in which fiber is processed into a finished textile product, in addition, the working conditions of people are also very important. Sustainable fashion has become not only a temporary trend, because it is constantly perceived and implemented by fashion designers and receivers.

The production costs of ecological clothing as a result of minimizing damages relating to cultivation, processing and transportation, as a result are much larger compared to conventional production. Despite this, sustainable fashion is gaining more and more supporters. Network stores also contribute to the development of ecological clothing lines. Despite the age of advocates of sustainable fashion, you can also meet her opponents. It is alleged that online stores promote the ecological approach to fashion in combination with the production of their clothing products in factories where "slave" practices prevail, and work is carried out by children. However, balanced fashion should be developed consciously in some cases, the type of natural fiber due to the use of a specific technological process may contain substances harmful to the human body and the environment. An example could be the production of bamboo materials, which is undesirable for the environment, due to the use of hazardous and harmful chemicals in the production. One of the equivalent methods in fashion is the use of fabrics obtained through recycling or the purchase of vintage clothing. An additional alternative is the AirDye technology, using synthetic fibers, thus limiting consumption and water pollution, which is used in very large quantities during cultivation and eliminating the cotton dyeing process. Despite many advantages, sustainable fashion is a trend in modern society, however, ecological clothes are currently quite expensive [1,3-5].

## 2. THE CONCEPT OF ECODESIGN AND ECOTEXTILES



**Fig. 1.** Importance of design phase in the product life cycle [6]

Ecodesign is a completely different, new approach to product design, taking into account the impact of the product on the environment throughout its entire life cycle. Ecodesign is created at the initial stage of the project, its main goal is to design a product and process that guarantees the benefits of the entities involved and full satisfaction of the consumer, while at the same time having the least impact on the environment. Currently, fashion designers have a significant impact on the development of sustainable fashion through the choice of materials, colors and the production system. Precise product analysis, interdisciplinary work methods and consumer needs and requirements lead to innovative product ideas, also taking into account the whole life cycle of a new or improved product. Ecodesign is currently "on time" and can even provide the company with success because it is perceived by consumers as responsible and motivating employees. Ecodesign is not only focused on the product's life cycle, because in this case the environment is also very important, so the designer should take into account not only the trend in fashion, but also logistics, product use, production process, in the case of clothing products, their maintenance, recycling or utilization (Fig. 1) [6-8].

In the case of textile products related to the ecological fashion area, the term "functional textile material" was used due to:

- a. The ecological situation of the planet,
- b. The use of materials and textiles practically everywhere eg as personal protection means, use as decorative elements at home, school, hotels, use in the form of composites in airplanes, as construction elements of bridges, roofs, tents, as a net, bags or reinforcement of roads, etc.
- c. Used, used textile products are a very big problem for the environment,
- d. A new generation of textiles related to new areas of application, where new materials ensure efficiency, comfort and comfort for the user [6].

Functional textile fibers are a wide and diverse area, and each functionality is associated with a new specification and material requirements. The textile functional product is usually made of various materials [6,7].

In the textile and clothing sectors, the importance of Ecodesign refers mainly to the environmental impact throughout the entire production chain. There are many different labels and ecological labels, each of which presents different aspects of sustainability. Textile industry has attempted to prevent environmental pollution during the implementation of production processes. The greatest attention was paid to the reduction of chemical substances, ie bleaches or dyes, etc. Attention was also paid to the more effective use of water and wastewater treatment. Textile industry is increasingly responding to consumer demand for so-called "Green fabrics", "eco fabrics". The most important tasks for sustainable fashion related to Ecodesign and the use of functional and ecological materials are shown in Figure 2.

Designing in relation to green / eco textiles involved the elimination of production stages using harmful substances and proper selection of raw materials. Figure 3 shows how ecological fibers can be classified [9-12].

