

Environmental scientist conducts international research on the impacts of cotton

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Cotton is the most widely used natural fiber for clothes. But how polluting are our jeans and shirts actually? Environmental scientist Laura

Scherer has coordinated an international research project on the impacts of cotton. The study is published in *Nature Reviews Earth & Environment*.

The consumption of textiles has exploded in the past decades. That's due to the promotion of fast fashion, Scherer says, "The environmental impacts of textiles have therefore also increased considerably." Much of Scherer's previous research focuses on the environmental impacts of food. "But sustainable food alone is not sufficient to meet sustainability targets. Not everyone can afford to install a [heat pump](#), but everyone can decide what they eat, what they wear, or how long they wear [clothes](#)."

To identify the footprint of these clothes and look for opportunities to reduce impacts, Scherer worked together with an international team of researchers. "We looked at cotton, as it is the world's most widely used natural fiber. Only polyester is used more in the textile market, but that's a synthetic fiber."

From cotton crops to garbage

Cotton is a soft, fluffy staple fiber that grows in a boll around the seeds of the cotton plant. It grows in warm environments, but the cultivation of the plant requires a lot of water. That's where the sustainability assessment of the fiber starts. "Sometimes, it is easy for consumers to ignore the impacts of the production because they happen abroad. For instance, the purchases of consumers in Europe can contribute to water scarcity in China and India," says Scherer.

"In the U.S., for example, the energy grids are carbon-intensive and people have the habit of frequently washing and machine-drying. In that case, the use phase can exceed the production phase in its contribution to the carbon footprint of jeans. In contrast, in a country like Sweden where the energy is cleaner, clothes are worn longer before washing, and

air-drying is more common, the use phase contributes relatively little to the overall carbon footprint of jeans."

It is better to wash our clothes less frequently, Scherer explains. "That has a dual benefit: it not only reduces the impacts from washing, but also helps maintain the quality of clothes. That way, they can be used longer. And also filling the [washing machine](#) to its full capacity and avoiding ironing help reduce the impacts."

Should we buy different textiles then?

How big the environmental impacts of our jeans and [t-shirts](#) are depends on the country, the cotton cultivation, the manufacturing and use of the product. At the cultivation stage, for example, the impacts vary depending on the levels of irrigation, pesticide and fertilizer applications. At the textile manufacturing stage, impacts depend on energy infrastructure and manufacturing technologies. And the impacts of the use phase vary due to consumers behavior. In their paper, the researchers analyzed and compared these different stages. Then they suggested opportunities for farmers, manufacturers and consumers to improve the environmental sustainability of cotton textiles.

Often it is the production of cotton garments that dominates the environmental impacts, Scherer says. "It can be the cultivation of [cotton crops](#) or the manufacturing of cotton garments. It takes several steps to go from cotton until something like a t-shirt or jeans comes out of it." Still, there are also various opportunities for consumers to reduce the impacts of their clothing.

When buying the next pair of pants, should we avoid cotton? "We compared [cotton](#) to several alternative fibers, both natural and synthetic ones. But it's difficult to judge if these are better as studies usually do not take consumer behavior into account. Materials might differ in how

often they need to be washed or how long they can be used. This influences their overall impact. So, more research is needed."

Instead of buying less clothes made from certain fibers, it's better to buy less in general. "A transition from fast to slow fashion demands changes in product design, marketing and consumer behavior." Even if the production of clothes might feel like something far away, we as consumers can make a significant change, according to Scherer. "Buying fewer clothes and washing less frequently are undoubtedly beneficial. And it even saves you money."

More information: Zhenggui Zhang et al, Environmental impacts of cotton and opportunities for improvement, *Nature Reviews Earth & Environment* (2023). [DOI: 10.1038/s43017-023-00476-z](https://doi.org/10.1038/s43017-023-00476-z)

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