

Veronica Bates-Kassatly
Dorothee Baumann-Pauly

Amplifying Misinformation

The Case of Sustainability Indices in Fashion

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Executive summary

THIS paper examines the sustainability assessment methodologies of apparel and fashion brands based upon what the sector itself defines as sustainable, and how it measures this. We conclude that the prevailing system falls decidedly short in assessing true sustainability. To illustrate this, we analyze one index in particular: The Business of Fashion (BoF) Sustainability Index.

THE BoF Index correctly identifies apparel's sustainability priorities as achieving both internationally agreed 2030 targets: the United Nations' Sustainable Development Goals (SDGs) and the Paris Agreement's 45% reduction in 2010 Greenhouse Gas Emissions (GHGs). In October 2022, however, the fast fashion and athleisure industry's own initiative, Textile Exchange, reported that it's unlikely that the fiber and materials market will stay within the 1.5°C pathway.

OUR analysis not only concurs, but concludes that the apparel sector will never reach either 2030 target if it continues to pursue misguided notions of what constitutes a sustainability metric and to rely solely on reporting to measure achievements.

Switching fibers is no sustainability fix

AS we shall demonstrate, so-called "Greenwashing" and "SDG Washing" are ubiquitous in both the sector and the BoF Index itself, and 'sustainability' focuses almost entirely on a red-herring. Namely that fashion and apparel can become sustainable simply by switching fibers, and that the most important determinant of any shoe or garment's sustainability is whether it was produced from 'preferred' or 'certified' materials

THIS conclusion is neither correct nor supported by the industry's own data. Primary data collected for cotton found that the mean Global Warming Potential (GWP) in textile manufacturing was more than 8 times greater than that in fiber production. Whilst the generic data used by everyone from the Science-based targets (SBTis) to the brands themselves shows that globally, raw material or fiber production only represents about 10% of the apparel sector's lifetime GHGs, and around 20% of production emissions. For climate change, the most important stage is manufacturing – representing roughly 60% of lifetime GHGs and around 80% of production emissions. Given the vast difference between countries in the carbon intensity of their energy systems, it is clear that the most important determinant of any item's environmental impact at the factory gate is where it was manufactured. The industry ignores this. So does the BoF Index.

THERE is no robust independent evidence that 'preferred materials' such as organic cotton, or 'responsible' alpaca contribute to achieving either the SDGs or the Paris Agreement. As for plastic microfiber pollution and reducing fossil dependency, the only truly effective way of mitigating this is for brands to restrict the use of polyester and other plastic fibers to those applications

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for which there is no technical substitute. Whilst the simplest and most effective method of kickstarting a significant reduction in the use of hazardous chemicals, would be for brands to commit to sourcing only antimony-free polyester. However, neither the restriction of plastic fibers nor switching to antimony-free polyester is currently included in the industry's sustainable apparel playbook or the BoF index.

Transparency does not guarantee accountability

AS for other metrics used in the index, the notion that transparency is the cornerstone of meaningful change is belied by the evidence. Until December 2019, Textile Exchange listed the standing director of the currently sanctioned Xinjiang Production and Construction Corps (XPCC) Cotton Association as a Board Member. Until February 2020, Patagonia equally openly listed XPCC farms as the main source of their organic cotton. Whilst the Better Cotton Initiative (BCI) made no secret of the fact that the XPCC was an implementing partner. In the past 18 months two documentary programs based on independent journalistic investigations claim to have identified the release of hazardous chemicals from viscose plants owned by Lenzing and Aditya Birla, respectively. Both companies are top ranked on the industry funded Canopy Hot Button Report. Both appear to claim Zero Discharge of Hazardous Chemicals (ZDHC) participation, and H&M and Puma, amongst others, transparently list sourcing from one or both factories.

Impact per wear as the only robust sustainability criteria

FASHION will not become sustainable unless and until consumers are persuaded to stop buying disposable attire, and to start cherishing, repairing, and maintaining their clothes, so that every item can be and is worn enough times to amortize impacts in production and disposal. For this to happen, the cost of resale/repair/rental must be proportional to purchase or replacement cost. The costs of recycling must be lower than those of purchasing virgin materials and dumping unwanted discards in the global south. For the industry, and so the BoF Index, to pretend that simply offering collection and resale, applying eco design principles, or paying some flat waste charge as a function of sales, will somehow solve apparel's waste problem is thoroughly misleading.

THOSE brands with a high impact per wear should be eliminated, and only those with a high positive socio-economic impact, combined with a low negative environmental impact per wear should remain. We obviously want consumers, legislators, and investors to have access to data that identifies which brands are best fulfilling this requirement. A BoF Index could be helpful to all stakeholders, but only if the underlying data is significantly improved. In fact, we would suggest that BoF and other such publications are taking a risk reporting bad data as representative of achievement and should insist on better data from the sector.

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Introduction

Assessing sustainability in fashion is more complex than the industry itself is willing to admit. For decades, fashion brands have been projecting an image of sustainability concern and their successful advancements. Our research has shown however, that sustainability in fashion is mostly reduced to environmental aspects¹ and that current sustainability measurement methods misrepresent the impacts that the industry is having on people and planet².

Our previous work has highlighted the fact that prevailing comparative fiber sustainability claims are not substantiated, and that the most important environmental impact metric is not impact at the factory gate, but impact per wear.

This paper builds on our previous work and further demonstrates that at the present time, the industry does not have the data needed to evaluate brand sustainability. Data needs to accurately reflect what it is supposed to represent. While the demand for greater transparency in the fashion industry has certainly resulted in the publication of more information, we are questioning whether the information provided is meaningful and can actually serve to advance sustainability in fashion.

The attempts to standardize measurement methods that capture the sustainability impacts of the industry are manifold. But from the Sustainable Apparel Coalition's (SAC) Higg Material Sustainability Index (Higg MSI), and the World Resources Institute (WRI) Science Based Targets (SBTis), to the proposed EU Product Environmental Footprint (PEF), and the German Green Button program, everyone is trying to standardize on agreed impact values that have themselves been plucked from an assortment of commercial Life Cycle Analyses (LCAs) and academic papers, that are not standardized at all³, and so produce values that scientifically, can neither be compared nor collated. Moreover, none appear currently to include country-specific manufacturing impacts and so seriously misinform as to real comparative climate footprint of the items concerned.

To inform and empower managers, consumers and investors, we need data that creates meaningful transparency over sustainability impacts. One powerful tool that guides all of these groups is sustainability indices, that assess companies and rank them in groups of best and worst performers. Indices are appealing because they are easy to read. But they also bear a great risk: if not done well, they misguide consumption and investment decisions.

In this paper, we take a closer look at sustainability indices and come to the conclusion that currently such indices lead to further confusion and amplify misinformation about sustainability in fashion. They do this through the following flaws:

1. Indices replicate a reductionist understanding of sustainability. They focus on the assessment of environmental impacts. Whether measures/initiatives have any real impact in ending poverty and hunger is hardly considered.
2. Indices rely on publicly available sustainability information, typically self-reported by fashion companies and/or manufacturers. Without verifying this information, indices merely report on reporting. It is self-evident that such reporting, masquerading as transparency, increases brands' ability to game the system.
3. From the choice of weightings to what passes as 'achieving' any given target, there is considerable subjectivity in the way that these indices are calculated. This is not necessarily obvious to the reader.
4. Indices conflate transparency with meaningful insights and reward more available information without questioning whether these values measure what is supposed to be measured.
5. Indices assign too much weight to the notion that 'sustainability' is determined almost solely by fiber, when even the industry's own data does not substantiate this claim. For climate change, the most important stage is manufacturing – representing roughly 60% of lifetime GHGs and around 80% of production emissions.
6. Indices collect many indicators but fail to assess the most critical sustainability criteria, namely the average number of wears per garment produced. This is an extraordinary omission because when garments are used more frequently it reduces both the impact per wear and the volume of waste. Thus far, however, no attempts have been made to assess the quality and longevity of a brand's products, or how they market to consumers, as part of their sustainability ranking.

To illustrate our claims, we assess one industry index in detail: The Business of Fashion (BoF) Sustainability Index 2022⁴. We find that the misapprehensions and shortcomings underlying the BoF Index appear common to all current attempts to assess sustainability in fashion. As such, we submit that the BoF Index is representative of an industry that may be well-intentioned about becoming more sustainable, but that has strayed from the correct path.

I.

What does the BoF
Sustainability Index
claim to measure?

Unlike many commentators in 'sustainable' fashion, BoF does not make the mistake of claiming that sustainability is some vague and malleable concept. The BoF Index succinctly and accurately links 'sustainability' in Fashion with achieving both the SDGs, and hitting a 45% reduction in Greenhouse Gas Emissions (GHGs) by 2030.⁵

As to how BoF purports to measure this, we quote:

"The Index is powered by public disclosures. Transparency is the cornerstone of any effort to drive meaningful change, establish accountability and benchmark progress."⁶

In other words, the BoF Sustainability Index is measuring corporate narratives, not actual action. These narratives are mostly controlled by the companies themselves because they decide what and how much they want to disclose. For example, third parties rarely get independent access to the detailed sustainability information relating to the measures and measurements of greenhouse gas emissions.

Furthermore, the report's 5,000 'data' points are presenting binary responses to questions.⁷ This means that there is little nuance or context. This type of approach to assess levels of corporate sustainability is, however, not unique to BoF. In fact, reliance on public data and binary responses is in line with all other indices produced by the apparel sector that we have been able to identify.

As we shall outline here, as a result of a number of misconceptions, the BoF Index fails to capture sustainability in fashion. It captures neither progress towards achieving the SDGs nor progress in reaching the Paris Agreement climate targets. That said, these misconceptions do not originate with BoF. BoF is simply reflecting the failings of the entire industry when it comes to accurately measuring sustainability in the footwear and apparel sector.

II. Misconception Number One

The BoF Index measures
what matters most for sustainability in fashion

The crucial environmental impact metric in fashion is not impact at the factory gate. It is impact per wear. Clothes and accessories are neither like food, where the impact on the consumer in terms of nutrients per 100 grams, or portion, is the metric that matters, and products can be labeled accordingly. Nor are they like an electronic device, where the impact on the consumer is in power consumption in use, and products can be labeled accordingly. Instead, the denominator in apparel and leather is both almost infinitely extensible, and almost entirely in the hands of the end user. This is because the sustainability of any piece of apparel depends primarily on:

The number of wears/uses per item. If a pair of jeans have a production impact of 11 kg CO₂e⁸, and they are worn 10 times, that's 1.1 kilos of CO₂ per wear. If they have an impact of 20 kg CO₂e, but they are worn 100 times, that's only 0.02 kilos of CO₂ per wear. Moreover, in the second case, after 100 wears there is only one pair of discarded jeans to process. In the first case, there are 10 pairs.

A garment's sustainability is also influenced by:

How many times users clean the item and how they do this. Hand washing and line drying for example has a far lower carbon impact than a hot machine wash followed by a tumble dry.

How they dispose of the item when they no longer want it. This is in large part determined by whether the user purchased items both physically and economically capable of repair – leather rather than plastic shoes for example, and at a price point significantly higher than the repair cost. And whether those items were then maintained to a standard worthy of resale or gifting.

It automatically follows that for a brand, whether it is or is not sustainable – as pointed out in the introduction – is largely determined by what it makes and how it sells it. If Brand A produces cheap, badly made items, marketed by legions of 'influencers' whose north star is 'never be seen twice in the same outfit', or 'how big is your haul'. And if Brand B produces using the highest quality raw materials, the finest artisanship, and markets without hype; then Brand B is almost certainly more sustainable than Brand A – no matter what their comparative production impacts might show – because Brand B's products will be worn/used so many more times. If brand B's garments can also be cleaned infrequently, at low temperatures, and do not shed harmful fibers in wash and wear, then the sustainability of B's products would be further enhanced.

In line with the sector as a whole, the BoF Index does not consider the types of business models that underpin the different brands, let alone attempt to measure this. So, strictly speaking, the BoF Index is not a sustainability index.

III.

Misconception Number Two

The BoF metrics focus on
the primary source of carbon emissions

As already noted, the BoF Index attempts to measure brands' contributions to meeting the SDGs, whilst simultaneously lowering their carbon footprint and reducing absolute greenhouse gas emissions, across the supply chain, by 45%, between 2010 and 2030. But are they actually measuring this?

The BoF Index, provides the following glossary of what they are evaluating when it comes to climate impact:

Scope 1 Emissions:

Direct emissions from a company's owned or controlled operations.

Scope 2 Emissions:

Indirect emissions generated by electricity or heat purchased by a company.

Scope 3 Emissions:

Indirect emissions that occur in the company's supply chain or during consumer use.

Based on the sector's own charts, as shown in [Annex I](#), it is clear that scopes 1 and 2 together constitute somewhere between 1% and 11% of apparel's lifetime emissions. While every little bit helps, and brands' attempts to make their own stores and operations more environmentally friendly are to be applauded, they are of little significance in the GHG race to 2030. What makes the biggest impact on the environment are scope 3 (emissions relating to primarily manufacturing in the supply chain as well as consumer use). As these scope 3 emissions are most relevant, the weight of measurement must be focused on these.

Most of the BoF metrics however, relate to scopes 1 & 2, and many do not relate to what the brand is actually doing, but rather measure commitments in the form of plans/targets/initiatives. We are not the only ones to point out that brands setting time bound targets that they then fail to deliver is an exercise in greenwashing, as it is quite without consequences.⁹ For example, in 2005, Patagonia committed to making all its polyester products recyclable by 2010.¹⁰

We are now in 2023, and as far as we are aware, little, possibly no Patagonia polyester whatsoever, is currently recycled fiber to fiber.¹¹ Similarly, to quote The Clean Clothes Campaign:

"In its 'Roadmap towards a fair living wage' H&M promised 850,000 workers a living wage by 2018. H&M happily took the credit for that commitment in 2013, but today not a single worker is actually making a living wage."¹²

Experience suggests then, that many of the time bound targets that BoF is using to rank brands on GHG emissions, will not in fact be realized either, and they are perfectly meaningless. The fashion industry is a highly competitive sector. Currently, Patagonia's customers are willing to pay \$139 for the notion of sustainability in a Capilene Air Crew sweater made with merino and 'recycled' polyester (rPET) obtained from plastic bottles. Genuine, fiber to fiber rPET, however, is considerably more expensive than the bottle based version. Similarly, if H&M would actually pay a living wage, but their competitors – Shein, Boohoo, Primark etc. – do not, H&M would most likely simply price themselves out of the fast-fashion market.

When it comes to Scope 3 (emissions from raw material production through manufacturing and assembly), the apparel sector has for many years been focused on a red-herring: that switching fibers will solve the sector's sustainability

problems and that, through ‘preferred’ fiber choices and ‘innovative materials’, brands will have a significant impact on global warming. But as [Annex I](#) demonstrates, the very same numbers that the industry uses to make comparative fiber sustainability assertions, in fact show that at best 9% to 15% – some 10% on average – of the lifetime climate impact of a garment can be attributed to the fiber production or the raw material phase. Recent claims by publications such as Forbes that brands can reasonably attribute “up to 80% of total product impact to raw materials (before the creation of the fabric and product)”¹³ are quite simply unsubstantiated. Much greater impacts are created in the textile manufacturing stages. Indeed, the WRI itself, in its *Roadmap to Net Zero: Delivering Science-Based Targets in the Apparel Sector* states that only 24% of production emissions can be attributed to fiber production. The vast majority of apparel’s GHG production emissions (76%) can be attributed to manufacturing.¹⁴

This is corroborated by the primary data collected for the 2016, Conventional cotton LCA used by both the PEF and the Higg MSI.¹⁵ This found that the mean Global Warming Potential (GWP) in textile manufacturing was more than 8 times greater than that in fiber production.¹⁶ For the industry and its funded initiatives to claim that fiddling with 10% of apparel’s lifetime emissions will reduce GWP by 45% by 2030, is to seriously mislead consumers, legislators, and investors. **Fashion and apparel must focus on, and measure the stage with the greatest impact: manufacturing.** Whilst the entire supply chain is complex and opaque, the manufacturing stage is also closer to the brands, and thus metrics are easier both to assess and to influence.