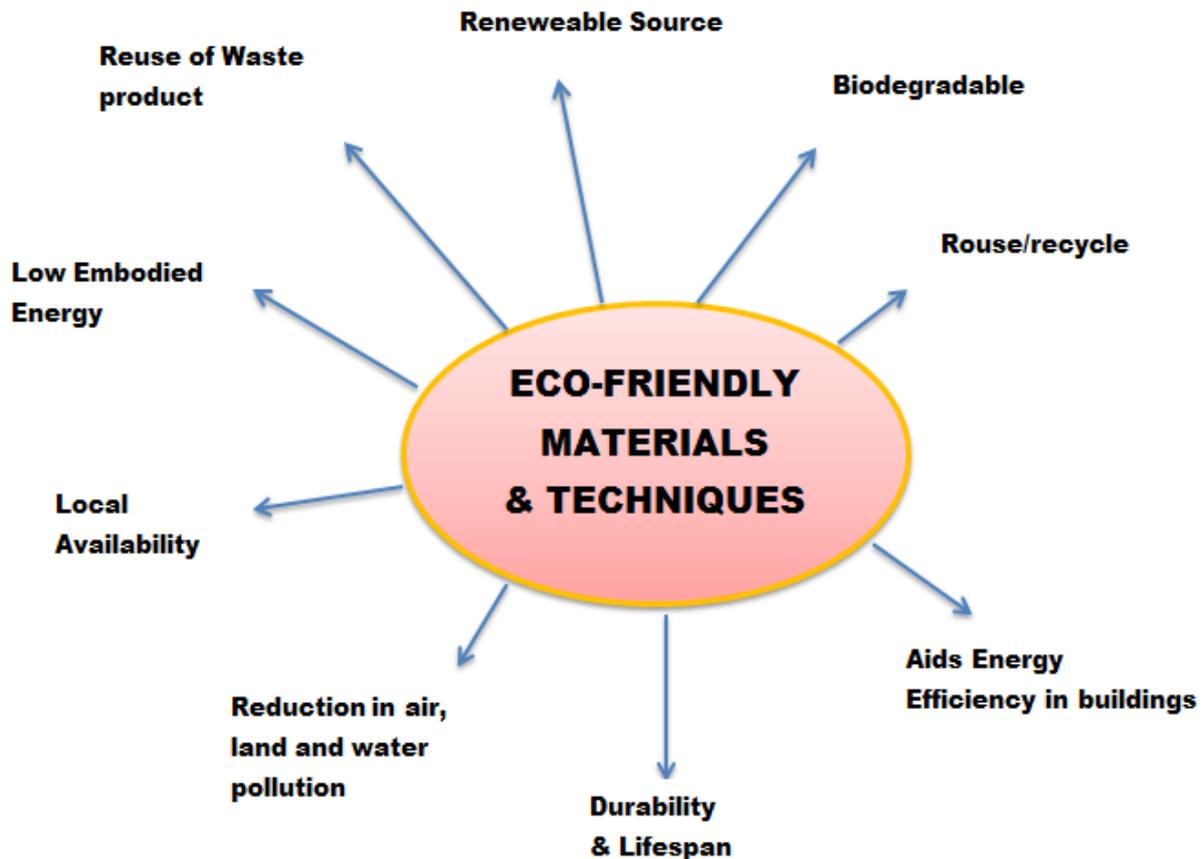


Fig. 2. Ecofriendly material and techniques concepts [6]

Materials are the most important elements in the production of sustainable textile products. Materials are associated with environmental and social responsibility due to the many different stages involved in the production of natural and chemical fibers, however, you must also consider converting the raw material into a ready fabric or knitwear.

As a result, the finished clothing product also includes several steps, e.g. pressing, packaging, labeling, which activities are related to the collection of resources, i.e. water, energy or chemicals. Obtaining a fashionable textile product is associated with many complex and complicated steps and tasks.

Guided by the choice of ecological fibers, which consume less resources and produce much less waste as well as pollution, we can design textile products and their production systems that I will balance. It should be remembered that textile products produce a lot of waste and pollution even after they have been used up and replaced with new ones. In order to reduce waste, recycling is needed while this process can be supported by the use of recyclable materials.

Therefore, materials play an important role in sustainable fashion because it is very important to choose the raw material and material that will be recyclable and thus support the environment [13].

