Taking the pressure off irreplaceable forests

Climate-smart solutions for paper, packaging, and textile fibres

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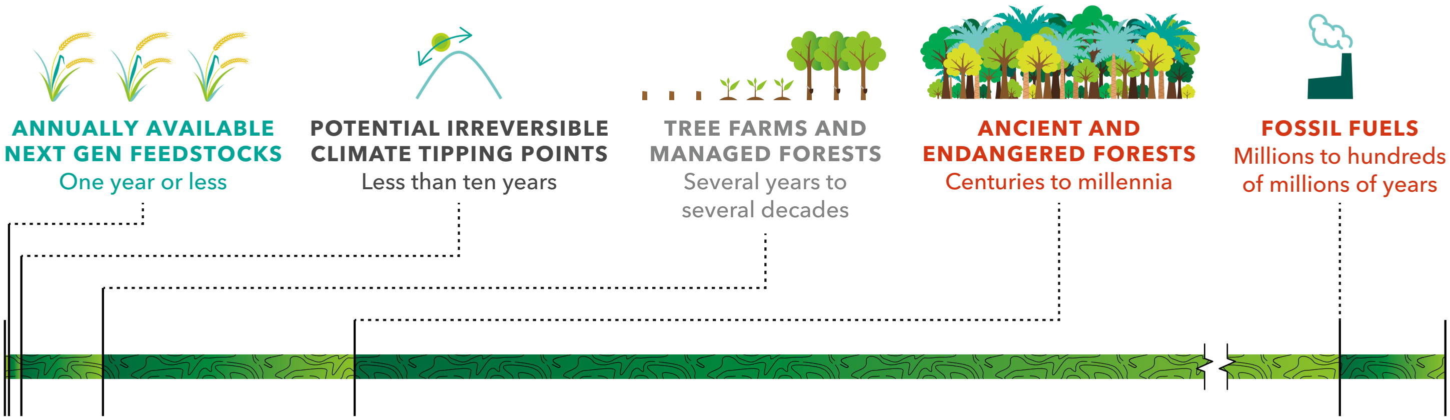
A Critical Decade for Climate

Timelines matter – and a tree farm is not a forest

TYPICAL "RENEWABILITY" TIMESCALES PUT IN PERSPECTIVE



With Scope 3 supply chain emissions on average representing over 90% of a brand's carbon footprint,[1] we don't have a choice but to transform our production and consumption systems.

Unfortunately, one of the most pervasive myths today suggests that logging *more* trees to produce paper, packaging, and textiles is the answer to our sustainable sourcing needs.

This claim, based on the idea that trees are 'renewable' and 'carbon neutral', ignores the broad scientific support that such assumptions are **oversimplifications at best – misleading or outright false at worst**.[2]

We've already learned that recyclable (in theory) too often doesn't mean actually recycled (in practice).

Now, we must do the same with 'renewable' and 'renewed'.

It is essential for the survival of our last remaining Ancient and Endangered Forests that we don't equate the 'renewability' of industrial tree farms with **biodiversity-rich forest ecosystems that took centuries to millennia to evolve**.

> These vital forest landscapes are functionally **irreplaceable** on timescales relevant to the current climate and biodiversity crises.[3]


Forests and Carbon

Old forests are the most effective terrestrial carbon sequestration system on earth

Peer-reviewed studies have found that undisturbed primary forests:

- contain 35% higher carbon stocks than logged forests on average[4]
- have an estimated 40 times higher sequestration potential per hectare over the next century[5]
- provide the fastest, cheapest, and most effective nature-based solution to preventing dangerous levels of warming when protected[6]