It follows that the simplest and most obvious place to start evaluating brand sustainability in GHG emissions, would be to rank brands by the relative carbon intensity of the electricity and heat generation of their manufacturing. Ideally, this would be primary, factory specific data. But where this is not accessible – and as [Annex I](#) shows, that currently appears to be the case for most material sourced by the leading fast fashion and athleisure brands – data on the carbon intensity of national grids is readily available. The gold standard is the IEA “Annual GHG emission factors for World countries from electricity and heat generation”.¹⁷

The Sphera GaBi database¹⁸ also provides an annually updated grid mix, which is used by the Higg MSI, and presumably the PEF. Sphera GaBi and the IEA data are behind a paywall, but an annually updated, open source index for electricity (with lower absolute values than Sphera GaBi), is available on Our World in Data (OWiD).¹⁹ Another option is Carbon Footprint.²⁰

The values shown in each are slightly different, so the sector would need to align on one, but the relationships between the country scores appear fairly standard and thus serve as a good starting point to measure climate impacts of fabric and garment production in different locations.

Using the OWiD values, it is immediately apparent that brands sourcing their yarns, textiles, and cut and sew from most factories in Bangladesh, Turkey, Vietnam, and Cambodia will have a GHG impact in manufacturing that is about 20% lower than that of brands sourcing from such factories in India, Indonesia, and China. Whilst those sourcing yarns, textile formation, and cut and sew from the average factory in Pakistan, Italy, and Portugal, will have a GHG manufacturing impact that is 50-60% lower.

Country	Carbon Intensity of Electricity in 2020 gCO ₂ e per kWh
Indonesia	625
India	624
China	546
Vietnam	477
Bangladesh	476
Cambodia	424
World	422
Turkey	410
Pakistan	294
European Union (27)	251
Italy	221
Portugal	207
France	57

Table 1: Carbon intensity of electricity, 2020 (Indonesia n.a. for 2021)²¹

Carbon intensity measures the amount of greenhouse gasses emitted per unit of electricity produced. Here it is measured in grams of CO₂e per kilowatt-hour of electricity.

Examination of BoFs 'Emissions' questions for 2022, however revealed that none whatsoever refer to which countries the respective brands were sourcing their manufacturing from. Indeed, brands like Hermès only score 36% for emissions, despite the fact that 80% of Hermès objects are made in France²² and France has one of the least carbon intensive grid mixes in the world. For 2020, OWiD estimates that the carbon intensity of the global grid mix was 422 gCO₂e/kWh. But that of France was only 57 gCO₂e/kWh.

By comparison, one of the top ranking companies in the BoF Index in the emissions category is the German sportswear manufacturer Puma²³, who scored 64% for emissions. Puma's Global Core Factory List 2021²⁴ reveals that Puma's goods are manufactured predominantly in China (63 suppliers), with an OWiD grid mix of 546 gCO₂e/kWh, and Vietnam (54 suppliers), with a grid mix of 426 gCO₂e/kWh. These are followed by Bangladesh and India (15 suppliers each), with a grid mix of 447 gCO₂e/kWh and 626 gCO₂e/kWh, respectively.²⁵ We do not know the actual volumes sourced from each region, but clearly, for BoF to claim that Puma has the lowest carbon footprint is counterfactual and misleading to both consumers and investors.

The BoF Index's omission to account for these differences in climate impacts of different sourcing locations reflects the sector's reluctance to admit that sourcing locations matter. It's an inconvenient truth for the fast fashion and athleisure industry that the textile producing countries that they source most of their fabrics from – such as China, Vietnam, or India – have the highest carbon intensity power generation, and hence the greatest negative impacts on climate change. The sector's solution – in the face of all evidence to the contrary – is to pretend that manufacturing location does not matter.

This misleading appearance is maintained by brands using prevailing metrics to evaluate their carbon emissions – either for their own sustainability reporting and/or to calculate and report on their science based targets. This is because, with the exception of proprietary scores, the Higg MSI does not in fact use its members' primary data to calculate impacts for the manufacturing phase (we are moreover informed that the PEF may end up employing the same system²⁶).

For spinning for instance, the Higg MSI uses Koç and Kaplan (2007).²⁷ For knitting/weaving they use Van der Velden et al. (2014).²⁸ The resultant kWhs required per kilo are then multiplied by the carbon intensity of an 'average' global gridmix.²⁹

The only variable that can be changed is the type of fiber and the width of the yarn (dtex)³⁰ and whether the fabric is knitted or woven, etc. There is no option to change the grid mix to reflect a lower or higher carbon intensive source, unless a manufacturer pays for a facility specific score to be added to the Higg system.³¹

In short, according to the Higg MSI, brands' manufacturing GHG emissions are identical, no matter whether they actually source their materials in France or Indonesia. Every single brand is purchasing 42% of their fabric from China, 28% from the EU, 7% from India, 5% from the USA, 5% from Turkey, 4.7% from Korea, 3.6% from Pakistan, 1.9% from Vietnam, 1.8% from Indonesia, and 0.7% from Bangladesh. But examining Puma's Global Factory List 2021³² shows no tier 1 or 2 European suppliers whatsoever on a total of 219 facilities.³³ That is 0% and nowhere near the 28% used in the Higg MSI weighting.

Whilst H&M's Group Supplier list September 2022³⁴ shows that of the 196 fabric, yarn, and tanneries suppliers listed, including household textiles, only 3 are in the EU³⁵. Simply on a supplier count, let alone the volume of purchases, that is nowhere near 28% – it is not even 2%. Indeed, in calculating the grid mix for their 2019 report (see Annex I) Mistra Future Fashion included no EU countries in the weighting on the grounds that all the EU nations from which Sweden imported clothing in 2013-17 were transit countries.³⁶

Using the same weightings as the Higg MSI and employing 2020 values from OWiD as a proxy for Sphera GaBi grid impact scores, Table 2 shows the extent to which GHG emissions in manufacturing are being over/under estimated by brands using the Higg MSI. Those whose garment and fabric production is concentrated in China, India, and Indonesia are seriously understating their emissions. Brands manufacturing predominantly in Vietnam and Bangladesh or in Turkey and Korea, are slightly under/over-estimating respectively. But those who source their fabrics particularly from the EU, but also from Pakistan, and to a lesser extent, the USA are being penalized for emissions that they are not, in fact, creating.

Country	Textile Export Volume	Share of Total %	Carbon Intensity of Electricity in 2020 gCO ₂ e per kWh	Intensity* Share Export	Weighted Avg comp to Actual Intensity %
China	106.6	41.6%	546	227.0	79.9%
EU	72.2	28.2%	251	70.7	173.9%
India	18.9	7.4%	624	46.0	69.9%
USA	13.9	5.4%	349	18.9	125.0%
Turkey	12.2	4.8%	410	19.5	106.4%
Korea	12	4.7%	426	19.9	102.4%
Pakistan	9.3	3.6%	294	10.7	148.4%
Vietnam	4.8	1.9%	477	8.9	91.5%
Indonesia	4.8	1.8%	625	11.2	69.8%
Bangladesh	1.9	0.7%	476	3.5	91.7%
TOTAL	256.4	100%		436.4	

Table 2: The extent to which carbon emissions in manufacturing are under/over stated in respective countries by using the Higg MSI weighted average grid mix.³⁷

NB: Based on OWiD values. The actual values in the Higg MSI come from Sphera GaBi, and will be different. The under and overestimating of impact will still apply.

In the specific case of the two brands discussed earlier, we can see that by using the Higg MSI, Puma is understating the GHG emissions from its Indian manufacturing by c30%; underestimating those of its Chinese manufacturing by c20%; and undervaluing the carbon impact of materials sourced in Vietnam or Bangladesh, by about 10%.

Similarly, for September 2022, H&M listed almost 80 fabric, yarn, and tannery facilities in China, a little over 60 in Bangladesh, almost 20 in India, and a handful in Indonesia and Vietnam. Whenever H&M uses the Higg MSI to estimate its manufacturing GHG emissions³⁸, it too will be clearly understating these by between 10% and 30%.

The use of the Higg MSI to evaluate impacts obviously, seriously underestimates real carbon emissions in fast fashion and athleisure's most common manufacturing locations, and overstates the emissions of those brands – EU SMEs? – who actually source their fabric in the EU. It also automatically implies that the only important variable to consider in attempting to mitigate the climate impact of clothing purchases is raw material choice. In reality, that choice is insignificant compared to the difference in GHG impact determined by manufacturing location.

If used in the PEF, this would not only be extremely misleading to consumers, it would also harm those brands that produce in Europe and disadvantage European garment and fabric manufacturers.³⁹

The system, moreover, hampers both investment in renewables at the manufacturer level, and GHG based sourcing, because there is no recognition for such investment and expense. Most brands are currently, apparently unwilling to pay a premium to factories that have invested in energy saving and renewables. And if there is no return on investment it will not occur. If brands were forced to calculate emissions based on the manufacturing countries from which they actually sourced, this would encourage the use of primary data, and it would financially justify the payment of a premium to both the brands management and its shareholders.

It is self evident that to use the Higg MSI to underpin 'science based targets', such as those of the WRI⁴⁰ and to use these in turn⁴¹ to underpin proposed legislation such as the New York State Fashion Act, cements the status quo rather than drives change, and is counterproductive.⁴²

Whilst it is true that Textile Exchange's data shows that the country of origin for some 50% of member material sourcing is unknown⁴³, finished material sourcing locations are far easier to determine than the source of the raw fiber or feedstock which can be very difficult to identify⁴⁴. Indeed, many brands observe that they can identify which countries the processing facility concerned sourced its raw materials from, but not which went into the specific material that they purchased.⁴⁵ For cotton for example (c20% of total fiber consumption), a spinning mill with a 72, or even a 36-bale laydown will generally blend at least 2 different growths (i.e. cotton from different countries), and maybe as many as 4. Whilst each country shipment could contain cotton sourced from dozens of different farms. Moreover, all of this can change from month to month, as the spinning mill mixes and matches the cotton it has on hand to meet its base specifications.⁴⁶

At the same time, it is clear that the manufacturing stage, followed by consumer use, generates the greatest GHG emissions. Not the raw material stage. Even where factory specific data is not available, independent data on country specific grid emissions is readily accessible (e.g. IEA). There is then no justification for not requiring brands to factor country-specific grid emissions into their Higg MSI, Germany's Green Button, and/or PEF impact scores. This would enable consumers to choose garments that had demonstrably lower impacts in production, rather than pretending that the most important environmental consideration is what type of fiber was used.⁴⁷

Indeed, since the industry's data shows that the use phase accounts for roughly 22% of apparel's lifetime GHG emissions, compared to c10% in fiber production, it is clear that even relatively easy to achieve changes in consumer laundering practices would have a GHG impact that is as large as the potential savings from any conceivable fiber switch. It is self-evident that it would be far more useful if clothing sustainability labels transmitted these two pieces of information, rather than potentially encouraging consumers to think that they can shop guilt free, and so consume more, by simply switching fibers.

Moreover, brands that have no specific country knowledge should be obliged to use the highest probable grid mix associated with the fabric concerned. This would both incentivise brands to trace sourcing, and reward them for shifting production to low carbon manufacturers.

To conclude, by omitting data on relative GHG emissions related to countries of production, the BoF Sustainability Index, like the sustainable apparel sector in general, does not provide any meaningful information on brands' progress towards a 45% reduction in such emissions by 2030. Indeed, the index – like the sector – is actually misleading. It suggests that brands greenwashing their manufacturing in high-carbon nations with pledges and targets, are more sustainable than those whose manufacturing is concentrated in regions with low carbon intensive power generation. This automatically undermines progress towards low carbon manufacturing solutions and will actually hamper efforts to move towards a 45% reduction in emissions, not enhance them.

In this context, it is perhaps worth mentioning that both brands and legislators could find themselves on the wrong side of public opinion if they continue with this tactic. Hundreds of yoga teachers called out Lululemon over its sourcing from coal-powered factories in China and Taiwan, in September 2022⁴⁸ A SAC member, Lululemon reports that it assesses impacts using the Higg MSI. Or in other words, that in its reporting to consumers and investors, the company currently underestimates its carbon emissions in manufacturing by more than 20%.⁴⁹

IV.

Misconception Number Three

The BoF metrics measure the
sector's contribution to meeting the UN SDGs by 2030,
whilst minimizing climate impacts

A brief history of the SDGs is provided in [Annex II](#). We conclude that contrary to its claims, the BoF Index fails to capture progress towards these objectives, whilst simultaneously misstating purported climate change impacts.

The overarching priorities of the SDGs are: No poverty, No hunger, and Good health and well-being for all.⁵⁰ From the sourcing of fibers to the manufacture of finished garments, fashion and apparel are heavily dependent on the Global South, so the sector could, if it really wished, make a real and fundamental contribution to ending poverty and food insecurity.

To quote the UN International Fund for Agricultural Development (IFAD):

“The starting point for a world without poverty and hunger is the rural world. An estimated 3.4 billion people – around 45% of the global population – live in the rural areas of developing countries. Most depend on small, family farms for their income and sustenance.”⁵¹

Given that, as outlined in [Annex I](#), the industry’s own data shows that raw material carbon emissions average only about 10% of the lifecycle total. Given also the difficulty brands have in identifying the specific sources of the fibers in any one product, along with the acknowledged absence of reliable data, we conclude that the most efficient and cost effective solution at the present time, when measuring the comparative sustainability of a fiber, is to focus on the extent to which its purchase contributed to SDGs one and two – No poverty, No hunger.

In the apparel industry however, as Textile Exchange’s own data shows, the focus is on what the New York Times has recently described as *S.D.G.s washing*⁵², where brands attempt to vaunt the ‘sustainability’ of their products based on their support for secondary SDGs such as *SDG 8 decent work and economic growth*, or indeed, *SDG 12 Responsible Production And Consumption*, with very few focusing on the all important SDGs 1 & 2.⁵³

SDG prioritization

Prioritization brings focus but all SDGs are connected.

85% of participating companies have identified priorities with respect to one or more of the SDGs. While all 17 of the Goals are interconnected, SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) remain top priorities for participants.

We have prioritized SDG 12 and we are committed to achieving the sustainable management and efficient use of natural resources, adopting sustainable practices, and integrating sustainability information into our (annual) reporting cycle.

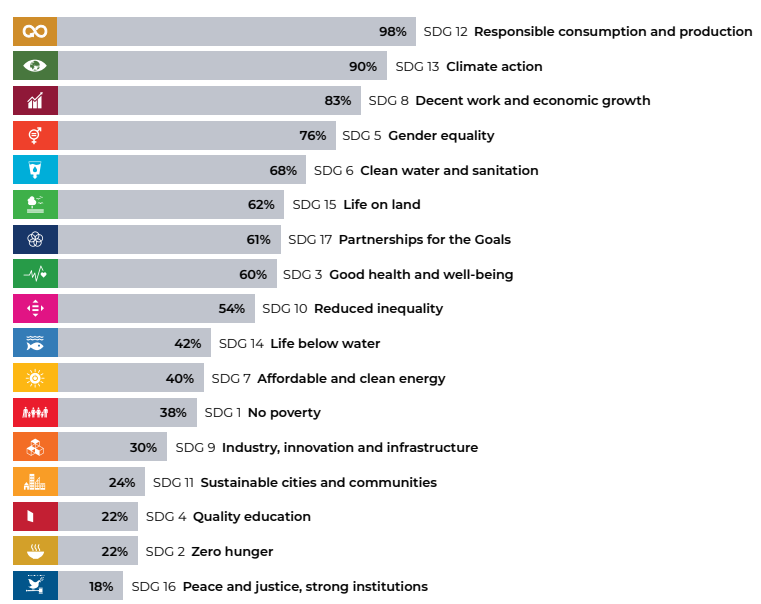


Figure 1: SDG prioritization by Textile Exchange Members⁵⁴

Materials

Assessing impacts of raw materials constitutes one of the BoF Index's six categories, with 3 'targets':

1. 100% Preferred Materials by 2022.
This has a weighting of 26%.⁵⁵
2. 100% of natural fibers are from Regenerative Sources by 2030.
This has a weighting of 48%.
3. Use only Recycled Polyester by 2030.
This has a weighting of 26%.

We were, however, unable to identify a single one of the BoF Index's yes/no questions that addressed the topic of earnings in supply chains – despite the fact that as [Annex II](#) shows, this is one of the bedrocks of the SDGs. Indeed, we have not been able to find any evidence from Textile Exchange, or others, that demonstrates any positive relationship whatsoever between what Textile Exchange declares to be a preferred material, and the income and food security of the farmers who produce it.

