

1. Introduction

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The E-Book on Sustainable Design and Process in Textiles is one of the several types of educational activities undertaken in the GreenTEX project. To the best authors' knowledge, it is necessary to change the awareness and approach to sustainability in the broad textile industry (and related ones). Future textile designers who in the future will create new products and solutions not only for the textile and clothing industry but also for others that use textile products (such as medicine, transport, hygiene industry and protective equipment) must have full knowledge and awareness of how to create new solutions in line with the goals of sustainable development.

The textile and clothing industry is responsible for the emission of around 2 to 3 billion tonnes of carbon dioxide annually. It's about 10 percent. Global CO₂ emissions from fossil fuels. The industry is therefore on the same list of the largest global emitters of greenhouse gases as energy, transport and food manufacturing. At the same time, the production of textiles and footwear consumes a great deal of water, and the cultivation of cotton used in the garment industry requires intensive pesticide use and degrades soil. In addition, due to the poor recycling infrastructure, the vast majority of, for example, clothes end up in landfills. Currently, the textile and clothing industry is the second largest industry burdening the environment (right after the fuel industry). Only better knowledge about the design and production processes of textile products and the awareness of the negative effects on the environment will make both, businesses and consumers, begin to see the real costs of this industry and look for possible solutions.

At the end of 2018, the leaders of the global fashion sector adopted the Fashion Industry Action Charter for Climate, in which they committed to reducing greenhouse gas emissions by 30% by 2030 and by 2050 – to achieve climate neutrality. Over the last 2 years, the signatories of the Charter have developed a strategy to achieve these goals by jointly identifying the most ecologically problematic areas of the fashion sector, finding effective tools for verification and reporting on environmental degradation at each stage of the production chain, identifying the possibilities of reducing pollution, with particular emphasis on the use of renewable energy sources, energy-efficient logistics and transport, and the transition to a circular economy model. Also in March 2020, the European

Commission adopted a new Circular Economy Action Plan, along with the EU's Textile Industry Strategy, to foster innovation and encourage re-use in the sector. However, in order to achieve these goals, it becomes crucial to recruit specialists in the field of materials science and designers who can take into account environmental aspects when creating new products. The market needs specialists who face a number of challenges, including the following tasks: introducing circular economy standards, measuring and reducing the negative impact on the environment, ensuring appropriate working conditions, as well as implementing transparent rules for communicating changes to the environment and consumers.

The E-Book on Sustainable Design and Process in Textiles is a compendium of knowledge in a nutshell. It covers various aspects to provide a wide perspective on how principles of sustainable development and circular economy can be implemented in the broadly understood '*design of textiles*'. The proposed GreenTEX approach is presented in a form of a diagram – see Figure 1.1 and it includes the following issues:

- starting from sustainable raw materials (various types of materials suitable for use);
- Green Design (different ecological design strategies, such as: dematerialization, modularity, longevity, recyclability, re-manufacture etc.);
- sustainable textile processes (various processes with analysis of SD aspects, such process as textile manufacturing process, pre-treatment process, coloration process, special finishing process etc.);
- textile products (diverse types of sustainable products);
- distribution (transportation aspects, carbon footprint);
- consumption and market (analysis of the market and customers' demand, awareness of the end consumer and its influence on the whole industry);
- financial and marketing analysis of textile industry;
- reusing and recycling (possibilities for textile industry).



Figure 1.1. The complex approach on ‘designing’ developed as the GreenTEX diagram – implementation of Sustainable Design and Process in Textiles

Source: authors’ own work.

Extra readings

1. GreenTEX project website [online], www.greentex.p.lodz.pl
2. GreenTEX platform [online], www.greentex.p.lodz.pl/platform