

# Sustainability in Fashion

*by Daniela Peckova Watanabe*

---

**Course:** Contemporary Issues in the Fashion Industry

**CUNY/NYC College of Technology Professor:** Dr. Nazanin Munroe Spring

**2022 Course/Section:** BUF 4700-OL70

The main garment industry problem is how to scale a business and be profitable while also being sustainable, that is a question that only technology can solve. Having felt the challenge while trying to turn my own business into more sustainable practices, the most frequent challenge faced while sourcing from sustainable business is the amount of time you need to plan ahead and count that everything still might change along the way, sustainable is the opposite of Fast Fashion, sustainable takes time, handmade crafts take long, sometimes one piece takes a month, that’s why is usually so much more expensive and it’s even known as Slow Fashion. But a few brands managed and more people doing sustainably means it becomes more viable, cheaper, and sustainable becoming a mainstream trend is important as all brands work towards the goal of educating the prospective customers.

Sustainable fiber sources are the ones that complete the full cycle of going back to nature, biodegradable, or recycled.

Natural fibers that are biodegradable come from limited resources or animals, which makes them not sustainable. Innovative fibers are coming from the most unlikely sources, mushroom leather, orange fiber, pineapple fiber, fermented wine fabric, and even milk fabric the variety is incredible and the lab seems to be the place where they are all coming from, another common thing is