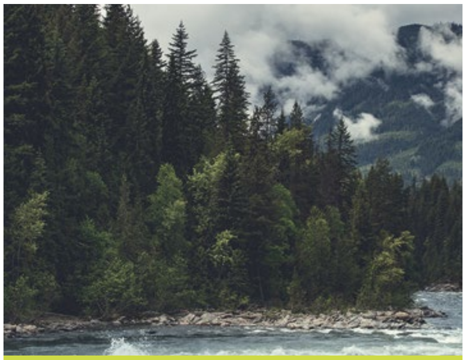
In all forest types, logging results in unavoidable forest and soil carbon losses at the time of harvest that add more carbon to the atmosphere at a time when science is telling us we urgently need do the opposite.[7]

Compared to what a towering 200 year old tree can sequester if left standing, the amount of carbon in a tiny seedling is insignificant. **Waiting for new growth to recapture the loss requires time we don't have**.

It is also critical to consider the legacy impacts caused by past conversions of carbon-rich forests, which is a central part of the history of most second or third growth managed forests and plantations that exist today.

In other words, **significant carbon transfer to the atmosphere has already occurred in most present day forests**. Far from carbon neutral, this in fact implies a pre-existing 'carbon debt' as a starting baseline.[8]

Ignoring such historical context is like assessing water quality in a polluted stream and assuming current condition counts as clean. Unfortunately, clever math or loopholes don't change the physics of what the planet experiences!



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QUICK QUIZ

Ancient and Endangered Forests are ...

A) Renewable?

B) Irreplaceable?

Answer: *(B): Individual trees may grow back, but extinct species and intricate ecosystems don't! Forests are far more than the sum of their trees.*

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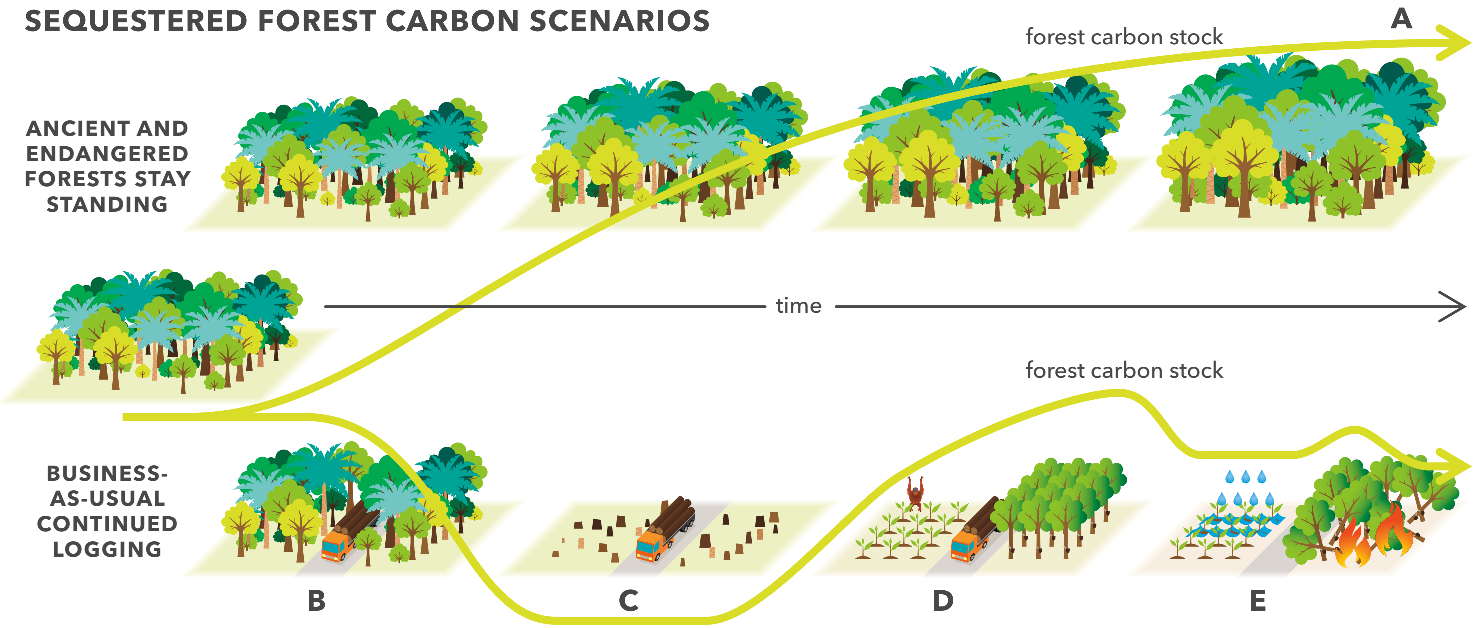
Worth More Standing