On the contrary, from the New York Times⁵⁶ to the sector's own studies⁵⁷ and third party reports⁵⁸, repeated analysis has found either no, or a negative relationship between Textile Exchange's preferred fibers – organic and BCI cotton for example – and farmer health, income, and food security. Whilst Textile Exchange's costly Responsible Alpaca Standard is demonstrably concerned not with the clean water and hunger of the indigenous farmers and their children – it is interested solely in the welfare of the alpaca herds.⁵⁹

Given the current turmoil in Sri Lanka – due in no small part to that nation's ill planned decision to switch overnight to 100% organic cultivation last year⁶⁰ BoF's failure to register that in the Global South, far from being synonymous with higher incomes and food security, organic cultivation has, in real time, been shown to contribute to quite the opposite, is surprising. Albeit, yet again, not so surprising, given that, as far as we can see, absolutely nobody in sustainable apparel has remarked on it either.

We should also note that SDGs 1 & 2 aside, it is far from evident that organic production contributes positively to SDGs 3 & 6 either. Organic cotton cultivation is heavily dependent on manure. And manure is toxic, to both people – particularly children – and to plant and animal life.⁶¹ Indeed, in one of the sad ironies of Sri Lanka's organic folly, a shipload of manure from China had to be turned back after samples revealed dangerous levels of bacteria.⁶²

As for reducing climate change, there is no evidence that organic production contributes positively to this either. For the past 8 years, the sector has made a number of unsubstantiated claims for the benefits of organic cultivation in terms of water saving and reduced GHG emissions. These were based on a misrepresentation of LCA outcomes published by Textile Exchange.⁶³ Recent rulings by the Norwegian Consumer Authority however, will hopefully have put an end to this.⁶⁴

The second and most important category for fiber sustainability, as far as the BoF Index is concerned, is that 100% of natural fibers should be procured from Regenerative Sources by 2030. Despite constituting 48% of BoF's materials target

to meet the SDGs by 2030, the BoF Index glossary offers only this by way of definition:

“Regenerative Agriculture: Farming principles and practices that seek to reverse environmental damage and restore soil health in order to enhance biodiversity and enable carbon drawdown.”

It is self-evident that none of these objectives are reflected in the six most important SDGs, and how ‘Regenerative Agriculture’ whatever that might be, contributes to zero poverty and hunger, good health, education, gender equality, and clean water is not elaborated. Yet again, this omission accurately reflects a sector failure. There is currently a rush by brands to tout a switch to ‘regenerative’ agriculture as the solution to all fashion’s ills, and the industry’s own-created and funded initiative, Textile Exchange, appears to be the sole source of BoF’s Regenerative Materials targets – as indeed, it appears to be for many brands.

It is beyond the scope of this paper to enter into a discussion of the merits of the Textile Exchange’s Report *Regenerative Agriculture Landscape Analysis* (2022b).⁶⁵ Suffice it to say we could find nothing demonstrating a positive return to small-holders from transitioning to regenerative principles in this report.⁶⁶ To quote leading agronomist and agroecologist Alain Peeters:

“Regenerative agriculture is a trendy concept focusing on soil regeneration. It is a narrow concept [...] Regenerative systems that sequester carbon in soils but are not profitable or are based on worker’s exploitation are not sustainable or acceptable.”⁶⁷

As for the ability of regenerative agriculture to generate significant net sequestration of soil organic carbon (SOC), a recent meta analysis suggests that the evidence simply is not there.⁶⁸ Current carbon emissions from global agriculture are estimated at +3.5 PgC/year.⁶⁹ Estimates of maximum potential mitigation vary, but the most recent studies top out at 0.43 PgC/year.⁷⁰

This is perhaps not surprising, no-till agriculture is already practiced on about one third of U.S. croplands and comes with its own potential additional emissions from the production of herbicides. Other methods of increasing soil carbon sequestration by irrigating, fertilizing, and so on, also come with their own emissions in production, reducing their net impact.⁷¹

Manure in particular, comes with significant carbon emissions attached. As they do with organic cotton production, Textile Exchange attempts to get round this by using tools such as Cool-Farm that allocate no manure production emissions to the crop carbon footprint.⁷²

Given that even in the USA – a market where traditionally few farmers have used it⁷³ – manure is currently a ‘hot commodity’, and that the EPA estimates that in 2020, manure management accounted for 9% of US methane emissions⁷⁴, it seems to us unlikely that regulators – including the PEF – will be able to sanction such accounting acrobatics, and we would not recommend that any brand adopt such a system.⁷⁵

It is, of course, an excellent idea that farmers should be incentivised to farm in a manner that promotes carbon sequestration. But given the complexity of the topic and the difficulties in accurate measurement, evaluating regenerative impacts seems well beyond the capacity of fashion brands and their funded initiatives, and

is clearly better left to those with greater expertise. On the other hand, supporting previous findings, Lessmann et al. (2021)⁷⁶ highlight that to encourage both soil fertility and SOC sequestration, it is best to focus on agricultural soils with large yield gaps and/or where SOC values are below levels that may limit crop production. For cotton production an obvious candidate is sub Saharan Africa where ICAC data shows that 11 nations harvest the lowest yields in the world: between c100 and c370 kilos per hectare, or roughly half the global average.⁷⁷

Focusing on increasing sub Saharan cotton yields would have the added benefit of making a very real contribution to SDGs 1 & 2.⁷⁸ Indeed, given that the very data that is used to promote comparative fiber sustainability also shows that raw material production is not a major contributor to apparel's lifetime GWP impact in any case (see Annex I for further detail), we would submit that fashion and its funded initiatives, should not be permitted to continue to distract attention with the false promise of preferred fibers significantly reducing global GWP impacts, and should instead be required to focus on promoting:

1. The quality and types of fiber that ensure social and physical longevity of the final product,
2. Fiber choices whose socio-economic impact would enable fashion to make a meaningful contribution to meeting the all-important SDGs 1 & 2 – no poverty, no hunger.

The third and final Materials target in the BoF Index is: Use only Recycled Polyester by 2030. This has a weighting of 26%. Currently, in apparel and fashion 'Recycled Polyester' is a misleading term. There is no significant commercially available polyester produced from recycled clothing. What the BoF Index is referring to is used plastic bottles recycled as polyester fabric.⁷⁹

When evaluating this recycling objective, the first thing to note is that of global PET production, 66% is devoted to textiles and 38% of that, to clothing (25% of the total). Packaging only represents 27%, albeit almost all of that (93%) is bottles. It follows automatically that if 25% is to supply 25%, and the entire textile sector switches to rPET as TE recommends, no bottles can be recycled as bottles.⁸⁰

That is a clear violation of every premise of circularity. The use of rPET to make polyester, breaks a virtuous circle of bottle-to-bottle, and inserts a linear diversion: bottle - fabric - clothing - dump. That is the opposite of sustainable. As indeed, the soft drinks industry itself pointed out last year, when it "called on the European Commission to revise EU waste directives to prevent recycled PET bottles from being downcycled to non-food applications – such as fashion."⁸¹

Indeed, there already appears to be too much competition for used plastic bottles as feedstock, and it has long been claimed that some disreputable manufacturers simply use brand new bottles. Tests using an innovative German method at the end of last year, apparently revealed that "Randomly selected garments from a range of high street fashion brands were found to contain zero or very little recycled polyester – despite label claims to the contrary."⁸²

There is moreover, no obvious link between recycling plastic bottles and ending poverty and hunger. Whilst the assertion that recycling results in lower carbon emissions is contested. A 2021 Chinese study found that "The total carbon

footprint of waste polyester recycling was 1154.15 kgCO₂/100 kg, approximately ten times that of virgin polyester textiles production.”⁸³ Indeed, the general consensus appears to be that future recycling based on used polyester clothing would come with an even higher carbon price tag.⁸⁴

From the potential leaching of toxic antimony in wash and wear⁸⁵, to the shedding of microfibers, the negative health and environmental impacts of plastic fibers in general, and of polyester in particular are both well documented and are not avoided by recycling.⁸⁶

Based on the precautionary principle that underpins the UN's own 1992 Rio Declaration on Environment and Development,⁸⁷ it is clearly not possible to label any form of fossil based polyester ‘sustainable’. BoF's claim then, that r-PET is sustainable, and contributes to attaining both 2030 goals – the realization of the SDGs and a 45% reduction in GHG emissions – is not substantiated. But it is pointless to blame BoF for this. The responsibility lies with myriad brands from Shein⁸⁸ and BooHoo⁸⁹ to Kering⁹⁰ and Patagonia⁹¹, who all repeat this claim with impunity.

Workers Rights

The second area where brands could automatically and easily contribute to the all important SDGs 1 & 2, and indeed, SDGs 3, 4, and 5, is by paying a living wage in all manufacturing. Before looking at that however it is important to point out that some of the leading brands in the BoF Index were associated with human rights abuses in 2020, that are not covered in the BoF 2021 index, or indeed, the 2022 version.

The first such abuse is the sector's involvement in sourcing cotton, not just from Xinjiang, China, but from the currently sanctioned XPCC, the paramilitary organization that has been directly implicated in Uighur oppression.⁹²

Such cotton was moreover, sold to consumers as ‘preferred’ despite it being recorded knowledge that schoolchildren were obliged to pick cotton against their will, and that the XPCC was involved in the exploitation of prison labor, forced Sinification, and the appropriation of natural resources.⁹³

In the light of the December 2020 US Withhold and Release Order, issued by US Customs and Border Protection, no cotton initiatives appear to be operating in Xinjiang at present, let alone in partnership with the XPCC.⁹⁴ But the earlier involvement of the Better Cotton Initiative (BCI) was particularly egregious. With the approval and financial support of members of the Better Cotton Fast Track Program (BCFTP) – Adidas, BESTSELLER, C&A, H&M, IKEA, Levi Strauss, Marks and Spencer, Nike, Tesco, Tommy Hilfiger, and VF Corporation – BCI engaged the XPCC as an implementing partner, and actually gave the XPCC what appears to be over a €1 million in 2016.⁹⁵

That said, until December 2019, Textile Exchange listed the standing director of the China XPCC Cotton Association as a Board Member.⁹⁶ And until February 2020, Patagonia listed XPCC farms as the main source of their organic cotton.⁹⁷ Nike, PVH, and Ralph Lauren also knowingly sourced organic cotton from XPCC farms.

The BoF Index makes no mention of this, and even lists some of those players – H&M, Adidas, Nike, PVH, etc. – as quite highly ranked for workers rights! Yet again, this is not surprising, as the sector itself has simply blanked any and all conversation around ‘preferred cotton’ from Xinjiang. Perhaps more disturbingly, despite all this being public knowledge, no brand or initiative has ever been held accountable by the fashion sector, its funded initiatives, or its journalists. Indeed, only the mainstream press has even made the connection, and their reports have been studiously avoided – not just by BoF, but by the apparel sector as a whole.⁹⁸

The second abuse of worker rights that occurred in 2020, was COVID cancellations. Expecting to exploit the one sided nature of the brand/manufacturer relationship, a number of major brands – including some of those highly ranked for workers rights in the BoF Index – canceled signed contracts and refused to pay for supplies already purchased and goods already made and even shipped, in the conviction that garment manufacturers would not only not sue, for fear of losing future business; they would not even dare to name the recalcitrant brands concerned.

The Center for Global Workers’ Rights (CGWR) at Pennsylvania State University, its director Prof Mark Anner, and the Workers Rights Consortium (WRC), however, had other ideas. Or, as the Guardian put it;

“H&M and Zara made a commitment to pay after Anner first revealed the scale of the cancellations in a CGWR/WRC report published at the end of March. Gap is among others that have since followed suit.”⁹⁹

The CGWR/WRC COVID-19 Tracker¹⁰⁰ lists Inditex (Zara), H&M, PVH, VF Corp, and Gap as all having initially refused to pay in full for orders already completed/ in production. Those brands all knew that if the manufacturers were not paid, they would not even be able to pay their workers the wages that they had been promised for the work that they had already done – let alone a living wage. But this did not prevent those 5 brands from attempting to shift the COVID burden of lost sales onto the workers whose rights they profess to hold so dear. Indeed, at the present time, Adidas is the subject of critical articles by the New York Times¹⁰¹ and others, as well as an ongoing CleanClothes Campaign, claiming that:

“While adidas calls itself the worldwide leader in sports, it really excels at wage theft, labour rights violations, and harassment.”¹⁰²

To rank brands’ words on worker rights, higher than their actions, is clearly not an effective way to measure sustainability, which brings us back to the question of a living wage. Patagonia claims to have been working on paying a living wage in its apparel assembly factories since 2010. As of 2020, only 12 out of 31 of them, or 39%, were paying their workers a living wage, on average. If Patagonia is advertising this, they presumably believe themselves to be well above the norm in this respect.¹⁰³

As an aside here, BoF is not the only organization to rank brands on workers’ rights. Know the Chain produces an annual report covering solely this aspect of brand sustainability. Their 2021 Apparel and Footwear Benchmark Report – which like the BoF is based on public declarations – ranks Adidas top, followed by Lululemon.¹⁰⁴

The BoF Index not only reverses this relative ranking but places both brands considerably below Puma and Inditex. How KtC manages to have such different workers’ rights rankings from BoF when both rankings appear based on public declarations is unclear. For Adidas however, we are told that:

“The favourable [KtC] ranking is also the reason [...] why current sustainability initiatives focus squarely on achieving climate neutrality, putting environmental metrics front and centre of their sustainability roadmap.”¹⁰⁵

Or in other words, since Adidas is highly ranked on labor rights by KtC, Adidas has apparently decided that their work in attaining zero poverty and no hunger is already done.

Failing specific data, the simplest and most effective way to measure whether any given brand pays a living wage throughout its supply chain is to ask where they manufacture. Brands manufacturing in countries/regions where the minimum wage is assessed to be a living wage should score highly on workers' rights. Those manufacturing in countries where the minimum wage is well below a living wage should not – unless and until they can demonstrate that their factories pay considerably above the odds.

Only brands manufacturing in France, Germany, Honduras, and parts of Italy¹⁰⁶ would appear to currently satisfy this requirement. Which means that Hermès would score highest on a real-world ranking and top ranked Puma, which manufactures in none of these would join most of the other brands in the index – at the bottom.¹⁰⁷

Transparency

Along with ‘Emissions’ ‘Transparency’ is the highest scoring category for the brands evaluated in the BoF Index. How Transparency equates with sustainability is not demonstrated, and it is hard to understand how top scorer Puma, listing the names and addresses of some 222 factories, only one of which appears to pay a living wage, helps fashion attain the SDGs.

The 2021 Fashion Transparency Index includes the following expert statement:

“Not only is transparency paramount to conscious purchasing practices, but it is the very foundation of accountability in terms of human rights and environmental issues. Uyghur forced labour is an example of the atrocities that can occur when companies are not able to verify what happens in their supply chains, and when they are not legally obliged to disclose information about their suppliers.”¹⁰⁸

That Patagonia was sourcing XPCC organic cotton was on their website. It was also on their supplier, Esquel's website – along with a list of other brands who sourced from Esquel. As already mentioned, that BCI was partnered with, and was funding the XPCC, was clearly stated in the BCFTP annual reports.¹⁰⁹

Textile Exchange was equally candid about the fact that a standing director of the XPCC Cotton Association was on their Board. To suggest that fashion's involvement in Xinjiang was due to a lack of transparency, flies in the face of the facts.

Similarly, Bovon and Perrin's 2021 documentary *Fast Fashion: The Real Price of Low-Cost Fashion*¹¹⁰, reveals that water supplies around Aditya Birla's (AB) Grasim Nagda plant are so polluted that the company has been obliged to distribute free drinking water to 22 neighboring villages, 6 days a week, since 2018. According to the Environmental Justice Atlas, local villagers have been protesting the activities of this plant since 1980.¹¹¹ Whilst researchers employed by Changing Markets

Foundation and its collaborators for a 2017 report uncovered claims that Grasim controls both the Nagda hospital and Nagda labor unions and has been involved in payments to leading politicians across India – including current prime minister Narendra Modi.¹¹² These payments have allegedly ensured that AB projects were approved despite local opposition, and that legal cases against AB were dismissed.