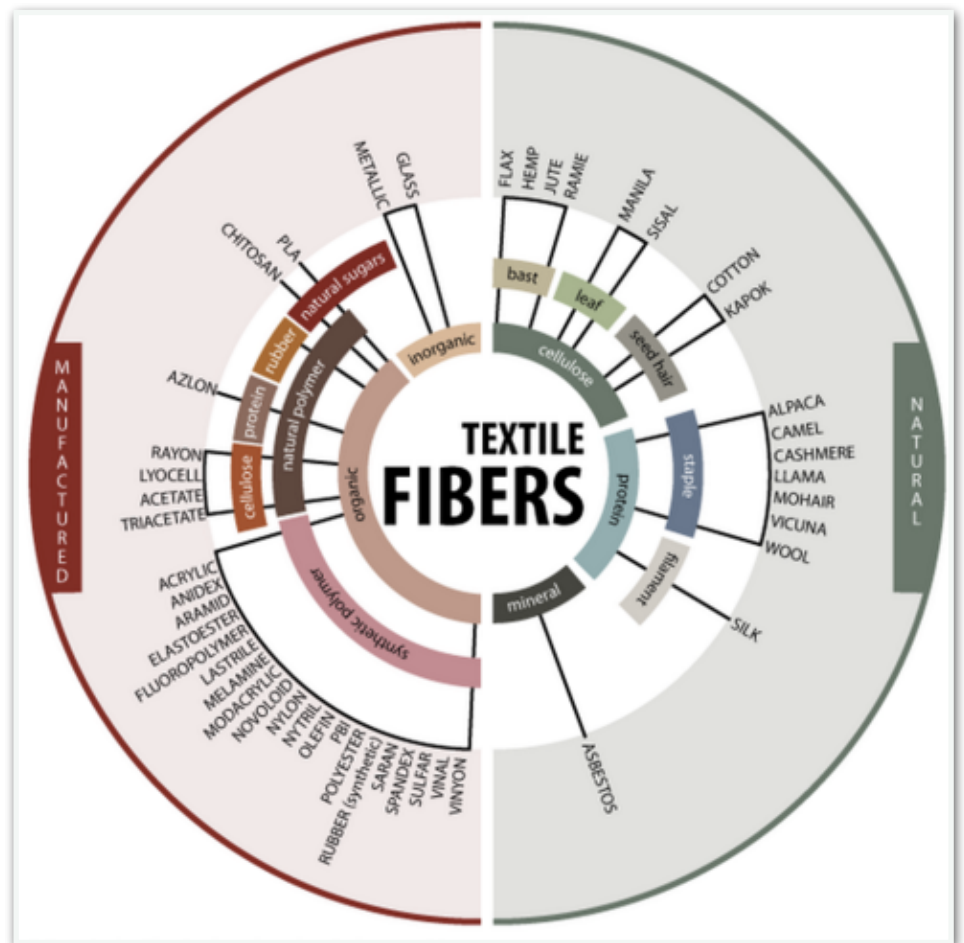


Figure 1. Types of Fibers. <https://www.close-the-loop.be/>

that the fibers are coming from food sources, an example of what could possibly happen is the current Ukrainian-Russian war and the fact that the world is facing a possible food shortage crisis, our resources are more limited than we notice. It's hard to sustain the natural fibers because a lot of water and space is needed to keep the plants or animals. According to the Victoria and Albert Museum (2018) video "The future of fashion: Bolt Threads" there are only 31 types of fibers in the world, and a lot of room for innovation, new technology efforts include the creation of fibers such as the bolt Thread technology use lab-grown yeast to create sustainable threads. There are also experimental processes where clothes made of mushroom fiber have a second function besides aesthetics, clothes that clean the air, fabrics that can suck Carbon Dioxide, an incredible innovation, imagine cleaning the carbon footprint as we walk. The issue we run into is the scalability of the idea, of how to democratize the sustainable fashion to leave the museum to everyday life. How can we find enough mushrooms to dress everybody? Well, we all say its impossible until it's done.



Figure 2. A Mycotex dress and jacket by Neffa, made from mycelium, and a carbon-negative bioplastic mac, made using algae by designer Charlotte McCurdy. <https://www.theguardian.com/environment/2020/feb/08/fashion-living-garments-suck-carbon-from-air>

In the luxury market, Stella McCartney is the most known sustainable brand that uses many of the most innovative materials in the market, the above-mentioned Bolt Threads and the vegan Technik Leather, "Created from recycled fibers and plants, Technik-Leather is our 100% animal-free performance fabric that captures the essence of premium leather" (Vonholzhausen, n.d.), the material is known for its durable performance, low carbon footprint, being lightweight, water scratch and stain resistant, also saving water a conserving land. It's one of the most sophisticated sustainable materials out there, but it does come with a heavy price tag that not everyone can afford, a bag from Vonholzhausen is on average \$495 while a McCartney mini-bag using the same material can cost \$1800. Stella McCartney also uses Recycled Nylon and

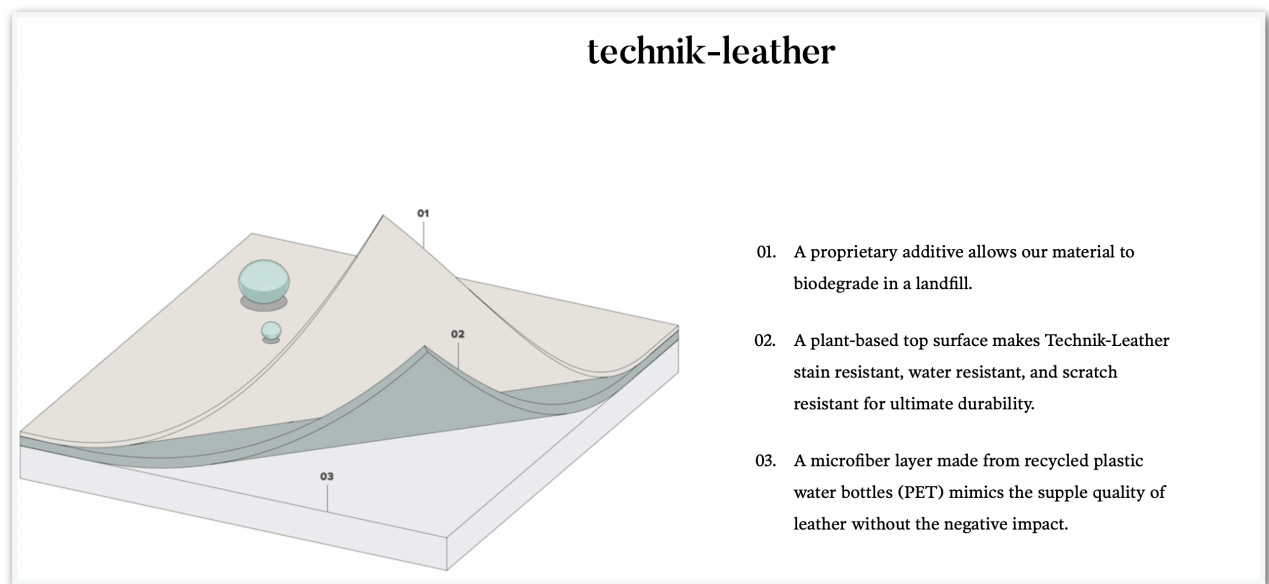


Figure 3. Technik Leather Layers. <https://vonholzhausen.com/pages/technik-leather?irclid=RmqS3GWeFxyITGRVas1XzXzuUkGQmx0SS3xzxU0&irgwc=1>