The conservation value of Ancient and Endangered Forests continue to grow year after year—as we strive to meet climate and biodiversity targets within the decade, they're our MVP

SEQUESTERED FOREST CARBON SCENARIOS



Continued logging undermines both the present and future carbon and biodiversity value of standing forests.

In other words, there is an opportunity cost of 'foregone growth' **(A)** created by cutting down trees that would otherwise continue to sequester carbon.[9]

Simply re-planting trees is not enough, since there is **no guarantee of full forest recovery** to pre-harvest conditions. E.g.:

- Road construction can permanently reduce forest carbon storage due to landscape 'scarring' **(B)**, which in some forests is the primary precursor to deforestation.[10]
- Exposed soils **(C)** release carbon for decades, if not centuries, after harvest, suppressing the carbon sink benefit of newly planted trees.[11]
- Fragmented habitat and monoculture plantations reduce ecosystem complexity **(D)** and put critical species at risk.[12]
- Ongoing climate feedback loops **(E)** such as fire, floods, drought, and disease pose elevated risks to young or degraded forests that are often less resilient to such threats than primary forests.[13]

Biogenic carbon losses are fundamental to quantifying the full carbon impact of logging forests and resultant forest products.

While some studies use default carbon neutral claims to avoid measuring biogenic carbon changes, Life Cycle Assessments (LCAs) show that **omitting such losses can dramatically underestimate net GHG emissions** – by as much as 75% to 92%.[14]

* biogenic carbon is carbon that is stored and released as a result of the growth, combustion, and decomposition of organic material

Low-carbon Solutions

Alternative fibres and technology

(both) © Daniel J. Benson

Next Generation Solutions use what is traditionally considered waste to deliver low-carbon alternatives to virgin tree fibre that help take pressure off forests, stabilize our climate, and protect biodiversity.

Despite differences in scope, boundaries, and products, available LCAs and carbon footprint studies indicate that Next Gen fibres used in paper, packaging, and textile applications **consistently outperform virgin tree fibres across the majority of environmental impact categories**.[15]

These solutions aren't science fiction. **Over 11 million tonnes of commercially produced pulp** created from textile and agricultural waste are already on the market today.[16]

Another **480+ million tonnes of available low-carbon feedstocks**[17] could be turned into pulp every year—representing untapped potential to dramatically scale up this production.

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When used as an alternative to virgin tree fibres, Next Gen fibres can help:

- Reduce Scope 3 emissions and achieve Science-Based Targets faster
- Diversify fibre sourcing and secure the supply of the future
- Alleviate degradation pressure on carbon and biodiversity rich forests
- Mitigate the opportunity cost of cutting down forests that would otherwise continue to sequester carbon
- Provide new revenue streams for farmers that eliminate the need to burn agricultural residues and provide cities with alternatives to landfilling textiles
- Reduce energy, water, and chemical use during the pulp processing stage
- Advance the shift towards a circular economy by embedding value in waste products