More recently, Rai's 2022 documentary for Italian television claims Lenzing's Indonesian subsidiary – PT South Pacific Viscose – is dumping un- or inadequately treated effluent into the neighboring water system.¹¹³ Local inhabitants appear to have been protesting this since 2019, but to little effect.¹¹⁴

Both producers are top ranked on the industry funded Canopy Hot Button Report¹¹⁵, and both appear to claim Zero Discharge of Hazardous Chemicals¹¹⁶ (ZDHC) participation. Moreover, H&M transparently lists both PT South Pacific and Birla's Nagda plant amongst their MMC fiber suppliers.¹¹⁷ Whilst Puma transparently list sourcing viscose only from Lenzing – including PT South Pacific.¹¹⁸

BoF and indeed the sustainable apparel sector's claim that transparency is a measure or a guarantee of the sustainability of a brand's sourcing does not appear to be substantiated either.

Having gone through four of BoF's six impact categories and found no evidence whatsoever that these are accurately measuring brand sustainability, suffice it to say that measurement in the remaining two categories is no more robust. But yet again, this is not BoF's failing, it is the sector's failing.

Water and Chemicals

'Water and chemicals' is split into 4 targets:

1. Reduce water use to naturally replenishable levels by 2030 - 30%;
2. Eliminate harmful pollution across the supply chain by 2030 - 26%;
3. Actively engage in industry efforts to minimize microfibre pollution - 7%;
4. Eliminate all hazardous usage of chemicals by 2030 - 37%.¹¹⁹

Clean water and sanitation is number 6 of the 2030 SDGs, so BoF's targets do relate to one of the index's two core objectives, and the absence of a direct relationship to reducing GHGs can be excused. The problem is rather that the stated targets do not demonstrably contribute to the objective concerned.

Target 1

What constitutes "naturally replenishable levels" of water use is not defined, nor is how this is to be measured, specified. Presumably, it is to be calculated by some scarcity weighting or water stress index such as AWARE¹²⁰ or WSI¹²¹.

A 2017 Australian research paper applied 3 different water scarcity indices in a study of milk production in SE Australia.¹²² Actual consumptive use in L H₂Oe/L milk varied from 9.1 to 313. The scarcity weighted values however, varied from an average of 18 L H₂Oe/L milk using WSI_{HH, EQ}, to 6,616 L H₂Oe/L using AWARE!

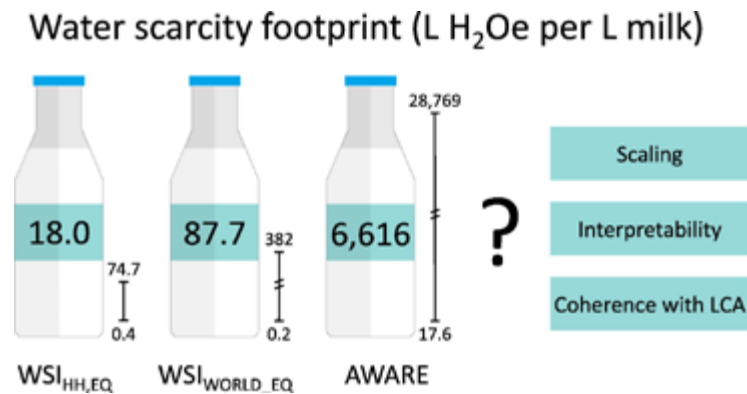


Figure 2: Comparative water scarcity footprints obtained from 3 different weighting systems: AWARE, WSI_{WORLD,EQ}¹²³ and WSI_{HH,EQ}¹²³

As Figure 2 above demonstrates, that is a massive difference. Which weighting is correct and who gets to decide? How would we feel if we were the producer whose actual consumptive use of water per kilo of milk was only 9.1 liters. But legislators – and indeed our competitors – proceeded to tell consumers that it was 6,616 liters?

There is clearly an ethical concern in allowing LCA specialists and fashion brands to unilaterally impose water weightings without consulting those who will bear the consequences¹²⁴.

The Australian study assessed the three indicators according to scaling, interpretability, and coherence with LCA results, and deemed the AWARE indicator least suitable. AWARE however, is the system currently used in the Higg MSI and the PEF. At this point, we would submit that since such weightings are entirely subjective, it is not unreasonable to ask: should they be used to inform consumers at all?

As for the BoF Index, with no clear definition of how to measure ‘naturally replenishable levels’, assessing whether brands are actually reducing water use to that level sounds a bit like asking: “How long is a piece of string?”

Target 2

Is eliminating harmful pollution across the supply chain. Fashion appears to rely on two industry created/funded/directed initiatives to monitor this: AFIRM¹²⁵, and particularly, the aforementioned ZDHC.¹²⁶

H&M claim to have enrolled all their suppliers in the ZDHC programme Roadmap To Zero, and to be continuously monitoring wastewater and suppliers’ input chemicals.¹²⁷

But as we saw in Transparency above, H&M sources viscose from both Aditya Birla’s Nagda plant and from Lenzing’s Indonesian subsidiary – PT South Pacific Viscose. Both production sites have been documented to be currently implicated in the release of hazardous chemicals to both air and water, despite apparently being ZDHC compliant. It is beyond the scope of this paper to examine AFIRM and ZDHC in any detail. Suffice it to say that, like the BoF Index itself, ZDHC appears to be based on self declaration. But any manufacturer who has no qualms about releasing hazardous chemicals will presumably also have no qualms about sourcing test certificates to certify that it does not.

This is obviously unacceptable. The industry cannot be allowed to continue to operate in an echo chamber, using its own considerable financial clout to certify itself environmentally compliant and ever more 'sustainable', when independent evidence suggests that the only thing that has improved is appearance, and that the poor in the global south continue to pay the price of the north's cheap fashion. Or as the Environmental Justice Atlas succinctly puts it,

"Despite gaining a high ranking on forest issues, investigations show that PT South Pacific Viscose might be linked to poisoning of villagers as well as air and water pollution."¹²⁸

And,

"The largest viscose fiber plant in India may be linked to crop damage, water scarcity, pollution, disease and severe occupational health hazards."¹²⁹

Target 3

When it comes to the third target: minimizing microfiber pollution – the quickest and simplest way to achieve this would be to observe the precautionary principle that all members of the United Nations signed up to in 1992¹³⁰, and to set targets for the elimination of plastic fibers in the apparel supply chain. Such targets are, however, nowhere to be found in the BoF Index. Yet again, this can hardly be blamed on BoF. There are no targets for the elimination of plastic fibers anywhere in the 'sustainable' apparel sector that we have been able to identify. Instead, brands divert attention with claims that r-Pet is the solution to all plastic problems¹³¹, along with studies showing washing machines and wash cycles will fix micro-fiber release.¹³²

Brands however, it seems, would rather not use peer reviewed studies, undertaken by internationally acknowledged experts at leading universities, and published in globally recognised science reviews.¹³³ They appear to prefer self-published studies, undertaken by funding 'not-for-profits' and working with washing machine companies.¹³⁴

This, despite the fact that fibers don't just shed in the wash, they also shed in wear and disposal. In fact, polyester microfibers have been found on Everest. There are no washing machines on Everest, and water does not flow uphill.¹³⁵

Target 4

Finally, when it comes to BoF's fourth water and chemicals target: Eliminate all hazardous usage of chemicals by 2030, we quote Chinese specialty polyester chip producer Decon:

"The heavy metal antimony has a certain degree of toxicity. It not only precipitates during the PET dyeing process and causes environmental pollution, but also brings 10,000 tons of antimony into nature every year after PET terminal products become garbage, causing irreversible pollution."¹³⁶

Given that, at least in the EU, it is currently estimated that about 60% of the fibers used in clothing are synthetic, of which polyester is predominant¹³⁷, and that roughly 80% of all polyester is manufactured using antimony as a catalyst¹³⁸, the simplest and most effective method of kickstarting a significant reduction in the use of hazardous chemicals, improving the water and health of the global poor, would be for brands to commit to sourcing only antimony-free polyester.

If Herman Miller has already achieved this in home furnishings¹³⁹, it is difficult to understand, not only what is preventing the apparel sector from following suit – no brand, including eco-warriors Patagonia, has committed to eliminating antimony from their supply chain – but also why the prevalence and toxicity of antimony is excluded from the sustainable apparel conversation.¹⁴⁰

The BoF Index water targets then, like those of the sector itself, do not accurately capture impacts – from emissions to water use. Simple measures like switching to antimony-free polyester, and restricting plastics to items that cannot readily be made in any other fiber type, are overlooked. And the finger is pointed at farmers for using water – based on weightings, which unbeknownst to most consumers and regulators, are inflating actual consumption by 2,000% or (considerably) more.

Waste

Waste, the lowest scoring category of the six – has 3 targets:

1. Eliminate waste to landfill and virgin and single-use plastic packaging by 2025 - 30%;
2. Establish waste-free production by 2030 - 27%;
3. Establish a circular business model by 2025 - 43%.

The link between these targets and the SDGs is far from clear. The fashion waste problem in the global south is dominated by cheap cast offs, exported – often in the guise of recycling – to poorer countries, particularly in sub-Saharan Africa. We quote the EU's own environment agency on the topic:

“EU consumers discard about 5.8 million tonnes of textiles annually – around 11 kg per person – of which about two thirds consist of synthetic fibres. In Europe, about one third of textile waste is collected separately, and a large part is exported.”¹⁴¹

Clearly, at least 66% of EU used clothing exports are plastic. These mountains of ever diminishing-quality clothing – not just from the EU, but from North America, China, and elsewhere – pollute both sea and land. Kantamanto in Ghana is the best known example¹⁴², but the problem is experienced from Senegal¹⁴³ to Cameroon. And whilst all eyes have been on Kantamanto, similar mountains of unwanted, largely plastic clothing, have been uncovered in Kenya¹⁴⁴ and Chile's Atacama Desert¹⁴⁵, Kenya imports perhaps 200,000 tonnes of used clothing a year, almost double the amount imported in 2013, about a third of which local processors claim is not wearable.

As for Alto Hospicio, in Chile, we quote Matteo Ward:

“Nobody really knows how much textile waste is currently being dumped there: cautious reports claim that there are approximately 59,000 tons a year, while others speak of more than 150,000 tons every year. The clothes arrive in cargo ships, packed in bales, and are sold by weight to local markets or traffickers in neighboring countries. Buyers cannot select or sort for quality: they buy a closed bale and they gamble, hoping to find good merchandise for resale. Once the bales are opened and the products are checked, whatever is considered unfit for resale or remains unsold is trashed into the desert.

The material composition and manufacturing of these clothes make them practically impossible and economically unsustainable to recollect, repurpose or recycle. This despite the fact that most of the brand-names I've found buried in the sands of the Atacama Desert continue to spend an enormous amount of energy and resources to promote their circularity goals, 'sustainable materials' and/or garment take-back programs. When clothes are designed and built to stay low – in costs, physical resistance and emotional durability – they can only go lower. And any other attempt to lift them up and recapitalize them in a circular economy will be an economically unsustainable exercise."



Courtesy Matteo Ward, Alto Hospicio, Chile, November 2022.

In other words, consumers are not dumping their Shein, H&M, and C&A skirts when the zip breaks because those skirts' zips cannot be replaced. They can be. But the cost would be as great or greater than that of purchasing the same skirt, brand new. Similarly, transaction costs would appear to prohibit the sale, let alone rental of a top that cost €5 or €7 to begin with. Threadup, for example, has a very long list of brands whose items are ineligible for a payout because their processing costs are higher than their resale value. Ineligible brands include Levi Strauss Signature, H&M, and Next (and of course, Shein).¹⁴⁶

Similarly, Vestiaire Collective have recently stated that they will phase out fast fashion sales from their website. This, in the name of sustainability, albeit BoF claims that such items only constituted 5% of Vestiaire's listings in the first place (considerably less of the value), so this too may be as much a reflection of economics as anything else.¹⁴⁷

Some 11 of BoF's 'waste' questions refer to resale, rental, and/or repair. But clearly, offering resale, rental, and repair will change nothing unless and until the cost is proportional to the price of a new product. In fact, arguably, re-sellers like Threadup promoting the notion that buying second hand is "All Thrills, Zero Guilt" and "reduces your carbon footprint by 82%", not only misleads consumers, by suggesting that how many times they wear each item is unimportant, but actually buttresses the current mindset that you can't be seen in the same outfit twice.

How many of Threadup's ineligible brand items end up dumped after the 30 day sale window closes? And where does Threadup send them? To Ghana and Chile, or to Kutch, India, where garments arrive in such good condition that the workers believe that water in the global north is more expensive than clothes, and so we throw them out rather than wash them?¹⁴⁸ A slight misconception perhaps, but one that nonetheless better captures the reality of global clothing waste than the fanciful notions of ecodesign and circularity which dominate the sustainable apparel conversation.

BoF's waste targets – not surprisingly, and yet again, we cannot blame BoF for this – reflect the Fashion industry's narrative of circularity and waste reduction, not the reality, which like everything else, will be determined by economics. For fast fashion the economics simply aren't there.

V. Case Illustration

Shein

To illustrate our points, we used the BoF Index methodology to assess one of the fastest growing but also most controversial fashion brands of our time: Shein.¹⁴⁹

When we started work on this report, with the help of a research assistant, we identified 41 questions in the BoF Index for which Shein's public disclosures would – in our opinion – have been sufficient to generate a yes response. And we noted that many of these declarations date only from the beginning of 2022. That score would have been sufficient to place Shein in the lower segment, just above the Italian sportswear brand Fila. During the course of our work, however, Shein made additional public declarations on both reducing absolute Greenhouse Gas emissions¹⁵⁰, and on offering resale¹⁵¹. These would likely bring Shein up to 54 'yes' answers to BoF's binary questions, lifting the company a further two places in the ranking.

As we were finalizing this paper, Shein made a further announcement, that in response to a recent, critical, UK television documentary (see below) it would make further commitments to workers' rights. Moreover, unlike brands such as Levi Strauss¹⁵² which has committed to a 40% absolute reduction in supply chain GHG emissions, without offering any serious matching funding pledge¹⁵³, Shein will be providing \$15 million of its own money to help upgrade hundreds of factories in its supply chain¹⁵⁴.

We did not have time to evaluate the impact that these new commitments would have on Shein's BoF ranking, but it is clearly not impossible that by the time the company's rescheduled US IPO takes place in 2024¹⁵⁵, Shein will have reached the top quarter of the BoF ranking, satisfying US investors that it is a 'sufficiently sustainable' brand. This means that its public sustainability engagement, while not top, will be considered good enough to invest.

Shein's public sustainability signaling however, stands in stark contrast to its actual business model. Shein makes profits based on selling large volumes of low-priced fashion items to consumers.

As a company that produces thousands of new products daily (reports vary from 1,000 per day¹⁵⁶ to 6,753¹⁵⁷) and that relentlessly markets drops and discounts to its customers, with a host of 'influencers' and collaborators posting \$1000 'hauls'¹⁵⁸ on Youtube, Shein cannot be a sustainable brand.

Given Shein's business model, it is secondary whether Shein uses rPET or organic cotton. The real problem for Shein's sustainability is that the company aggressively promotes the minimal number of wears of a Shein product and the continual purchase of new products. Shein is moreover based in China, and appears to source the entirety of its offering – from spinning to garment manufacture – from that country. This of course means that an accurate evaluation of a brand's carbon impact, rather than the fanciful notions currently employed, would place Shein amongst those at the bottom of any emissions ranking.

For those who ask: "Can fast fashion ever be sustainable?" The answer is no, because the most relevant sustainability measure is impact per wear. If 'fast' means rapidly purchased and rapidly discarded, a brand can never be sustainable, neither for people nor for the planet. Shein is an ultra-fast fashion brand that thrives thanks to large volumes sold that likely go into landfills after very few wears.

Even should it be the case that expanded offerings from brands like Shein address the needs of different niche groups and that each of these actually wears the average garment 100 times, the problem of fast fashion's failure to internalize the externalities of its low cost production remains.

Clothes produced by workers who were not paid a living wage can never be deemed sustainable. Purchase contracts including punitive delivery conditions and razor thin margins, that oblige manufactures to cut costs by outsourcing to cheaper and less reputable producers, failing to run their effluent treatment, and forcing their workers to put in excessive hours with crushing production targets, can never be sustainable. For example, a recent investigative report by UK television's Channel 4 on Shein's production conditions, highlighted a range of issues related to working conditions, including very low wages.¹⁵⁹

Shein responded by commissioning their own audit from Intertek and TUV. This found some of Channel 4's findings false, some to represent misunderstandings, and some – excessive hours worked for example – to be true.¹⁶⁰

Conclusion

Our hope in writing this report is that BoF and others will take it in the spirit in which it is intended. We are categorically not naming and shaming that respected publication. BoF, in their sustainability index, have accurately captured and distilled what fashion is claiming is making the sector more sustainable. It is this that is wanting.