Polyester, recycled Cashmere, and sustainably sourced Cotton, Viscose, and Silk. Stella McCartney(n.d.) explains why it's important to source sustainably:

Viscose, also known as rayon, starts its life as a tree. Every year, 150 million trees are cut down to create fabric. Some come from sustainably managed forests, like that Stella

McCartney uses, though a significant amount of the global viscose supply still originates from ancient and endangered forests.

So it doesn't mean that comes from nature that is a good material option because that material might be depleting our environment of much-needed forests. Below is a tab of the ranking of textiles by different environmental impacts:

*environmental impacts*

	Energy use	Water use	Greenhouse gases	Waste water	Direct land use
↓ Decreasing environmental impact	Acrylic	Cotton	Nylon	Wool	Wool
	Nylon	Silk	<i>Synthetic</i>	<i>Regen.</i>	Ramie
	Polyester/PTT	Nylon	Polyester	<i>cellulosic</i>	Cotton
	<i>Regen. cellulosic (viscose, Modal)</i>	<i>Regen. cellulosic</i>	Lyocell	<i>Natural bast fibres</i>	Flax
	PLA/Cotton/Lyocel	Acrylic	PLA	Nylon	Hemp
	Wool	Hemp	Viscose	Polyester	Viscose and Modal
	<i>Natural bast fibres</i>	Wool	Modal		Modal
	<sup>1</sup> (nettle, hemp, flax)	<i>Natural bast fibres</i>	Cotton		Jute
		<i>Natural bast fibres</i>	<i>Natural bast fibres</i>		PLA
		Polyester	Wool		Lyocell ( <i>Synthetic</i> )

Source [Defra 2010]

Figure 4. Environmental Impacts. <https://www.semanticscholar.org/paper/Mistra-Future-Fashion---Review-of-Life-Cycle-of-21-Chapman-Hollins/739893062680c631c755391f334901c7239f8c5c>

A sustainable mid-range brand, Patagonia is an example of a mainstream brand that successfully implemented sustainable and ethical practices. The brand uses organic certified cotton and recycled materials like Recycled Spandex, NetPlus® Recycled Fishnets, NetPlus® material is made from 100% recycled discarded fishing nets collected in fishing communities in South America”(Patagonia, n.d.), Recycled Cotton "made from scraps gathered from the fabric floors"(Patagonia, n.d.) producing Cotton takes a lot of water so this a sustainable practice. Patagonia has a variety of sustainable materials, the brand also works with Recycled

Polyurethane, Recycled Nylon, Recycled Wool, Recycled Cashmere, Recycled Polyester, Recycled Tencel, and the innovative Advanced Denim that uses less energy, less water, and emit less CO<sub>2</sub> in the dying process that is done using sulfur dyes to bond instead of the traditional jean synthetic indigo dying process. A Patagonia long sleeve surf top costs \$49 and a one-piece swimming suit \$159 putting the brand in the mid-range affordability section.

Patagonia stopped using synthetic indigo because of the amount of water and energy that requires. Synthetic indigo also requires a large amount of petroleum, cyanide, and formaldehyde which are toxic and can turn rivers into non-potable water sources, also killing its wildlife. Turning back to the original Indigo derived from plants seems like a good idea, the reason why the synthetic indigo was developed is the difficulty to fix indigo to the fabric but people are looking to innovate the original Indigo techniques with technologies like the Advanced Denim and Tinctorium, another new technology. Tinctorium uses genetically modified bacteria to mirror the original indigo brand and bond the color to the fabric in the same way. While Tinctorium uses bacteria to create indigo, Colorifix cast genes to create microbes that turn into a variety of colors. Colorifix also uses a sugar-based fermentation process to create pigment. So while there is sugar there is pigment. Without the help of technology, it's very hard to make natural dyes, it takes 1.5 kilos of flowers to color naturally one page of paper red as seen in the Victoria and Albert Museum (2018) video "In Search of Forgotten Colors: Sachio Yoshioka and the Art of Natural Dyeing", so technology is making it possible to look at past techniques and enhance them with more consciousness and care for the environment.