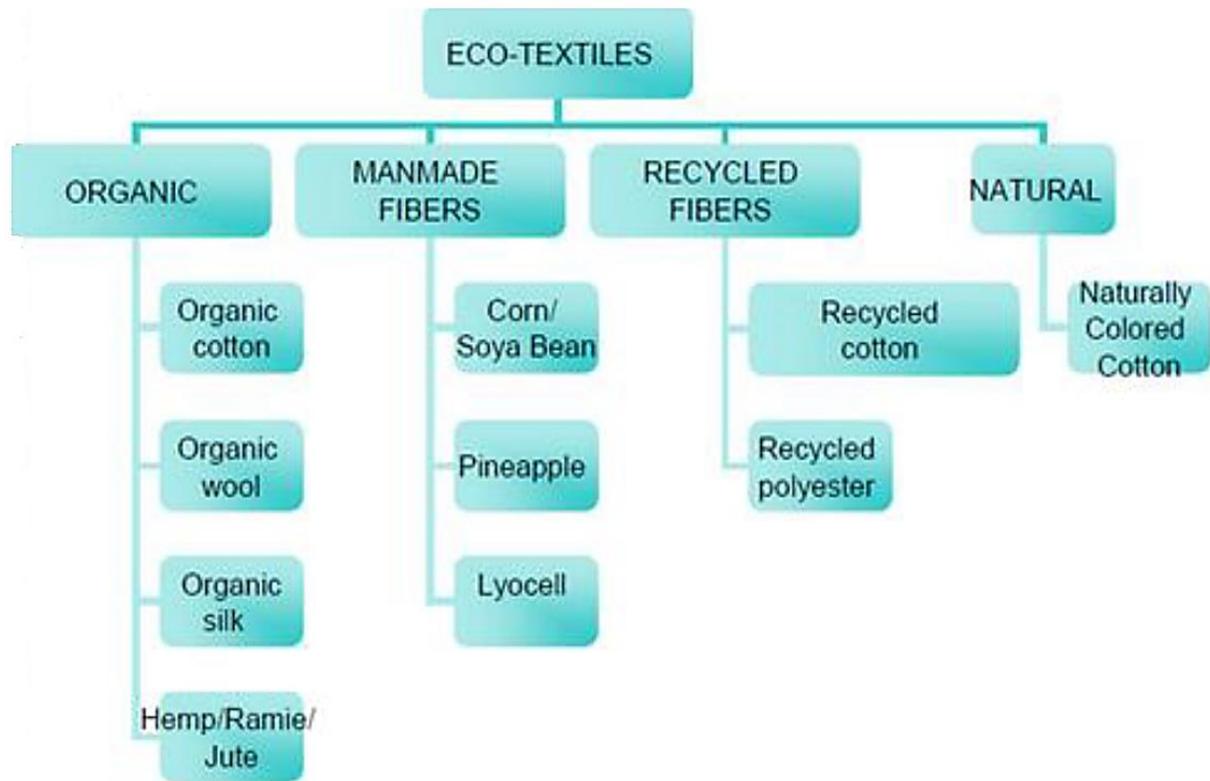


Fig. 3. Classification of eco friendly textiles fibers [6]

### 3. CURRENT SITUATION

Currently, the global market size for organic fibers is approximately 9,570 kg - data from 2016. It is forecasted that growing awareness in the area of sustainable fashion will contribute to the increase in demand for natural materials and will be a driver of significant market growth.

It is expected that the demand for organic fibers will increase in the near future. Organic fibers have many advantages compared to, for example, synthetic cotton or other synthetic fibers because they do not contain pesticides, chemicals or have a negative impact on the environment. Therefore, we should replace traditional cotton cultivations with organic (low-chemical) crops, eg organic cotton, hemp and flax, which need less pesticides and water for their production.

Organic cotton production took place in Turkey at the end of the 1980s [15]. In the following years, companies from around the world made attempts to grow organic cotton [16].

The main factors determining the rapid development of organic cotton products on the global market were:

- Development of knowledge in the field of ecology of textile products,
- A changing lifestyle of consumers,
- Clothing companies changing their business strategies [14].



Fig. 4. Stages of growing organic cotton [14]

