

The background of the page is a photograph of cotton bolls. The image is a close-up, showing several white, fluffy cotton bolls attached to a brown stem. The bolls are in various stages of maturity, with some showing the dried, brown husks. The background is a soft, out-of-focus field of cotton plants under a clear blue sky.

CANOPY'S COTTON LINTER POSITION

Canopy is a strong proponent of alleviating pressure on the world's forests and climate by shifting towards circular models of production for paper and textiles, and by using lower impact alternatives to wood fibre. Catalyzing rapid and broad adoption of more sustainable systems and solutions is a priority for Canopy.

CONTEXT

Cotton linter has been a consistent fibre source for textiles for several decades.

When cotton is ginned and the seeds are removed, the fluff around the seed has a very high cellulose content, which makes cotton linter a desirable material. Many viscose pulp producers use cotton linter as a feedstock.

Social and environmental impacts of growing cotton have long been identified as areas of concern. Environmental issues are related to: the intensive use of chemical pesticides^[ii]; the depletion of soil fertility; loss of biodiversity; water-intensive resource use; conversion of natural ecosystems to agricultural use^[iii]; use of Genetically Modified Organisms (GMO)^[iv]; and competition with food crops. In addition, labour practices associated with cotton production, including cases of forced and child labour, have been in the spotlight, globally.

In addition to the impacts related to growing cotton, the water and chemical use impacts associated with processing the cotton linter into textiles also needs to be considered. Whether derived from forest fibre, cotton linters, or bamboo, pulping fibres to make viscose is traditionally a chemically-intensive process. Ensuring producers are using cutting-edge technologies that provide more efficient and cleaner alternatives to conventional pulping methods is critical when considering the use of cotton linter, as is compliance with robust chemical use standards.

Can cotton linter be a lower impact feedstock?

Brands and producers often ask whether cotton linter can be considered an innovative and more responsible Next Generation material. Independent, third-party Life Cycle Analyses (LCA) that adhere to high-quality LCA standards provide useful guidance to the impacts of various materials, including cotton linter.

A cutting-edge LCA carried out in 2017 evaluated cotton linter as one of several alternatives to wood pulp used for the production of viscose. The study showed that cotton linter has a lower footprint than some wood pulps, such as those derived from tropical wood or northern boreal forests that may be carbon-rich or house high levels of rich biodiversity. However, the study also noted high chemical use for processing cotton linter.

This LCA compared ten sources of man-made cellulose fibre (MMCF), and highlighted that the main impact categories for cotton linter are freshwater consumption, high levels of non-renewable energy use, and hazardous chemical use. The study considered production of MMCF derived from five completely different material feedstocks (wood, bamboo, cotton linter, flax by-products, recycled clothing), with supply chains stretching across four continents.

The LCA assessed cotton linter grown from cotton in India and processed in China and concluded that it performed as a “middle class” fibre across most impact categories. Canopy notes that cotton linters derived from cotton grown in other regions, as well as those grown using organic/regenerative practices and processed in cleaner facilities, would perform differently and could receive a higher ranking.

Canopy's Position

Canopy recommends that cotton linter sourcing for MMCF adheres to the following criteria, before it can be considered a lower-impact feedstock:

1. The cotton has not been grown in conditions that lead to the depletion of soils, or under conditions which require the expansion of the agricultural footprint into natural ecosystems.
2. Cotton should not be cultivated on land where it's cultivation displaces food crops or places pressure on regional water supplies.
3. Canopy recommends all producers using cotton linter work with their suppliers to steadily eliminate any GMO cotton as quickly as possible.
4. To achieve the above three criteria, certification standards which include social and environmental criteria such as those concerning labour, water, pesticide use, soil conservation, biodiversity, and restriction of chemical substances should be pursued. Strong, robust, long-standing cotton certifications such as the Global Organic Textile Standard (GOTS) should be preferred for cotton grown for linters. For agricultural waste raw material streams Canopy also recommends the Roundtable on Sustainable Biomass (RSB) be attained due to its robust criteria.[v]
5. Cotton linter should be processed in best-in-class pulping facilities that have a closed-loop chemical system to address and eliminate toxic emissions and effluent issues.[vi]
6. Cotton linters should be blended with fibres produced by MMCF fibre producers that have achieved a "green shirt" in the CanopyStyle Hot Button Report, and not mixed with fibres from Ancient and Endangered Forests.

- i. canopyplanet.org/resources/plan-for-saving-forests-climate/
- ii. The production of raw materials, spinning them into fibres, weaving fabrics and dyeing require enormous amounts of water and chemicals, including pesticides for growing raw materials such as cotton. [europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI\(2019\)633143_EN.pdf](https://eur01.safelinks.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI(2019)633143_EN.pdf)
- iii. For information on these impacts, see www.worldwildlife.org/industries/cotton
- iv. For information on possible impacts of GMO cotton, see scidev.net/asia-pacific/gm/news/india-never-benefited-from-genetically-modified-cotton.html
- v. rsb.org/framework/
- vi. Zero Discharge Hazardous Waste (ZDHC) will be releasing guidelines for cotton linter in the future.



So, is cotton linter a Next Generation Solution?

Canopy does not categorize cotton linter unambiguously as a low-impact Next Generation fibre. Cotton linter can have higher impacts as an MMCF feedstock than other agricultural fibres (such as flax), microbial cellulose, and post-consumer recycled textiles. However, cotton linters may have less impact than some types of forest fibre. When the above criteria have been met, cotton linter can qualify as an interim Next Generation Solution alternative fibre, which should be supplemented whenever possible with lower impact fibres.