After having discussed the latest technologies by large brands, we discuss the most affordable sustainable options. From the 33 brands listed on the Good Trade (2021) article "35 Ethical And Sustainable Clothing Brands Betting Against Fast Fashion", none had been classified as a budget brand the most affordable would go from \$ to \$\$, that it was Kotn a sustainable Canadian brand that sells Cotton products. The third sustainable brand discussed in this essay includes products that start at \$11 for socks and \$26 for cotton t-shirts. Kotn (n.d.) uses non-toxic dyes on cotton. It's very rare to see other materials besides lycra and cotton being used on affordable sustainable brands, that's why the main challenge of this industry is in how to run a

competitive and profitable sustainable business because the technologies are being constantly developed but it is usually expensive. After so much research on the latest innovation, I come to the conclusion that upcycling and recycling are the most sustainable option because it's using what's already been created instead of creating more products that use more energy, land, water and in terms of scaling a sustainable business it seems the most affordable would be to use cotton and recycled lycra. Textile is a field that didn't see radical innovation since the last invention of the petroleum made Nylon during WWII. As the awareness of sustainability become more mainstream more money is available for new technologies to be developed, things are moving fast and we expect to see many new fibers in the next few years.



Figure 5. What's Sustainable Fashion? <https://thevou.com/fashion/sustainable-fashion/>

## References

- Figure 1. Close The Loop. (n.d.). *Types of Fibers*. Retrieved March 26, 2022, from <https://www.close-the-loop.be/en/phase/3/end-of-life>.
- Figure 2. The Guardian. (2020). *A Mycotex dress and jacket by Neffa, made from mycelium, and a carbon-negative bioplastic mac, made using algae by designer Charlotte McCurdy*. Retrieved March 26, 2022, from <https://www.theguardian.com/environment/2020/feb/08/fashion-living-garments-suck-carbon-from-air>.
- Figure 3. Vonholzhausen. (n.d.). *Technik Leather Layers*. Technik Leather . Retrieved March 26, 2022, from <https://vonholzhausen.com/pages/technik-leather?irclid=RmqS3GWeFxyITGRVas1XzXzuUkGQmx0SS3xzxU0&irgwc=1>.
- Figure 4. Semantic Scholar Org. (n.d.). *Environmental Impacts*. Retrieved March 26, 2022, from <https://www.semanticscholar.org/paper/Mistra-Future-Fashion—Review-of-Life-Cycle-of-21-Chapman-Hollins/739893062680c631c755391f334901c7239f8c5c>.
- Figure 5. The Vou. (2021). *What's Sustainable Fashion? What EXACTLY Is Sustainable Fashion & Why Is SO Important*. Retrieved March 26, 2022, from <https://thevou.com/fashion/sustainable-fashion/>.
- Patagonia. (n.d.). *Environmental & Social Footprint*. Patagonia. Retrieved March 26, 2022, from <https://www.patagonia.com/our-footprint/>
- Staff. (2022, March 25). *35 ethical and sustainable clothing brands betting against Fast Fashion*. The Good Trade. Retrieved March 26, 2022, from <https://www.thegoodtrade.com/features/fair-trade-clothing>.
- Stella McCartney US. (n.d.). *Fibers from forests: Stella McCartney US*. Fibers From Forests | Stella McCartney US. Retrieved March 26, 2022, from <https://www.stellamccartney.com/us/en/sustainability/fibres-from-forests.html>
- Sustainable Clothing & Home Decor. quality, comfort, ethics*. Kotn. (n.d.). Retrieved March 26, 2022, from <http://kotn.com/>
- Victoria and Albert Museum. (2018). *In Search of Forgotten Colours - Sachio Yoshioka and the Art of Natural Dyeing*. Retrieved March 26, 2022, from <https://youtu.be/7OiG-WjbCQA>.
- Victoria and Albert Museum. (2018). *The future of fashion: Bolt Threads*. Retrieved March 26, 2022, from <https://www.youtube.com/watch?v=eOT4mvO1a3M&t=40s>.