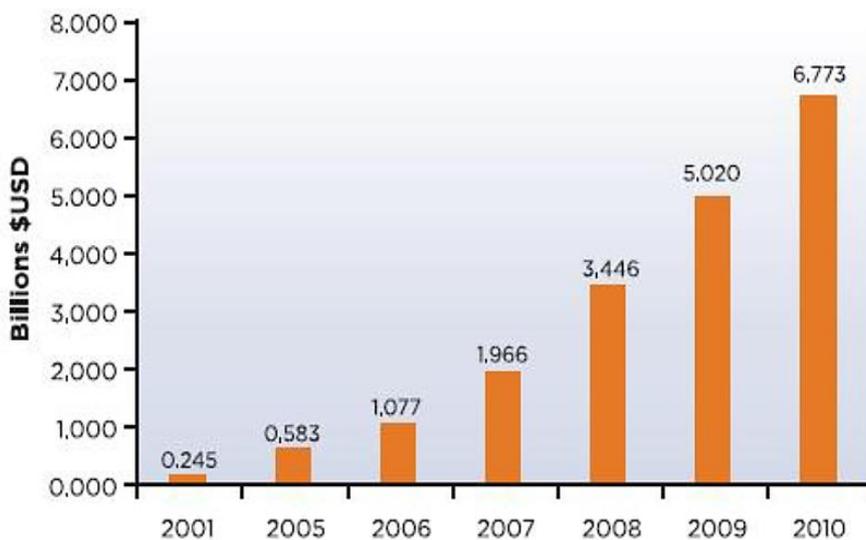


Fig. 5. Estimated Global Retail Sales of Organic Cotton Products: 2001-2010 [14]

A significant part of the fashion industry in the textile industry is based on cotton, with the ever-increasing demand for organic products. Currently, the largest increase in demand concerns organic cotton (Figure 5). In addition to the growing demand, farmers derive a lot of benefits from growing organic cotton, because they use natural cotton growing methods and do not need drastic and dangerous chemicals that are harmful to people and their environment [17]. The comparison of the use of organic cotton with conventional cotton for humans in various fields, eg health, economy, economics, etc., is presented in Table 1.

In Europe, the most ecological fibers are grown in:

- France,
- Italy,
- Germany,
- UK [13].

It is believed that favorable regulations in the production and production of biology-based products with severe penalties or sanctions related to the use of synthetic polymers will contribute to market growth in the fiber area, which will translate into increased sales of sustainable fashion. It should be mentioned that in China and India there has been a rapid development of the textile industry. However, India is leading the way in the sustainable production of textiles due to the fact that they locally obtain natural fibers [18]. Currently, a very important group are ecological fibers from recycling because they eliminate harmful impact on the surrounding environment. These fibers are becoming more and more popular [13]. Figure 6 shows the share of particular types of ecological fibers related to sustainable fashion on the global market.

**Table 1.** Advantages of organic cotton compared to conventional cotton [14]

	<b>Conventional Cotton</b>	<b>Organic Cotton</b>
<b>Environment</b>	<ul style="list-style-type: none"> <li>• Water pollution</li> <li>• Loss of biodiversity</li> <li>• Adverse changes in water balance</li> <li>• Pollution of soil and air</li> <li>• Pesticides killing beneficial insects</li> </ul>	<ul style="list-style-type: none"> <li>• Improved water utilization</li> <li>• Increased biodiversity</li> <li>• Soil and air are hygienic</li> <li>• Eco-balance between pests and insects</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Health problems in regions where regulatory systems are weak</li> <li>• Poisoning and casualties due to extensive use of pesticides</li> </ul>	<ul style="list-style-type: none"> <li>• Use of local varieties and resources</li> <li>• Helpful for low income families due to more premium</li> </ul>

