

Sustainable fashion



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The history of textiles

Textiles are fundamental to our everyday life. We cannot imagine a world without textiles, since they are used in clothing and footwear, but also in many other products such as carpets, towels, bed linen, and curtains. For this reason, **we have a long history with textiles**. Cotton, for example, is already in use since 5.000 BC.

The mass production of clothing began roughly in the mid–19th century, when some manufacturers began to produce garments that did not require fitting. Fashion became an established industry towards the mid-20th century, when fashion garments began to be mass-produced. With increasing mass-production of consumer commodities at lower prices, and with global reach, sustainability has become an urgent issue amongst politicians, brands, and consumers.

When 1132 people died in the collapse of the Dhaka garment factory (known as the Rana Plaza accident), this served **as a wakeup call to the global fashion industry**, generating momentum to operate in a more sustainable (people, animal and planet-friendly) manner.

One of the challenges global fashion brands see themselves faced with is **the need to use resources less wasteful**. As one of the elements contributing to more sustainable operation textile producers look at the use of renewable raw materials (biomass) as feedstock for their production.

The history of textiles: a timeline

5000 BC

First cotton use

100 BC – 1400 AD

Trade with Asia, Silk Road

1940s

Introduction of synthetic fibres

End of 20th century

Transition to a consumption culture,
moving of production to Asia

2013 AD

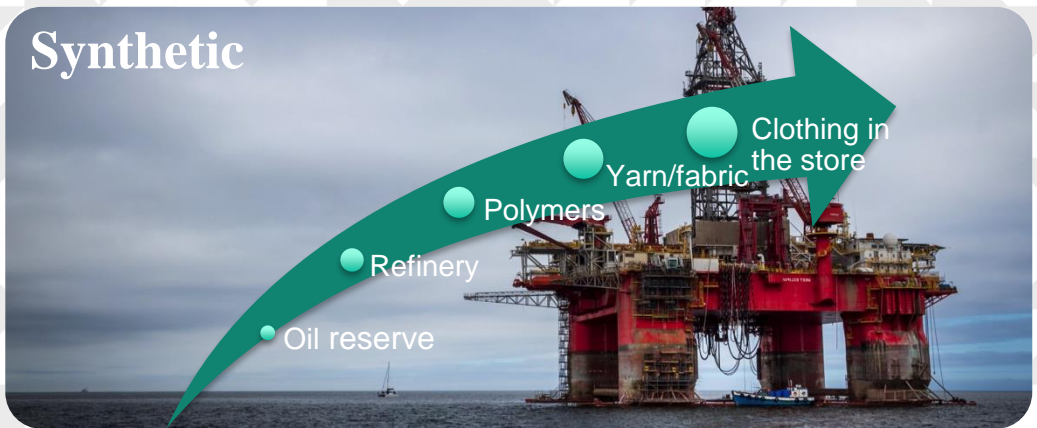
Dhaka factory collapse. Consumer
awareness and start of a new transition?

How are textiles made?

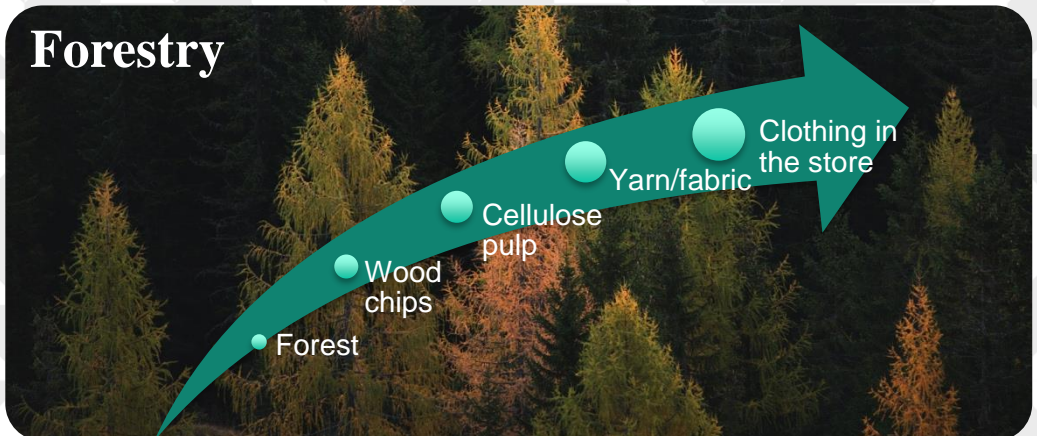
The production process of textiles is very dependent on the type of textile. Synthetic textiles, such as nylon and polyester, are made from mineral oil, a fossil resource, whereas other fabrics, such as cotton and modal are made from biomass, a renewable resource.