Environmental Benefits of Next Gen Fibres

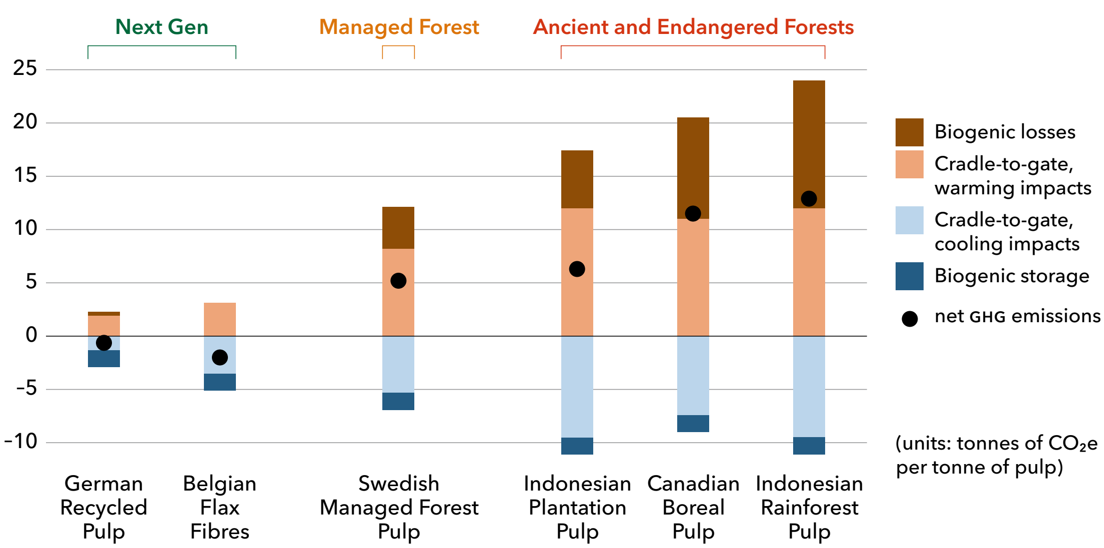
Quantifiable LCA evidence

Compared to virgin tree fibre, each tonne of Next Gen fibre **avoids an estimated four tonnes of GHG emissions** on average.[18]

In specific sourcing scenarios, these Scope 3 emissions savings have been documented to reach up to 15 tonnes of GHGs compared to tree fibre from carbon-rich landscapes like Ancient and Endangered Forests.[19]

Robust LCAs that include independent third party reviews and comprehensive biogenic carbon accounting find that, relative to virgin tree fibres, Next Gen fibres have on average:[20]

- **95% to 130% less GHG emissions**
- **88% to 100% less land-use impacts**
- **At least 5 × lower impact on biodiversity**

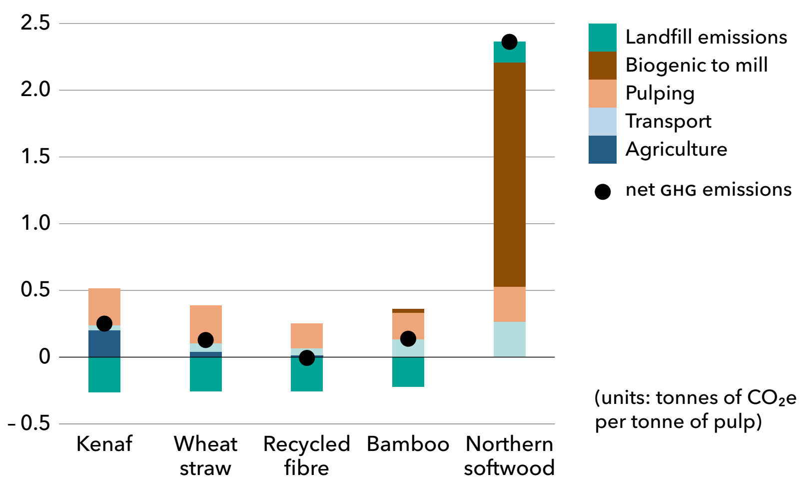


(Left) GHG emissions associated with distinct sourcing scenarios for textile fibres such as viscose and rayon, demonstrating the relative carbon benefits of Next Gen feedstocks, as well the significant magnitude of biogenic carbon emissions for virgin forest fibres that occur at the time of logging and due to foregone growth.