As we have demonstrated in this paper, current metrics in sustainable fashion do not capture essential truths, and are therefore, not fit for purpose. There is nothing nefarious about all this. At the moment, there is no economic benefit in walking the walk – only in talking the talk. Until this changes, nothing else will.

Brands must be obliged to declare the carbon intensity of their manufacturing based on the grid mix of the actual location – not some fictitious average which suggests that location and factory make no difference, and that the burden for climate change in fashion can be shifted onto farmers in the global south.

Brands should not be allowed to mislead consumers by suggesting that what makes an item sustainable or otherwise is the choice of fiber, when in reality, raw material production represents only a minor part of the product's lifetime GHG emissions.

Those wishing to parade their sustainability must either manufacture in low carbon nations – and pay the considerably higher costs for both power and labor. Or they must manufacture in facilities in high carbon nations where the owners have invested heavily in GHG mitigation – and pay the cost premium that reflects and rewards such investment, encouraging sustainable innovation. The rest is not only 'just talk' it is, and has been, a barrier to real change.

Sustainability is not a marketing concept. Sustainability is not part of the conversation in order to enable brands to sell or as the NCA recently put it, "Green claims for products are not a human right for brands"¹⁶¹. Sustainability is there because it is a social and environmental imperative.

The most sustainable brand is the one with the lowest impact per wear. Even if brands focus on reducing the GHGs associated with their manufacturing impact, rather than messing around with fiber switching, if they continue to produce and market in such a manner that the outcome is very few wears per item produced, they should obviously still fall at the bottom of any sustainability ranking.

Whilst data on average number of wears is currently conspicuous by its absence, Ingun Klepp and Sifo in Norway have a simple and effective suggestion – all apparel should be labeled with a QR code identifying the brand and the date the item was put on the market, as well as the fiber composition. Waste and recycling facilities would scan these upon receipt of the discards.¹⁶² After a couple of years, comparing the outcomes to the respective brands' sales volumes, a pattern would develop. Those producing garments with a shorter service life and/or more expensive waste treatment (lack of recycling options) should not only pay the most in producer responsibility levies, they should also rank lowest for sustainability.

As for fashion as a whole, in order to be sustainable, it must sell fewer items. This does not mean that each and every brand must sell fewer items. On the contrary – and this is one reason why we are opposed to legislative measures such as the proposed New York Fashion Act that appear to intend to impose production caps based on the status quo – those brands with a high impact per wear should be eliminated completely, and only those with a high positive socio-economic impact, combined with a low negative environmental impact per wear should remain. We are firm believers in the efficacy of market forces. It follows automatically that it is desirable and contributes to the achievement of both 2030 goals, if brands are required to distinguish themselves to both investors and consumers on these grounds.

To do this, they must evaluate both their sourcing and their marketing – not just the former – and check what data they have, or could get, that enables them to distinguish their product on the metrics that we have identified – GHG emissions, income to the poor, extended use/wear, elimination of antimony, mitigation of plastics, etc.. – and they should communicate that.

We obviously want consumers, legislators, and investors to have access to data that identifies which brands are best fulfilling these sustainability requirements. A BoF Index could be helpful to all stakeholders in this context, but only if the underlying data gets better. Indeed, we would suggest that BoF and other such publications are taking a risk reporting bad data as representative of achievement, and should insist on better data from the sector, in order to maintain their own professional integrity.

Annex I.



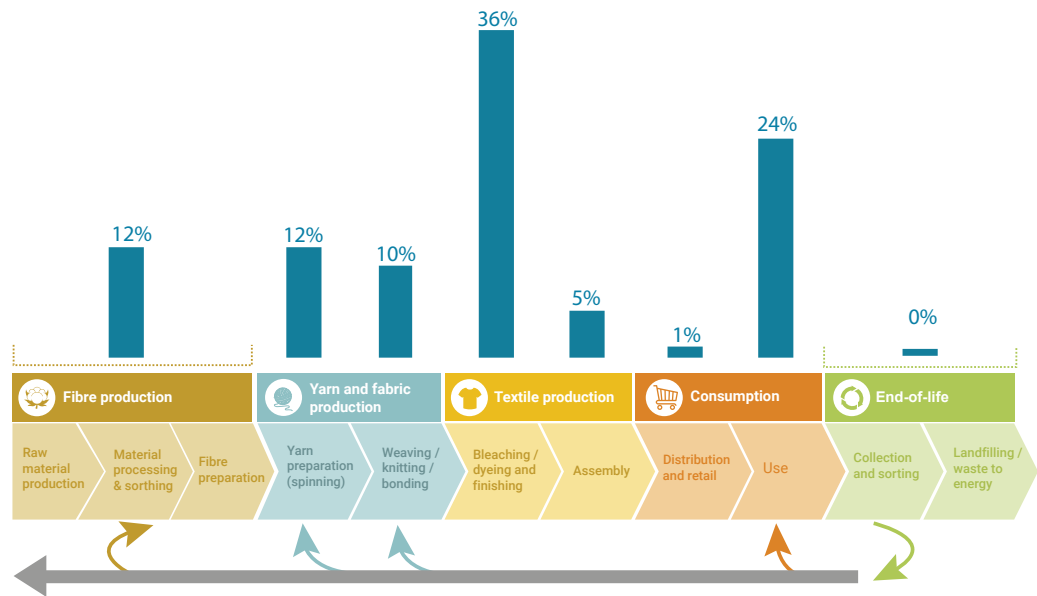
The relative importance of different life-cycle stages
in the total lifetime climate impact of apparel
– all eyes should be on manufacturing

The charts shown in this Annex come from:

1. A 2020, UNEP report¹⁶³ that is based on Quantis' WALDB data. (Figure 3)
2. H&M's 2019 sustainability report¹⁶⁴. (Figure 4)
3. A 2019 report¹⁶⁵ by Mistra Future Fashion, evaluating Swedish apparel consumption. (Figure 5)
4. A 2018 report measuring the impact of global fashion, written by LCA and WALDB database providers, Quantis¹⁶⁶. (Figure 6)
For this chart please note: *"EXCLUSION OF USE PHASE, This typically high impact stage was not included."* The use phase includes primarily GHG impacts in laundry and transport (shopping).
5. A summary of a 2015 LCA of LEVI'S® 501® JEANS¹⁶⁷. (Figure 7)
The Levi Strauss LCA, of course, does not appear to consider all fibers – only cotton. *"Today, it is estimated that about 60 % of fibers used in clothing are synthetic"*¹⁶⁸ and GHG emissions in the production of plastic fibers, predominantly polyester, are higher.¹⁶⁹ Levis incidentally, provide an updated evaluation of their lifecycle emissions in their 2021 Sustainability report. This shows that across all fibers in the Levi Strauss supply chain, GHG impact in raw material production has fallen from 9% to 7% of the lifetime total, whilst GHGs emitted in fabric production have risen from 27% to 39%.¹⁷⁰

As all of these charts show, the industry's own data attributes no more than 7 - 15% of apparel's lifetime GHGs to raw material or fiber production.

Simple mathematics tells us that if we are trying to achieve a 45% reduction on 2010 emissions, focusing on only 10% of those emissions cannot possibly achieve this. The largest share of apparel's lifetime climate impact is accounted for by manufacturing, which averages 60% in the 5 tables below. And in the use phase, which on average accounts for 16 - 37% of lifetime GHG emissions.



Source: LCA on global apparel, see Box 1.

Figure 3: UNEP Sustainability and Circularity in the Textile Value Chain: Global Stocktaking¹⁷¹
Climate impact across the global apparel value chain

Total (kilotonnes) 17,662, of which % comes from:

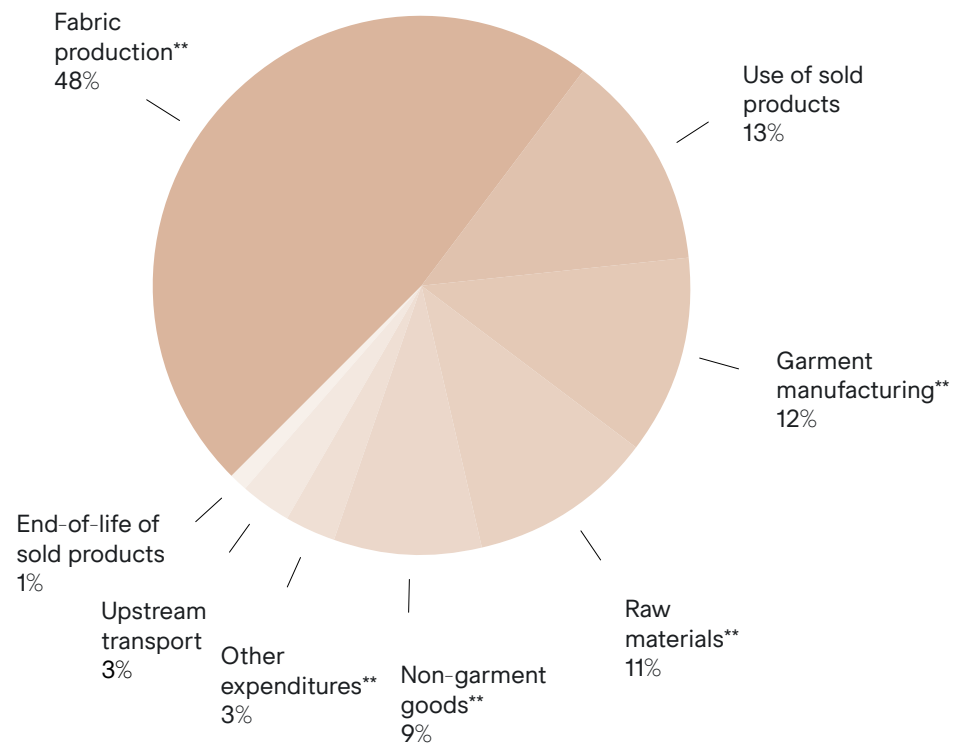


Figure 4: H&M's 2019 sustainability report. Scope 3 CO₂e emissions¹⁷²

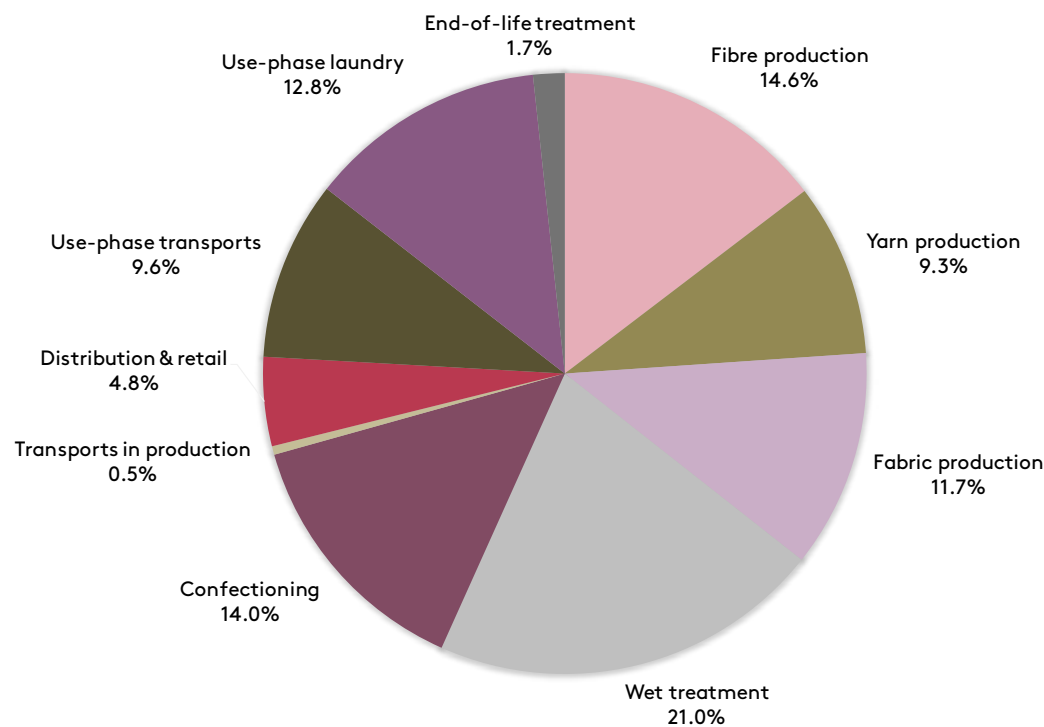


Figure 5: Sensitivity analysis of the climate impact of Swedish clothing consumption, contribution of life cycle phases. Scenario with European electricity mix assumed for retail, use and end-of-life processes located in Sweden.¹⁷³

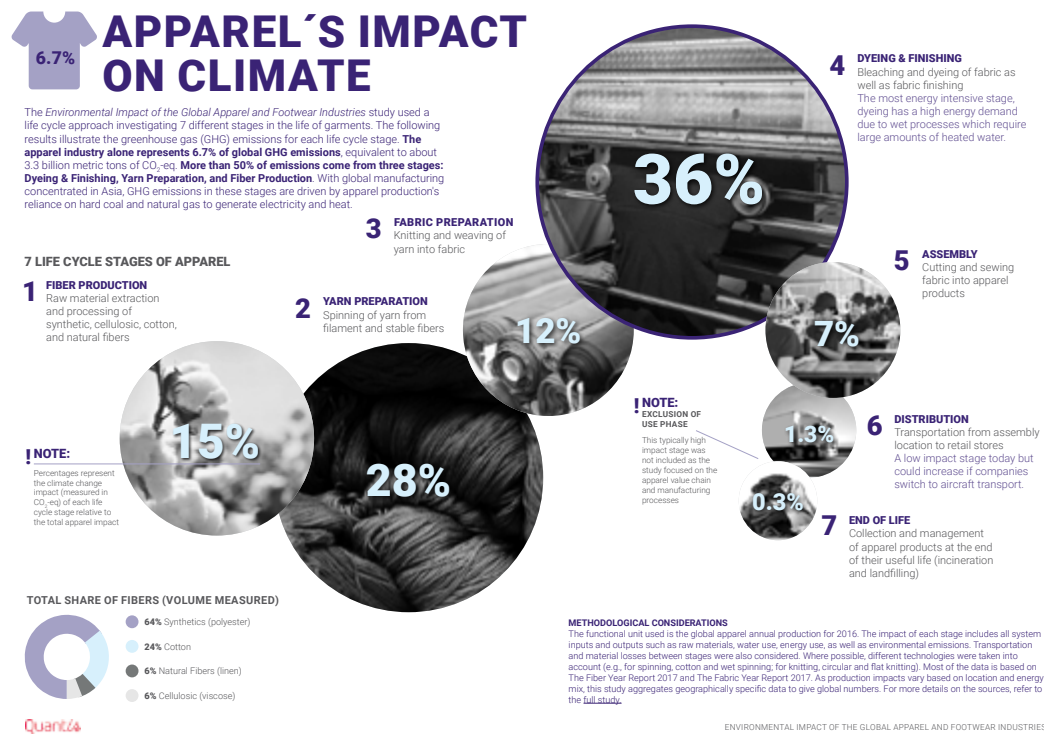


Figure 6: Measuring Fashion 2018 – Insights from the Environmental Impact of the Global Apparel and Footwear Industries study. *Apparel's impact on climate*¹⁷⁴

LEVI'S® 501® JEANS: CLIMATE CHANGE IMPACT

Consumer Care phase dominates the climate change impact area (driven by high use of non-renewable energy).