Two examples of the production process from starting material to final product are shown below. Note that this does not include what happens with the textile at the end of its lifetime.

Synthetic



Forestry



The problem with current textiles

Every European citizen consumes on average about 26 kg of textiles each year, mainly made from cotton and synthetic materials.

Cotton is a very thirsty crop, requiring 2,700 liters of water - what one person drinks in two-and-a-half years - **to make one cotton shirt**. Cotton farming is also responsible for intensive use of chemicals (insecticides and pesticides), that leads to water pollution.

Synthetic materials are materials that are produced from mineral oil in a similar way as plastics are made. Therefore, **synthetic textiles face the same environmental issues as plastics**: they contribute to greenhouse gas emissions, the source of global warming, and to microplastics pollution.

Most of the textiles that we use in the EU are produced in Asia, where **production is not always taking place with respect to people**. Often, the people who are involved in making the textiles, such as the farmers and tailors, do not get a fair income.



Is organic cotton more sustainable?

Cotton is the world's most popular natural fibre and [accounts for almost a quarter \(22%\)](#) of global fibre production. **To grow cotton, excessive amounts of water and pesticides are needed.** Moreover, to produce enough cotton for one t-shirt, an average of [17 teaspoons of chemical fertilizers](#) are used and nearly a teaspoon of active ingredients, such as pesticides, herbicides and insecticides.

As a response to these environmental impacts, 'preferred cotton' and organic cotton programmes have been developed. Cotton produced under a 'preferred cotton' standard has improved environmental and/or social sustainability outcomes and impacts compared to conventional cotton. Approximately [a quarter of all cotton](#) is produced under these preferred cotton programmes.

As the term organic does not necessarily include the various social impacts of cotton production, this has led to [discussions about the integrity](#) of organic standards on cotton products. On the other hand, [most organic cotton standards cover both](#) the environmental and social impacts of the cotton supply chain. While there are many benefits to organic cotton over conventional cotton, it does not necessarily mean that it is produced in a socially responsible way. In order to be sure that your cotton clothes are produced in a more environmentally and socially sustainable way, **check for the GOTS, OCS and Fair Trade labels.**

Read the **full article** on organic cotton on our [Allthings.bio website](#)

Bioeconomy and textiles

An alternative way to produce **bio-based textiles by starting from biomass instead of mineral oil**. This is the idea of the bioeconomy, which is explained in more detail in the bioeconomy factsheet.

There are two bio-based options. The first is **natural textiles**, such as wool, linen and cotton. A second option is **biosynthetic fibres**, where biomass is processed to make fibres that resemble plastics.

Both bio-based materials aim to address the current problems with textile production. Using biomass instead of mineral oil reduces CO₂ emissions, biodegradable textiles prevent microplastics pollution in the ocean, avoiding the use of cotton reduces the use of water and toxic chemicals, and a fair price for biomass can stimulate rural economies. However, these problems with sustainability are too diverse and complex to solve with one type of bio-based textile. Therefore, many different bio-based textiles have been developed.



Interact with the bioeconomy

Play our **serious game** to get familiar with the bioeconomy.

Use our **label scanning app** to learn what the bioeconomy labels say about the products they are found on.

Serious Game Mission BioHero



Scanning App Label BioHero



Join our **LinkedIn group** to discuss all matters related to the bioeconomy.

Further reading

Movies and pictures

- [Call to action animation](#) from the Ellen McArthur Foundation
- [The naked truths about fashion](#)
- BioCannDo: [Testing a bio-based T-shirt](#)
- The Nairobi [Forests for Fashion](#) exhibit
- [UNTV](#) on what sustainable fashion may look like
- Photos from the [New York Exhibit](#)
- [Exhibition on biomaterials](#) from the Fashion for Good museum

Technical reading

- [Quick guide to biosynthetics](#) from Textile Exchange, an international non-profit organisation focusing on sustainable textiles. A concise document on the current status of textiles in the bioeconomy, with the main benefits and concerns.
- [Brochure](#) with examples and context of sustainable fashion from forestry products.
- Overview of the [bio-based textile sector](#) and its sustainability assessment methods



Beyond bioeconomy in general, the Allthings.bioPRO factsheets series covers the project's four missions, tangible themes that are familiar to the wider public, as follows:

- The Bioeconomy
- Jobs and Careers
- Kids and Schools
- Food Packaging

The factsheets are living documents, that are refined and expanded over the duration of the project (September 2020 - August 2023), taking into account feedback collected during engagement with the public.

The latest editions of the factsheets can always be found at the project website, www.allthings.bio.

**For more information contact our coordinator
Valerie Sartorius, v.sartorius@fnr.de**