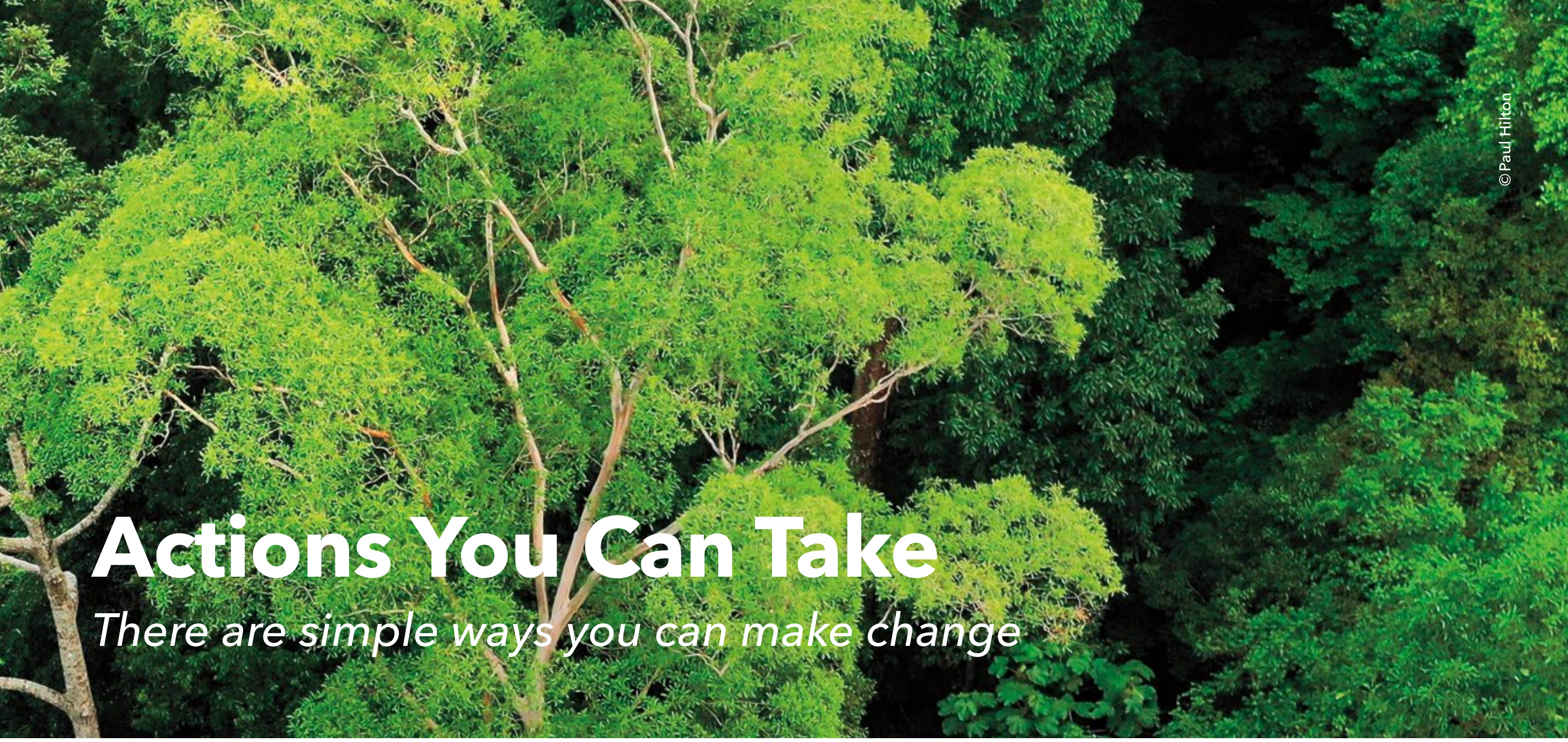
Stella McCartney LCA (2017), adapted from their Figure 5

(Right) As above, except for paper fibres instead of textiles. The GHG differential between Next Gen and virgin forest fibre is likely even higher than shown, due to exclusion of foregone growth impacts which were beyond the study scope.