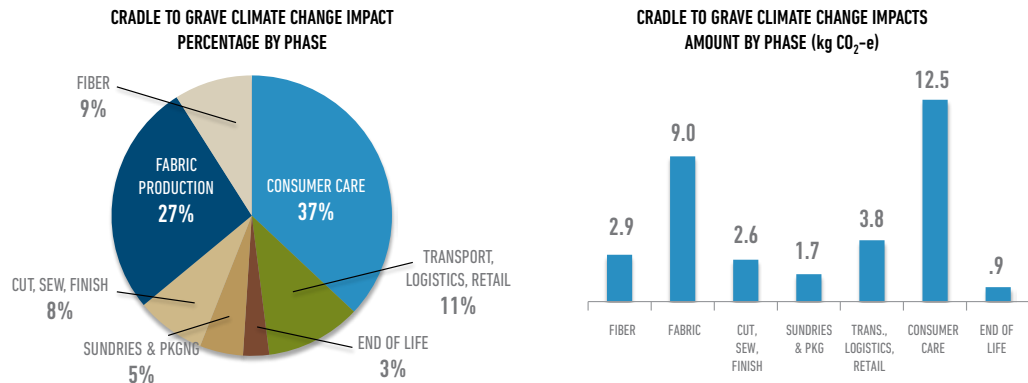
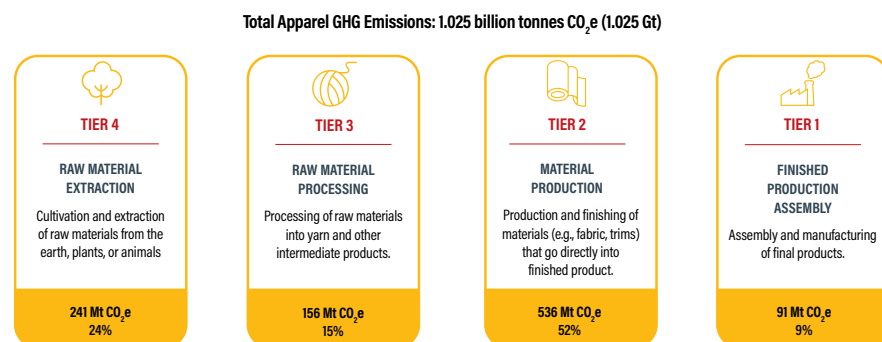


Figure 7: Levi's® 501® Jeans: Climate Change Impact¹⁷⁵
The Life Cycle of a Jean – Understanding the environmental impact of a pair of Levi's® 501® jeans
Levi Strauss & Co. © 2015

Further validation of our selection of studies to consider is provided – entirely coincidentally – by The UN Fashion Industry Charter for Climate Action, *Climate Action Playbook* (2020), which also uses reports 2-5 above to illustrate GHG emissions across the fashion value chain.¹⁷⁶

Finally, the WRI itself – which is both source and validator of the SBTis that the BoF Index refers to, both references the Levi Strauss LCA as indicative of respective life cycle impacts, and ¹⁷⁷ shows the following distribution of GHG impacts across the production cycle:



Note: 1 million tonnes = 1 Mt
Source: WRI authors.

Figure 8: Estimated GHG Emissions for the Apparel Sector manufacturing, 2019¹⁷⁸

Only 24% of production emissions can be attributed to fiber production. The vast majority of apparel's GHG production emissions (76%) can be attributed to manufacturing.

Whilst the 2016 Cotton Incorporated conventional cotton LCA – which was based on primary factory data – found that for the ubiquitous cotton t-shirt, GHG emissions in manufacturing are almost 8 times those of raw material production. As an aside here, this clearly demonstrates that recycling fibers is not the silver bullet that it is portrayed to be. The industry's much vaunted circularity initiatives may help to reduce landfill, but they will have little impact on climate change. The bulk of the carbon emissions in manufacturing are in spinning through to dyeing, finishing, etc. and replacing virgin with recycled fibers will not change these.

Impact Category	Units	Global Mean	Standard Deviation
GWP (with credit)	[kg CO2-Equiv.]	-113	518
GWP (without credit)	[kg CO2-Equiv.]	1,326	518

Figure 9: Comparative total GWP emissions from cultivation¹⁷⁹

Impact	Unit	Total	Knit Yarn Production	Knitting	Knit Preparation	Batch Dyeing	Knit Finishing	Compaction
GWP	kg CO2 eq	10,169	4,225	388	737	2,573	2,090	156
PED	MJ	153,896	59,047	5,209	11,367	40,133	35,984	2,156
AP	kg SO2 eq	63.7	34.3	3.17	2.86	9.08	12.9	1.41
EP	kg PO4 eq	7.1	1.30	0.13	0.63	2.61	2.37	0.05
ODP	[kg R11-Equiv.]	2.21E-05	3.40E-08	3.22E-09	6.67E-08	1.29E-07	2.19E-05	2.40E-10
POCP	kg C2H4 eq	3.8	1.87	0.18	0.22	0.69	0.80	0.08
BWC	kg H2O	237,132	34,561	2,768	54,962	114,247	30,078	515
BWU	kg H2O	13,960,536	7,783,850	693,233	926,273	2,688,398	1,723,654	145,128
HHPA	kg PM2.5 eq	5.6	2.57	0.24	0.22	0.80	1.65	0.10
ADP	kg Sb eq	6.48E-02	4.28E-04	2.85E-05	2.71E-03	4.20E-02	1.97E-02	7.63E-06

Figure 10: Comparative total GWP emissions from manufacturing¹⁸⁰

There are, of course, reports that attribute a greater percentage of apparel's GHG impact to fiber production, but those we have identified, appear flawed. For example: *Fashion on Climate* was published in August 2020.¹⁸¹

This report was “part of a multiyear strategic-knowledge partnership between the Global Fashion Agenda and McKinsey & Company. The partnership aims to present research and a fact base on the priorities of CEOs and to guide and mobilize industry players in taking bold action on sustainability.” That paper found that 38% of GHG impact came from material production. Closer examination however, reveals that the underlying assumptions for the GHG emissions in cotton production were not substantiated, and considerably overstated cotton's raw material climate impact.¹⁸² The report claimed around 310 million tonnes of CO₂e, or nearly 11.5 tonnes per tonne, are emitted annually in cotton cultivation. The reality is that less than¹⁸³ 2.0 tonnes of CO₂e are emitted per tonne of cotton fiber.

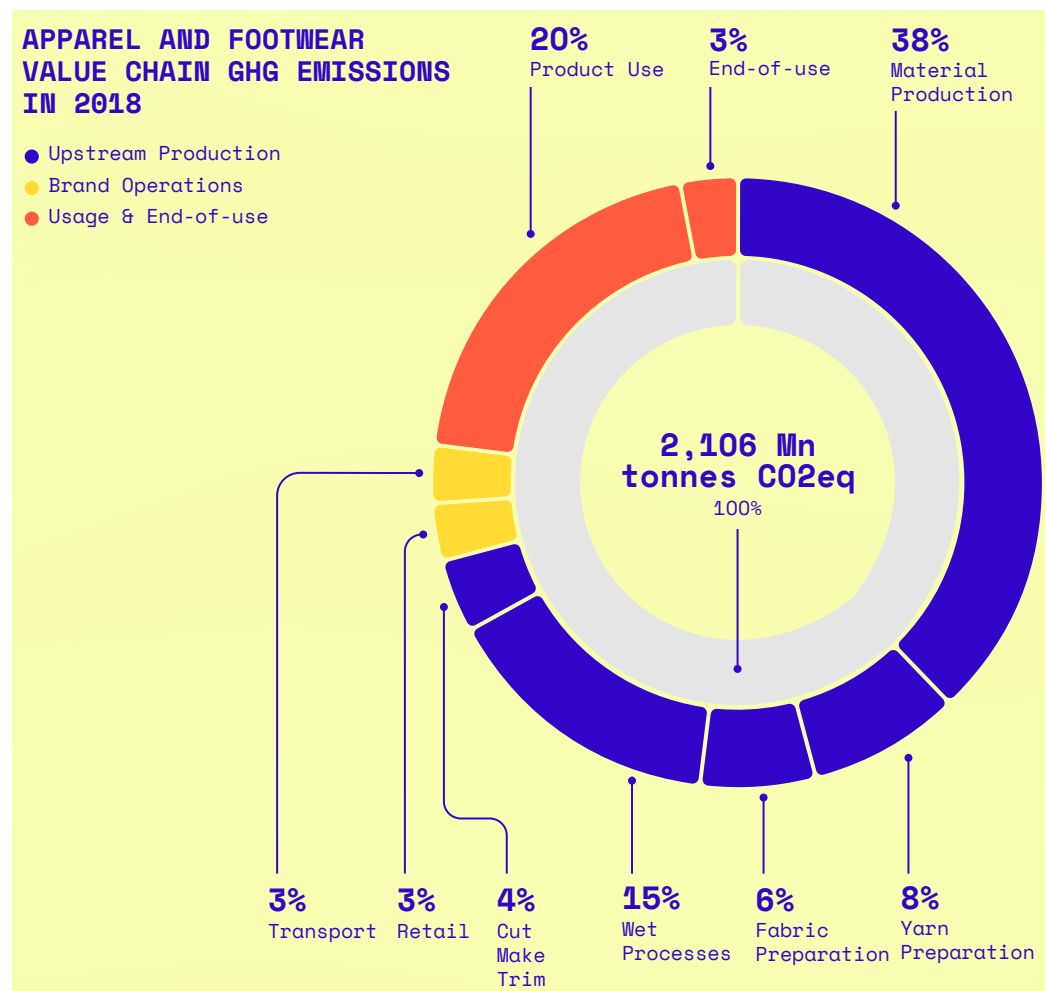


Figure 11: Apparel And Footwear Value Chain GHG Emissions In 2018
Fashion on Climate – How the Fashion Industry can Urgently Act to Reduce its Greenhouse Gas Emissions¹⁸⁴

A slightly modified version of this chart (Figure 12) was recently produced by BoF itself, in its November 2022 publication: *The State of Fashion 2023*, co-authored with McKinsey.¹⁸⁵



Figure 12: Material production creates the greatest climate impact across the fashion lifecycle

It is true that we have ourselves been seriously critical of the validity of the industry's impact data in all our earlier reports. We believe however, that on balance more accurate data might not change the percentage allocation to fiber production significantly.

1. The raw material GHG impact of polyester is seriously underestimated. Accurate data would increase fiber's share.
2. Leading brands in terms of volume of output, appear to manufacture largely in Asia. Their GHG impact is also seriously underestimated by using methodologies like that of the Higg MSI, that are based on Koç and Kaplan (2007)¹⁸⁶, and Van der Velden et al. (2014)¹⁸⁷, combined with a grid mix whose carbon intensity is considerably lower than that of the countries concerned. Accurate data would increase manufacturing's share.
3. Consumer impact is very sensitive to wash assumptions and the electricity mix employed. Sandin et al found that using the Swedish electricity mix resulted in the use-phase laundry contributing only 2.9% of lifetime impact. Substituting the EU electricity mix increased use-phase laundry's share to 12.8%. Whilst the Levi's LCA showed that if for US consumers, the assumed number of wears between washes was increased from an average of about 3 to 10 wears, GHG impact would fall by 77%. Accurate data could result in this share rising or falling.
4. While we don't have access to the data that underpins these end-of-life claims, there is reason to believe that end-of-life impact is understated. The US EPA estimates that "Municipal solid waste (MSW) landfills are the third-largest source of human-related methane emissions in the United States, accounting for approximately 14.5 percent of these emissions in 2020." By comparison, enteric fermentation accounted for 24% and manure management, as already mentioned, for 9%. This suggests that more accurate data might result in this share rising.¹⁸⁸

In other words, in terms of percentage allocation, the net result of using more accurate data in all categories might well be to largely cancel each other out, and the obvious conclusion is that if the industry is to reduce GHG emissions by 45% by 2030, it must focus on, and measure, its actual impact in manufacturing.

Under the prevailing system this will not happen, because most brands simply do not appear to have primary data on their fabric sourcing. As we pointed out in our report *The Great Green Washing Machine – Part 2: The Use and Misuse of Sustainability Metrics in Fashion*¹⁸⁹, Textile Exchange's 2020 Material Change Insights Report revealed that 54% of participants, accounting for 77% of uptake volume, did not know which country their polyester came from (page 99). This was a significant increase from 2019, when only 42% of participants, accounting for 48% of uptake volume, had no idea from which country their polyester was sourced (page 79). For the other fibers covered, in 2020, 42% of the uptake volume of cotton came with no known country of origin, and the same applied to 65% of polyamide, 60% of the feedstock for manmade cellulosics (MMCs), 55% of wool, and 60% of leather. The 2021 Insights Report shows little improvement. Transparency over country of origin for cotton, polyester, and MMC volumes is up slightly. That over polyamide and leather is down, whilst wool remains unchanged.¹⁹⁰

Moreover, Textile Exchange's 2019 report, also reveals that when it came to participating companies' self-assessment of their data quality and accuracy, only 7% thought it fully accurate, and 41% thought their own data quality and accuracy was average or worse (page 101).¹⁹¹ It should moreover be noted that even knowing with certainty that one sourced fabric in China or India does not automatically equate to having primary data.

It is self-evident that whether for their own SBTi calculations, or to comply with legislative requirements such as the NY Fashion Act, the larger brands in particular will be using the Higg MSI to calculate the production impact of most of their materials. They will, as a result, both be seriously underestimating their own carbon emissions and preventing substantive change.

Annex II.



A Brief History of
the United Nations Sustainable Development Goals

Prior to the SDGs we had the MDGs. Established following the Millennium Summit of the United Nations in 2000, the target date for meeting these was 2015. The overarching aim of The UN's Millennium Development Goals (MDGs) was to end extreme poverty and hunger, followed by the achievement of universal primary education and gender equality, and then, three health related targets.



Figure 13: United Nations Millennium Development Goals¹⁹²

We now have the SDGs. Created in 2015 with a target date for achievement of 2030, there are 17 of these. Eradicating poverty and hunger was not achieved in 2015, and has now been split into two goals. The three health targets – which were also not met in 2015 – have been combined into one, but the principal critical objectives remain the same: Ending poverty and hunger, whilst ensuring good health, good education, and gender equality for all.



Figure 14: United Nations top 6 Sustainable Development Goals¹⁹³

As an industry that is heavily dependent on the global south, fashion is uniquely placed to promote and support attainment of the SDGs. From the sourcing of fibers to the manufacture of finished garments, the apparel and leather sector, could, if it really wished to, make a real and fundamental contribution to ending poverty and food insecurity, and ensuring good health, quality education, and clean water for the millions of global poor who toil in its extended supply chains.

As the UN itself pointed out in the early stages of the development of the SDGs¹⁹⁴ raw materials – such as cotton, silk, and alpaca – play a vital role in the economies of many emerging nations and poor rural areas and a greater return would make a huge difference to the millions of farmers concerned. It is also self-evident that paying a living wage in shoe, bag, and apparel manufacturing would make a direct and immediate contribution to hitting SDGs 1 & 2.

Some commitment to the SDGs is currently almost ubiquitous across the apparel industry. But to quote a recent piece in the New York Times:

“There have been concerns that companies [...] are publicly supporting the goals as a way to burnish their image rather than make real change”.

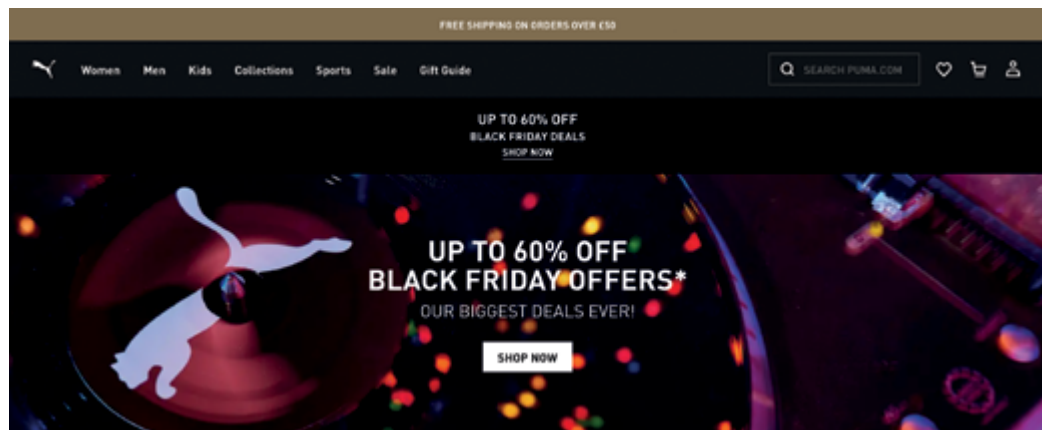
The extent of this “SDGs washing” was recently evaluated in Japan and showed that 32% of companies surveyed were making the SDG 8 (*Decent work and economic growth*) a priority. Support for “no poverty”, “zero hunger”, “clean water and sanitation,” was less than 7%¹⁹⁵.