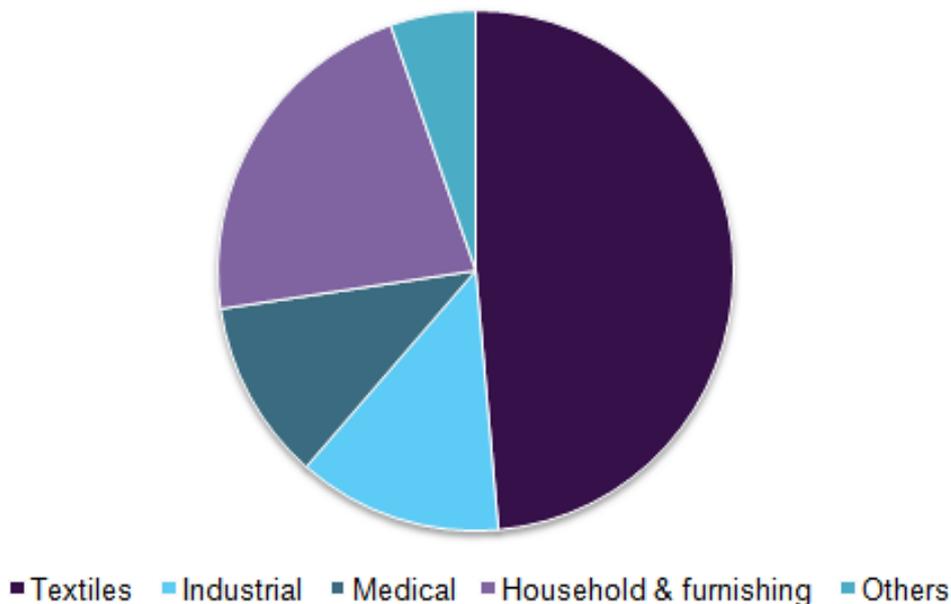
<b>Economy</b>	<ul style="list-style-type: none"> <li>• Resource consuming</li> <li>• High production cost</li> <li>• No alternative crops</li> </ul>	<ul style="list-style-type: none"> <li>• Less resource consumption</li> <li>• Lower production costs</li> <li>• Niche product</li> <li>• More revenue for farmers</li> </ul>
<b>Food</b>	<ul style="list-style-type: none"> <li>• Pesticides entering human food through cottonseed oil</li> <li>• Contamination of meat and milk from animals fed on cotton products</li> </ul>	<ul style="list-style-type: none"> <li>• No danger of contamination of edible items originated from cotton source.</li> </ul>
<b>Agricultural</b>	<ul style="list-style-type: none"> <li>• Reduced soil fertility</li> <li>• Poor irrigation, contamination fields becoming barren</li> </ul>	<ul style="list-style-type: none"> <li>• Increased soil fertility</li> <li>• Crop rotation maintains soil structure</li> </ul>
<b>Health</b>	<ul style="list-style-type: none"> <li>• Chemicals remained in final product cause health problems</li> <li>• Chronic diseases (cancer, infertility, weakness, illness)</li> </ul>	<ul style="list-style-type: none"> <li>• No use of pesticides, or chemicals that saves the farmer and surroundings from chronic diseases.</li> </ul>



**Fig. 6.** U.S. eco fiber market volume by product, 2014 - 2025 (Kilo Tons) [13]

It is forecasted that the demand for ecological products made of alternative fibers such as hemp, flax and bamboo in the clothing sector will increase [14].

Analyzing Figure 7, it is evident that ecological fibers are applied mainly, reaching almost 50% in textile products. The second sector with the largest application of eco fibers is household goods. From the graph it can be read that ecological fibers are also used in industry and medical devices.



**Fig. 7.** Global eco fiber market volume by application, 2016 (%) [13]

It is expected that stable prices of organic fibers together with better durability and much better properties of finished products will gain a significant advantage over synthetic fibers. Affordable availability of raw material would enable stable delivery, so this aspect is very important in the transition from synthetic to organic fibers. Mature and experienced economies, ie Europe and the United States, constantly strive to develop and use organic fibers in clothing products. It is expected that the area of medical applications will also increase due to increased awareness in the field of hospital-related diseases, which would allow demand for ecological medical materials [13].

#### **4. CONCLUSIONS**

Sustainable development significantly influenced today's textile and clothing industry, the process of transforming the textile industry into a more sustainable one is above all very sensitive, requiring broad knowledge, skills and commitment.

In conclusion, it can be said that sustainable fashion is gaining more and more interest. Not only are the ecological food and cosmetics products, but also the clothing products no longer fashionable. Through the use of organic fibers that apply to the entire production process and the possibility of recycling, sustainable fashion is gaining more and more

followers. Organic fibers and products made of them in this currently organic cotton gained the greatest interest in the textile fashion market because it is characterized by many advantages and is an alternative to the dominant synthetic fibers. Natural cotton and other natural fibers such as flax, bamboo are used on the textile market because of their properties, but for example, growing cotton is not conducive to the environment, because it requires a very large amount of water, fertilizers and pesticides.

As a result of the growing interest of users in the ecological fashion, well-known designers and "chains" try to introduce ecological collections. Additionally, the conscious recipient can always check whether the purchased clothing has a certificate or a sign defining ecological and social responsibility. Sustainable fashion is one of many aspects that significantly affect the environment, through the purchase and use of ecological clothes we have a positive impact on the surrounding environment. On the other hand, clothing companies are not able to produce clothing through an ethical production system, as well as design and design new clothing collections using sustainable and suitable materials that can be recycled. In addition, the production of ecological clothing is currently associated with higher costs, which translates into the final price of the manufactured clothing product, and as everybody knows, not every consumer can afford to support eco fashion [19]. However, it should be remembered that the environment is very important, that's why it is so important to use organic products because our future depends on it. The future of the clothing industry will therefore depend on products that will offset environmental and social burdens throughout the life cycle of a textile product.

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