Kimberly-Clark LCA (2013), modified Figure 3.8



* Please note the benefits of Next Gen feedstocks are generally applicable to each of the fibres compared in the LCAs included here. We recommend caution when applying these results to sugarcane bagasse or other fibres due to lack of credible and transparent LCAs.



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Actions You Can Take

There are simple ways you can make change

1. Join Canopy's Pack4Good and CanopyStyle initiatives – contact us at info@canopyplanet.org
2. Eliminate all sourcing from the world's Ancient and Endangered Forests
3. Prioritize products with high recycled and Next Gen content – find packaging options in the EcoPaper Database and viscose producers in the Hot Button Report
4. Join our Next Gen Champions Circle to help scale up Next Gen production, reduce your Scope 3 emissions, and keep forests standing – contact us at nextgensolutions@canopyplanet.org

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WHY WASTE WASTE?

Given that hundreds of millions of tonnes of low-carbon Next Gen feedstocks are otherwise burned or landfilled every year, why would we choose to increase pressure on forests – one of the most effective and actively operational carbon capture technologies on the planet?

Now is the time to protect forests, reduce waste, and secure fibre supply chains by scaling up adoption of Next Gen feedstocks.

(denim) © Daniel J. Benson; (straw) © Maksym Ivashchenko

Footnotes

1. CDP (2022). Engaging the Chain: Driving speed and scale, CDP Global Supply Chain Report 2021. https://www.cdp.net/en/research/globalreports/engaging-the-chain
2. e.g., see Helin et al. (2012). Approaches for inclusion of forest carbon cycle in life cycle assessment – a review, GCB Bioenergy. https://doi.org/10.1111/gcbb.12016 and Leturq (2020). GHG displacement factors of harvested wood products: the myth of substitution, Scientific Reports. https://doi.org/10.1038/s41598-020-77527-8
3. According to the IUCN, the global authority on the status of the natural world, there is clear evidence that primary forests are "difficult, if not impossible, to replace in human time scales and irreplaceable in the time scales needed to tackle the climate and biodiversity crises as well as development challenges." For details, see the IUCN Policy Statement on Primary Forests Including Intact Forest Landscapes (2020), https://www.iucn.org/resources/policystatement/iucn-policy-statement-primary-forests-including-intact-forestlandscapes
4. Mackey et al. (2020). Understanding the importance of primary tropical forestprotection as a mitigation strategy, Mitigation and Adaptation Strategies forGlobal Change. https://doi.org/10.1007/s11027-019-09891-4; Luyssaert et al.(2008). Old growth forests as global carbon sinks, Nature. https://doi.org/10.1038/nature07276
5. Lewis et al. (2019). Restoring natural forests is the best way to remove atmospheric carbon, Nature. https://doi.org/10.1038/d41586-019-01026-8
6. Cook-Patton et al. (2021). Protect, manage and then restore lands for climate mitigation, Nature Climate Change. https://doi.org/10.1038/s41558-021-01198-0
7. To limit warming to 1.5°C, science-led calls for a Global Deal for Nature require us to protect at least 50% of the planet by 2030. https://www.globaldealfornature.org/science/
8. Malcolm et al. (2020). Forest harvesting and the carbon debt in boreal eastcentral Canada, Climatic Change. https://doi.org/10.1007/s10584-020-02711-8; Rosa et al. (2016). The Environmental Legacy of Modern Tropical Deforestation, Current Biology. https://doi.org/10.1016/j.cub.2016.06.013
9. For an example analysis of these impacts, see Stella McCartney LCA (2017). Life Cycle Assessment Comparing Ten Sources of Manmade Cellulose Fibre. Conducted by SCS Global Services. https://www.scsglobalservices.com/resource/lca-comparing-ten-sources-ofmanmade-cellulose-fiber