A similar situation appears to prevail in the apparel sector, with everything from educational courses¹⁹⁶ to Textile Exchange publications¹⁹⁷ focusing on the opportunities fashion provides to meet SDGs 7-12, particularly the omnipresent SDG 8 “decent work and economic growth,” and glossing over the imperatives of SDGs 1-3.



Figure 15: United Nations Sustainable Development Goals 7-12¹⁹⁸

Indeed Textile Exchange's 2021 Material Change Insights Report shows that participating brands – many of them listed in the BoF Index, including top scorers Puma, Kering, Levi Strauss, H&M, Burberry, VF, PVH, and Nike – ranked the most important SDG for sustainable apparel to achieve as “SDG 12 Responsible Production and Consumption”.¹⁹⁹ How is it possible to claim to be promoting responsible consumption, whilst buying into Black Friday?



How is it possible to claim to be producing responsibly when paying workers and farmers in the supply chain well below living wages? Indeed, wages and many small farm incomes in the global apparel supply chain appear too low to fund a decent life, and in many instances we are looking at reports of hunger and malnutrition.²⁰⁰

For the sector to overlook all of this and to pretend that commitment to some vague and unspecified notion of “Responsible Production and Consumption” constitutes commitment to the SDGs is shameful. SDGs one and two are the bedrock upon which the rest must be built, not the other way round.

Abbreviations	page 55
Notes	page 56
Authors	page 62

Abbreviations

BCI : Better Cotton Initiative

BCFTP: Better Cotton Fast Track Program

BoF: Business of Fashion

CO₂e: Carbon dioxide equivalents

CGWR: Center for Global Workers' Rights

EU: European Union

Fashion Act: New York State Fashion Sustainability and Social Accountability Act

GHGs: Greenhouse Gas Emissions

GWP: Global Warming Potential

Higg MSI: Higg Materials Sustainability Index

LCA: Life Cycle Analysis/Assessment

NCA: Norwegian Consumer Authority

NYT: New York Times

OWiD: Our World in Data

PEF: Product Environmental Footprint

rPET: Recycled Polyester

SAC: Sustainable Apparel Coalition

SDGs: Sustainable Development Goals

SBTi: Science Based Targets Initiative

SBTis: Science Based Targets

TE: Textile Exchange

UN: United Nations

WRC: Workers Rights Consortium

WRI: World Resources Institute

XPCC: Xinjiang Production and Construction Corps

Notes

¹ See: Bates-Kassatly, V. & Baumann-Pauly, D. (2021). *The Great Greenwashing Machine – Part 1: Back to the Roots of Sustainability*.
<https://gcbhr.org/backoffice/resources/reportfinal72dpi2.pdf>

² See: Bates-Kassatly, V. & Baumann-Pauly, D. (2022a). *The Great Green Washing Machine – Part 2: The Use and Misuse of Sustainability Metrics in Fashion*.
<https://gcbhr.org/backoffice/resources/great-green-washing-machine-report-part-2final.pdf>
and Bates-Kassatly, V. & Baumann-Pauly, D. (2022b). *The Rise and the Fall of Life Cycle Analysis (LCAs) and the Fall of Sustainability: Illustrations from the Apparel and Leather Sector*.
<https://gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf>

³ See: Bates-Kassatly, V. & Baumann-Pauly, D. (2022b). *op. cit.*

⁴ Business of Fashion. (2022). *The BoF Sustainability Index 2022*.
<https://shop.businessoffashion.com/products/the-bof-sustainability-index-2022>

⁵ Infinite MIT. (n.d.). *Carl Sagan – Guest Speaker at Sloan Symposium "Management in the Year 2000"*. Retrieved December 19, 2022, from
<https://infinite.mit.edu/video/carl-sagan-guest-speaker-sloan-symposium-management-year-2000%E2%80%9D-11141987>

We quote Business of Fashion (2022): "[The end of this decade is the deadline to achieve the UN's Sustainable Development Goals and a critical milestone in efforts to forestall a climate crisis. \[...\] The aim of the Index is to track progress in transforming the fashion industry ahead of the 2030 milestone.](#)" (pp. 5, 15)

⁶ Business of Fashion. (2021, March 22). *The Sustainability Gap: How Fashion Measures Up*.
https://cdn.businessoffashion.com/reports/The_Sustainability_Index_2021.pdf

⁷ The following description comes from: Business of Fashion. (2021, March 21). *Measuring Fashion's Sustainability Gap – Download the Report Now*.
<https://www.businessoffashion.com/reports/sustainability/measuring-fashions-sustainability-gap-download-the-report-now/>

We use this whenever possible, as that report remains open access.

Whilst we have received free copies of both the 2021 and 2022 publications, the 2022 Index report is behind a paywall – at a cost of £3,495.00 for the report and raw data – the 2021 raw data in Excel format is available but at a cost of £995 excluding VAT.

Looking at the 2021 Index, we can see that, specifically, a list of "[338 different metrics](#)" – actually yes/no questions – was compiled by BoF's "[12 respected global experts in sustainability](#)". BoF then combed freely accessible public disclosures, made up to December 31, 2020, by the largest five publicly listed companies in each of 3 categories: luxury, high street, and sportswear – 15 companies in total. If those disclosures were deemed to match BoF's list of questions sufficiently to generate a yes answer, the brand got a tick or point. No, or insufficient disclosure generated a "no" score by default. The points were then summed. The final score in each of the 6 categories represented the percentage of Y/N for which the brand scored a point in that category. All 6 category scores were weighted equally to arrive at the final percentage score.

The 2022 index is based on: "[200+ binary \(yes / no\) metrics to enable like-for-like comparisons of sustainability performance across 30 fashion companies](#)". Specifically, the largest 10 companies across 3 segments: Luxury, High Street, and Sportswear. As noted, the 2021 report only covered 5 companies in each segment and used "[338 metrics across six categories to measure performance against 16 ambitious environmental and social targets](#)".

⁸ Carbon dioxide equivalents.

⁹ Changing Markets Foundation. (2022). *License to Greenwash: How Certification Schemes and Voluntary Initiatives are Fuelling Fossil Fashion*.
<http://changingmarkets.org/wp-content/uploads/2022/03/LICENCE-TO-GREENWASH-FULL-REPORT.pdf>

¹⁰ Patagonia. (n.d.). *Closing the Loop – A Report on Patagonia's Common Threads Garment Recycling Program*. Retrieved December 22, 2022, from
<https://eu.patagonia.com/gb/en/stories/closing-the-loop-a-report-on-patagonias-common-threads-garment-recycling-program/story-19961.html>

¹¹ Incidentally, major brands like Patagonia and Shein are not included in the BoF Index because they are privately held and not publicly listed.

¹² Clean Clothes Campaign. (2019, April 3). *Not a single worker is making a living wage yet H&M claims to have done an amazing job*.
<https://cleanclothes.org/news/2019/not-a-single-worker-is-making-a-living-wage-yet-hm-claims-to-have-done-an-amazing-job>

- ¹³ Roberts-Islam, B. (2022, May 16). *Environmental Impact Assessments Could Undermine Sustainable Fashion – Experts Explain Why*. Forbes.
<https://www.forbes.com/sites/brookeroberstislam/2022/05/16/environmental-impact-assessments-could-undermine-sustainable-fashion-experts-explain-why/>
- ¹⁴ Sadowski, M., Perkins, L. & McGarvey, E. (2021, May 11). *Roadmap to Net Zero : Delivering Science-Based Targets in the Apparel Sector*. World Resources Institute.
<https://www.wri.org/research/roadmap-net-zero-delivering-science-based-targets-apparel-sector>
- ¹⁵ Cotton Incorporated. (2017, March 17). *LCA Update of Cotton Fiber and Fabric Life Cycle Inventory*.
<https://resource.cottoninc.com/LCA/2016-LCA-Full-Report-Update.pdf>
- ¹⁶ Mean GWP in fiber production (excluding carbon credit) was only 1.3 kg CO₂e per kilo of fiber. For manufacturing, from yarn production through to finishing and compaction, GWP was between 10.2 and 10.7 kg CO₂e per kilo of fabric (see Annex I).
- ¹⁷ International Energy Agency. (n.d.). *Emissions Factors 2022*. Retrieved January 5, 2023, from
<https://www.iea.org/data-and-statistics/data-product/emissions-factors-2022>
- ¹⁸ Sphera. (n.d.). *Life Cycle Assessment Product Sustainability (GaBi) Software*. Retrieved January 5, 2023, from
<https://sphera.com/life-cycle-assessment-lca-software/>
- ¹⁹ Our World in Data. (n.d.). *Carbon intensity of electricity, 2000 to 2021*. Retrieved January 5, 2023, from
https://ourworldindata.org/explorers/energy?tab=chart&facet=none&country=CHN~IND~BGD~ITA~PRT~FRA~VNM~OWID_WRL~IDN~KHM~TUR~PAK&Total+or+Breakdown=Total&Select+a+source=Low-carbon&Energy+or+Electricity=Electricity+only&Metric=Carbon+intensity
- ²⁰ Carbon Footprint . (n.d.). *Country Specific Electricity Grid Greenhouse Gas Emission Factors*. Retrieved January 5, 2023, from
https://www.carbonfootprint.com/docs/2022_03_emissions_factors_sources_for_2021_electricity_v11.pdf
- ²¹ Our World in Data. *Carbon intensity of electricity, 2000 to 2021*. op. cit.
- ²² Webb, B. (2021, October 7). *Inside Hermès: Where leather factories are still the future*. Vogue Business.
<https://www.voguebusiness.com/sustainability/inside-hermes-where-leather-factories-are-still-the-future>
- ²³ Puma were the top scorers overall. In 'emissions' they rank second after Levi Strauss.
- ²⁴ Puma. *Global Factory List 2022*.
<https://gcbhr.org/backoffice/resources/puma-global-factory-list-2022.pdf>
- ²⁵ One factory was listed in low intensity Austria. This factory may also pay a living wage. See part IV. [Misconception number three – Workers Rights](#).
- ²⁶ "According to the current draft/ 5.1.2. Life cycle stage 2 – Manufacturing: Primary data for processes and technologies shall be used to select the most relevant dataset from the EF 3.X database. Specific location and loss rates shall be used to edit the datasets (country energy mix as a minimum, specific energy type and amount if data are available)." Source: Baptiste Carriere-Pradal 3 November 2022. When brands do not have primary data, the WRI SBTis permit the use of the Higg MSI. It remains to be seen what the PEF will permit.
- ²⁷ Koç, E., & Kaplan, E. (2007). An Investigation on Energy Consumption in Yarn Production with Special Reference to Ring Spinning. *Fibres & Textiles in Eastern Europe*.
http://www.fibtex.lodz.pl/63_08_18.pdf
- ²⁸ Van der Velden, N.M., Patel, M.K. & Vogtländer, J.G. (2014). LCA benchmarking study on textiles made of cotton, polyester, nylon, acryl, or elastane. *Int J Life Cycle Assess* 19, 331–356.
https://www.researchgate.net/publication/258220983_LCA_benchmarking_study_on_textiles_made_of_cotton_polyester_nylon_acryl_or_elastane
See Annex I.
- ²⁹ The Higg MSI obtains this by taking the following annual grid mix data published by Sphera GaBi (email from the SAC of 20 September 2022).
Bangladesh (BD): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/242fceff-e74e-4821-a474-48f2171eb16c.xml>
China (CN): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/124e9246-9e84-4352-86b5-c08837e8cf92.xml>
European Union (EU-28): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/001b3cb7-b868-4061-8a91-3e6d7bcc90c6.xml>
India (IN): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/b9f24581-2fe8-4393-810c-4789a92b9c3b.xml>
Indonesia (ID): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/f2081add-ee2d-4e73-9135-ffecebf9c9991.xml>

Korea (KR): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/275a3714-2f49-4612-a114-46a2bd4ebeb4.xml>

Pakistan (PK): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/e7c5883a-241d-45ff-9f2f-0b378e0cf332.xml>

Turkey (TR): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/86c2ab55-7307-418c-bd11-b50166206ce9.xml>

United States (US): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/6b6fc994-8476-44a3-81cc-9829f2dfe992.xml>

Vietnam (VN): <http://gabi-documentation-2021.gabi-software.com/xml-data/processes/56b47454-0b28-47ed-bf6a-09ca1593488f.xml>

This is then weighted by 2013 textile export volumes.

(See: Sustainable Apparel Coalition. (2020, July 31). *Higg Materials Sustainability Index (MSI) Methodology*. <https://howtohigg.org/wp-content/uploads/2020/07/Higg-MSI-Methodology-July-31-2020.pdf>)

as cited in the World Trade Organization summary of International Trade Statistics 2014.

(See: World Trade Organization. (2014). *Europe's exports of manufactured goods totalled almost US\$ 5 trillion in 2013*. https://www.wto.org/english/res_e/statis_e/its2014_e/its14_highlights2_e.pdf)

Which results in the Chinese grid mix (CN) having a weighting of 42%, the EU grid mix has a weighting of 28%, India's (IN) carries a weight of 7%, and so on.

³⁰ The finer it is, the greater the electricity required per kilo.

³¹ Email from the SAC of 28 September 2022.

³² Puma. *Global Factory List 2022*. op. cit.

³³ A further three tier 3 suppliers are shown – all Lenzing, one in Europe. Tier 1 refers to contract factories. Tier 2 or 3 to “key manufacturers of components and materials”. (See: Puma. *The Puma Forever Faster Sustainability Handbooks – Social Standards*. <https://gcbhr.org/backoffice/resources/pumahandbooksocial-standards.pdf>)

³⁴ H&M Group. (n.d.). *Supply chain*. Retrieved January 5, 2023, from <https://hmggroup.com/sustainability/leading-the-change/transparency/supply-chain/>

³⁵ 15 EU manufacturers are listed, including two ceramics, one cutlery manufacturer, and a PVD coating company in Portugal; glassworks in Poland and France; a printing press in Denmark; a candle factory in Sweden; a paper napkin and table decoration company in Germany; a bedding company in Hungary; a furniture maker in the Czech Republic; a perfume and cosmetics company in Sweden; and a spinning and dyeing facility in Portugal that produces home textiles. As far as fashion and apparel is concerned, only two producers are listed from Europe: a clothing factory in Portugal and an underwear and stocking manufacturer in Italy.

³⁶ Mistra Future Fashion. (2019, September 5). *The impact of Swedish clothing consumption*. <http://mistrafuturefashion.com/impact-of-swedish-clothing-consumption/>

³⁷ Our World in Data. *Carbon intensity of electricity, 2000 to 2021*. op. cit. (NB. 2020 grid. For 2021, Indonesia is not available in OWID).

³⁸ H&M Group. *Supply chain*. op. cit.

³⁹ Lu, S. (2022, December 2). *EU Textile and Apparel Industry and Trade Patterns*. FASH455 Global Apparel & Textile Trade and Sourcing. <https://shengluofashion.com/2022/01/28/eu-textile-and-apparel-industry-and-trade-patterns-updated-january-2022/>

⁴⁰ https://sciencebasedtargets.org/resources/legacy/2019/06/GBT_App_Guide_final_0718.pdf

⁴¹ For those brands that do not have primary data, which in the case of fast fashion and athleisure, appears to be most. See Annex I.