10. e.g., Wildlands League (2019). Boreal Logging Scars. https://loggingscars.ca/report/
11. e.g., James and Harrison (2016). The Effect of Harvest on Forest Soil Carbon: A Meta-Analysis, Forests. https://doi.org/10.3390/f7120308; Dean et al. (2017). Conventional intensive logging promotes loss of organic carbon from the mineral soil, Global Change Biology. https://doi.org/10.1111/gcb.13387
12. e.g., Price et al. (2020). BC's Old Growth Forest: A Last Stand for Biodiversity. https://veridianecological.files.wordpress.com/2020/05/bcs-old-growth-forest-report-web.pdf
13. e.g., Li et al. (2022). Deforestation-induced climate change reduces carbon storage in remaining tropical forests, Nature Communications. https://doi.org/10.1038/s41467-022-29601-0
14. See LCA figures on pg. 6, adapted from Stella McCartney LCA (2017). Life Cycle Assessment Comparing Ten Sources of Manmade Cellulose Fiber. Conducted by SCS Global Services and from Kimberly-Clark LCA (2013). Assessment of Alternative Fibers for Pulp Production. Conducted by V. M. Thomas and W. Liu at the Georgia Institute of Technology
15. Based on eight studies analyzed that include both publicly-available and innovator-provided reports commissioned by Stella McCartney (2017), Kimberly-Clark (2013), Step Forward (2012, 2014), Infinited (2020), Columbia Pulp (2019), Red Leaf (2021), and PaperWise (n.d.), which evaluated a collective total of 10 Next Gen fibres (including a mix of wheat straw, flax byproducts, and recycled textiles; excluding sugarcane bagasse due to lack of transparency from producers) and 18 virgin tree fibres (including a mix of plantations, managed forests, and primary forests). While each study's methods vary in terms of "best practice" transparency and scope (e.g., see Canopy's LCA guidance chart https://canopyplanet.org/lca-guidance-chart/), all studies nonetheless tell a consistent overarching story about the benefits of Next Gen fibres. They include four studies for which Canopy served on the critical review panel (Stella McCartney, 2017; Kimberly-Clark, 2013; Step Forward 2012, 2014). Note that the methodological differences between studies preclude direct, one-to-one comparison of results, and thus all reported averages and ranges should be viewed as approximate only. Emissions associated with specific fibre sourcing, manufacturing, and production practices will vary.
16. Based on production volumes of "pulp from fibres other than wood" obtained from FAOSTAT statistical database (2020). Forestry Production and Trade, Food and Agricultural Organization of the United Nations (FAO). https://www.fao.org/faostat/en/#data/FO (Accessed July 2022)
17. Based on agricultural crop residue burning and textile waste data combined, respectively, from: FAOSTAT statistical database (2019). Burning – Crop Residues, Food and Agricultural Organization of the United Nations (FAO). https://www.fao.org/faostat/en/#data/GB (Accessed July 2022) and from: Global Fashion Agenda and The Boston Consulting Group (2017). Pulse of the Fashion Industry. https://globalfashionagenda.org/shop/pulse-of-the-fashionindustry-2017/
18. Based on an average taken across the eight studies listed in footnote 15.
19. See top figure on pg. 6, adapted from Stella McCartney LCA (2017). Life Cycle Assessment Comparing Ten Sources of Manmade Cellulose Fiber. Conducted by SCS Global Services.
20. Specific statistics based on results reported in the multi-stakeholder criticallyreviewed LCAs, Stella McCartney (2017) and Kimberly-Clark (2013), which provide the broadest scope and highest level of methodological transparency relative to the other six studies also included in Canopy's analysis (see footnote 15 for complete list).

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