⁴² The Fashion Act. (n.d.). *Read the Bill*. Retrieved January 5, 2023, from <https://www.thefashionact.org/billtext>

Also see: Science Based Targets & World Resources Institute. (n.d.). *Apparel and Footwear Sector Science-Based Targets Guidance*. Retrieved January 5, 2023, from https://sciencebasedtargets.org/resources/legacy/2019/06/GBT_App_Guide_final_0718.pdf

We quote (our bold): “**As companies develop their GHG inventories, establish targets, and measure progress against targets, they would ideally have access to primary data (e.g., emissions from the manufacture of their products). This said, given the nature of the industry, it is very difficult for companies to access primary data, particularly further upstream [...]. Thus, companies will likely use the Higg suite of tools** in particular, the Facility Environmental Module (FEM) and the Higg MSI, in the target-setting process. To calculate the GHG emissions for materials in tiers 3 and 4 [...], companies can use the Higg MSI to estimate emissions for these tiers, assuming they know the mass of materials that is purchased for their products. For example, if a company uses 100 million kilograms of cotton for its products, it can look at the Higg MSI to get an average emissions factor for cotton [...]” (p. 31)

- ⁴³ Rising to perhaps as much as 90% when we factor in uncertainty. See Annex I.
- ⁴⁴ Harmonized System (HS) codes for example, can be a valuable source of information.
- ⁴⁵ Textile Exchange. (2022a). *Material Change Insights 2021*. p. 67.
https://textileexchange.org/app/uploads/2022/06/Textile-Exchange_Material-Change-Insights_Report_2021.pdf
- ⁴⁶ We are grateful to Allan Williams for his insights. Email of 17 June 2022.
- ⁴⁷ Green Button. (n.d.). *Requirements for production processes*. Retrieved January 5, 2023, from <https://www.gruener-knopf.de/en/production-processes>
- ⁴⁸ Readfearn, G. (2022, September 14). Hundreds of yoga teachers call out lululemon over coal-powered factories. *The Guardian*.
<https://www.theguardian.com/environment/2022/sep/14/hundreds-of-yoga-teachers-call-out-lululemon-over-coal-powered-factories>
- ⁴⁹ Lululemon. (n.d.). *Lululemon 2021 Impact Report*. Retrieved January 6, 2023, from <https://corporate.lululemon.com/-/media/Files/L/Lululemon/our-impact/reporting-and-disclosure/2021-lululemon-impact-report-final-13-09-22.pdf>
- ⁵⁰ United Nations. (2022). *The Sustainable Development Goals Report 2022*.
<https://unstats.un.org/sdgs/report/2022/>
- ⁵¹ International Fund for Agricultural Development. (n.d.). *Why Rural People?* Retrieved January 6, 2023, from <https://www.ifad.org/en/investing-in-rural-people>
- ⁵² Dooley, B. & Ueno, H. (2022, August 26). Why Is This Colorful Little Wheel Suddenly Everywhere in Japan? *The New York Times*.
<https://www.nytimes.com/2022/08/25/business/japan-sdg.html>
- ⁵³ See Annex II for further details.
- ⁵⁴ Textile Exchange. (2022a). *op. cit.*
- ⁵⁵ The BoF Index glossary defines "Preferred Materials" as follows:
"A term used by non-profit standard-setting group Textile Exchange to describe a material that is ecologically and/or socially progressive compared to alternatives."
And this is how BoF describes "Textile Exchange":
"A non-profit organization focused on accelerating climate action in the textile industry through standards and research that encourage the uptake of fibers that are produced in a more environmentally and socially responsible manner compared to alternatives."
How or why these weightings were arrived at, is unclear.
- ⁵⁶ Wicker, A., Schmall, E., Raj, S. & Paton, E. (2022, April 12). That Organic Cotton T-Shirt May Not Be as Organic as You Think. *The New York Times*.
<https://www.nytimes.com/2022/02/13/world/asia/organic-cotton-fraud-india.html>
- ⁵⁷ de Hoop, T., McPike, J., Vasudevan, S., Udayakumar Holla, C. & Taneja, M. (2018). *Social and Economic Impact Assessment of Cotton Farming in Madhya Pradesh*. American Institutes for Research.
<https://www.laudefoundation.org/en/resources/4333socioeconomicstudyweb.pdf>
Kumar, R., Nelson, V., Martin, A., Badal, D., Latheef, A., Suresh Reddy, B., Narayanan, L., Young, S. & Hartog, M. (2019). *Evaluation of the early impacts of the Better Cotton Initiative on smallholder cotton producers in Kurnool District, India* (Final evaluation report). ISEAL Alliance.
<https://www.evidensia.eco/resources/17/evaluation-of-the-early-impacts-of-the-better-cotton-initiative-on-smallholder-cotton-producers-in-kurnool-district-india-final-evaluation-report/>
- ⁵⁸ Bates-Kassatly, V. & Baumann-Pauly, D. (2021). *op. cit.*
- ⁵⁹ Bates-Kassatly, V. (2022, March 25). *Alpaca Stories Part 3: When PETA Strikes, Certifications Follow*. Fibershed.
<https://fibershed.org/2022/03/25/alpaca-stories-part-3-when-peta-strikes-certifications-follow/>
- ⁶⁰ A Presidential Task Force "Creating a Green Sri Lanka with Sustainable Solutions to Climate Change" was established in May 2020 "to transform Sri Lanka into a sustainable, green socio-economy adapted to climate change" by establishing a plan for the national transformation to organic agriculture.
(See: United States Department of Agriculture & Global Agricultural Information Network. (2021). *Sri Lanka Restricts and Bans the Import of Fertilizers and Agrochemicals* (N° CE2021-0007). https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Sri%20Lanka%20Restricts%20and%20Bans%20the%20Import%20of%20Fertilizers%20and%20Agrochemicals_New%20Delhi_Sri%20Lanka_05-14-2021)
On this committee's recommendation, on 6 May 2021, its economy already reeling from COVID's impact on two of the main sources of foreign exchange – tourism and remittances – the Sri Lankan government banned

imports of chemical fertilizers and pesticides, to rein in rising health care costs, that it claimed (without providing evidence) stemmed from overuse of chemicals in agricultural production.

The administration assured consumers that the retail price of rice would remain unaffected. But rice production fell by 20% in the first 180 days, farmers left a third of all farmland fallow, and food prices naturally soared.

(See: Varadarajan, T. (2022, July 14). Sri Lanka's Green New Deal Was a Human Disaster. *The Wall Street Journal*. <https://www.wsj.com/articles/sri-lanka-green-new-deal-was-a-human-disaster-gotabaya-rajapaksa-borlaug-synthetic-fertilizers-hunger-organic-agriculture-11657832186>)

Ignoring farmer protests, the advice of all the nation's agricultural experts, as well as medical evidence, the Government persisted with this folly.

In "September, the country declared an economic emergency to control food supply and contain soaring inflation"

(Toh, E. M. (2022, March 8). Sri Lanka's central bank chief says measures to deal with economic crisis may not be « palatable ». *CNBC*. <https://www.cnbc.com/2022/03/08/sri-lanka-central-bank-chief-on-dealing-with-countrys-economic-crisis.html>)

In November, the organic ruling was overturned. Too late. The combined impact of all of these misfortunes – COVID, unavoidable, the organic folly, self-imposed – was soaring prices, even less foreign exchange, as this had to be diverted to purchase needed rice and other essential food imports, and increasingly chronic fuel shortages. These shortages proceeded to hit the tourism industry, which was only just beginning to recover, further exacerbating the forex situation.

One of the authors of this report visited Sri Lanka in February 2022. Her guide was unable to fulfill the contract as agreed, because he simply could not get the fuel needed for his eco-friendly vehicle. Not surprisingly, his bitterness was palpable, his message to BoF and the sustainable apparel sector clear:

"Rice 12 months ago was 60 rupees per kilo. Now it's 150/kilo. We have to import from India and China, but there is no foreign exchange. The Government say they care about health. But what about our health. We have no money. We cannot eat."

⁶¹ Bates-Kassatly, V. & Baumann-Pauly, D. (2022a). *op. cit.*

⁶² Varadarajan, T. (2022). *op. cit.*

⁶³ Bates-Kassatly, V. (2022, September 1). *Real or not Real? Debunking some of the assumptions in our industry*. <https://www.veronicabateskassatly.com/read/ibfuw5pssfc18swm464yyo3eei8a6d>

⁶⁴ Forbrukertilsynet. (2022, October 11). *Consumer authorities issue guidance on environmental claims to the textile industry*. <https://www.forbrukertilsynet.no/eng-articles/consumer-authorities-issue-guidance-on-environmental-claims-to-the-textile-industry>

⁶⁵ Textile Exchange. (2022b). *Regenerative Agriculture Landscape Analysis*. <https://textileexchange.org/wp-content/uploads/2022/01/Regenerative-Agriculture-Landscape-Analysis.pdf>

⁶⁶ Textile Exchange quotes one Indian initiative, but not only are the claims self declared, not independently verified, and so almost certainly overstated, two very different figures for the annual incomes of participating farmers are cited:

a) "Before working with us, farmers were making about \$400 per acre yearly. A really good yearly income was \$700 per acre. Now they earn over \$1400 per acre."

And b) "I would not say that is a fair relationship, because it is still only 200 dollars a month per acre for farmers. But at least it is a good root to start from." (\$200x12= \$2400).

⁶⁷ Peeters, A. (2022). *Regenerative agriculture is a trendy concept focusing on soil regeneration. It is a narrow concept that does not disturb people*. LinkedIn. https://www.linkedin.com/posts/alain-peeters-1b6b3039_brief-regenerative-agriculture-conference-activity-6977346422497026048-M2qz

⁶⁸ We are grateful to Allan Williams for drawing our attention to this report.

⁶⁹ PgC = Petagrams of carbon – 10¹⁵ grams of carbon

⁷⁰ Lessmann, M., Ros, G. H., Young, M. D. & Vries, W. (2021). Global variation in soil carbon sequestration potential through improved cropland management. *Global Change Biology*, 28(3), 1162-1177. <https://doi.org/10.1111/gcb.15954>
<https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15954>

⁷¹ Schlesinger, W. H. (2022). Biogeochemical constraints on climate change mitigation through regenerative farming. *Biogeochemistry*, 161(1), 9-17. <https://doi.org/10.1007/s10533-022-00942-8>
<https://link.springer.com/article/10.1007/s10533-022-00942-8>

⁷² Cool Farm Alliance. (n.d.). *Frequently Asked Questions*. Retrieved January 7, 2023, from <https://coolfarmtool.org/coolfarmtool/frequently-asked-questions/>

- ⁷³ "About 15.8 million acres of cropland, equivalent to about 5 percent of all U.S. cropland, are fertilized with livestock manure".
(See: United States Department of Agriculture (2009). *Manure Use for Fertilizer and for Energy*. https://www.ers.usda.gov/webdocs/publications/42731/16739_ap037fm_1_.pdf?v=0)
- ⁷⁴ United States Environmental Protection Agency. (2022). *Basic Information about Landfill Gas*. <https://www.epa.gov/lmop/basic-information-about-landfill-gas>
- ⁷⁵ Dairy Herd Management. (2022, April 6). *In the U.S., Manure is 'Hot Commodity' Amid Commercial Fertilizer Shortage*. <https://www.dairyherd.com/news/dairy-production/us-manure-hot-commodity-amid-commercial-fertilizer-shortage>
- ⁷⁶ Lessmann, et al. (2021). *op. cit.*
- ⁷⁷ International Cotton Advisory Committee . (n.d.). *ICAC Cotton Data Book*. Retrieved January 7, 2023, from <https://icac.org/Publications/Details?publicationId=8>
- ⁷⁸ Bates-Kassatly, V. (2021, September 22). 'Sustainable' Fashion Forgot Where It Came From. <https://www.veronicabateskassatly.com/read/sustainable-fashion-forgot-where-it-came-from>
- ⁷⁹ In some cases, as in some variants of Lycra's COOLMAX®, pre-consumer waste fabric may also be used.
(See: Lycra. (n.d.). Coolmax® Ecomade Technology. Retrieved January 7, 2023, from <https://www.coolmax.com/en/business/search-technologies/coolmax-ecomade-technology>)
- ⁸⁰ Belliveau, M. & Krithivasan, R. (2022). *Problem Plastic: How Polyester and PET Plastic Can be Unsafe, Unjust, and Unsustainable Materials*. Defend our Health. <https://defendourhealth.org/wp-content/uploads/2022/07/PET-Report-Part1-070622d-1.pdf>
- ⁸¹ Mathews, B. (2021, December 17). Beverages sector asks EU for priority access to rPET. *Apparel Insider*. <https://apparelinsider.com/beverages-sector-asks-eu-for-priority-access-to-rpet/>
- ⁸² Mathews, B. (2021, November 1). Lab tests expose recycled polyester fraud. *Apparel Insider*. <https://apparelinsider.com/lab-test-exposes-recycled-polyester-fraud-in-supply-chains/>
- ⁸³ Qian, W., Ji, X., Xu, P. & Wang, L. (2021). Carbon footprint and water footprint assessment of virgin and recycled polyester textiles. *Textile Research Journal*, 91(21-22), 2468-2475. <https://doi.org/10.1177/00405175211006213>
<https://journals.sagepub.com/doi/abs/10.1177/00405175211006213>
- ⁸⁴ TittlePress. (2021, August 13). *Recycled plastic fashion boom comes with a price tag*. <https://tittlepress.com/fashion/1064237/>
- ⁸⁵ Biver, M., Turner, A. & Filella, M. (2021). Antimony release from polyester textiles by artificial sweat solutions : A call for a standardized procedure. *Regulatory Toxicology and Pharmacology*, 119, 104824. <https://doi.org/10.1016/j.yrtph.2020.104824>
<https://www.sciencedirect.com/science/article/pii/S0273230020302506>
- ⁸⁶ Moore, T. (2022, July 21). PET Plastic Report. *Defend Our Health*. <https://defendourhealth.org/blog/pet-plastic-report/>
- ⁸⁷ United Nations. (1992). Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992). (A/CONF.151/26 (Vol. I)). https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151.26_Vol.I_Declaration.pdf
- ⁸⁸ Forrest, F. (2022, April 29). Evolushein : Shein launches first positive impact collection with recycled polyester. *Just Style*. <https://www.just-style.com/news/evolushein-sheins-new-collection-features-recycled-polyester/>
- ⁸⁹ Boohoo. *Our Sustainability Plan/CLOTHESMADE SMARTER*. Retrieved January 8, 2023, from <https://www.boohoo.com/page/sustainability-guide.html#clothes>
- ⁹⁰ Kering. (2019). *Kering Standards for Raw Materials and Manufacturing Processes*. <https://dq06ugkuram52.cloudfront.net/files/5636276/21097194.pdf>
- ⁹¹ Patagonica. (n.d.). *Why Plastics*. Retrieved January 7, 2023, from <https://www.patagonia.com/why-plastics/>
- ⁹² U.S. Department of the Treasury. (2020, July 31). *Treasury Sanctions Chinese Entity and Officials Pursuant to Global Magnitsky Human Rights Executive Order* [Press Release]. <https://home.treasury.gov/news/press-releases/sm1073>

U.S. Customs and Border Protection. (2020, December 2). *CBP Issues Detention Order on Cotton Products Made by Xinjiang Production and Construction Corps Using Prison Labor* [Press Release]. <https://www.cbp.gov/newsroom/national-media-release/cbp-issues-detention-order-cotton-products-made-xinjiang-production>

⁹³ Bates-Kassatly, V. (2020, August 7). *Shaking Hands With The Devil: "Sustainable Cotton" and the Xinjiang Production and Construction Corp.* <https://www.veronicabateskassatly.com/read/shaking-hands-with-the-devil-sustainable-cotton-and-the-xinjiang-production-and-construction-corp>

⁹⁴ U.S. Customs and Border Protection. (2020). *op. cit.*

⁹⁵ Bates-Kassatly, V. (2022, August 24). *Heaven is High and the Emperor is Far Away.* <https://www.veronicabateskassatly.com/read/heaven-is-high-and-the-emperor-is-far-away>

⁹⁶ Screenshot of 23 September 2019.

⁹⁷ Screenshots of 13 February 2020 and 18 December 2019.

⁹⁸ Rascouet, A., Hipwell, D. & Pham, L. (2021, October 15). *China Is Forcing Fashion to Mute Itself Over Dirty Cotton.* *Bloomberg.* <https://www.bloomberg.com/news/articles/2021-10-14/china-forces-better-cotton-initiative-fashion-brands-to-be-quiet-over-xinjiang> and *Better Cotton Initiative's fall a cautionary tale of trying to be all things to all people* <https://www.scmp.com/news/china/diplomacy/article/3129087/bcis-fall-cautionary-tale-trying-be-all-things-all-people>

⁹⁹ McNamara, M. (2020, October 8). *World's garment workers face ruin as fashion brands refuse to pay \$ 16bn.* *The Guardian.* <https://www.theguardian.com/global-development/2020/oct/08/worlds-garment-workers-face-ruin-as-fashion-brands-refuse-to-pay-16bn>

¹⁰⁰ Workers Rights Consortium. (n.d.). *Covid-19 Tracker : Which Brands Acted Responsibly toward Suppliers and Workers?* Retrieved January 8, 2023, from <https://www.workersrights.org/issues/covid-19/tracker/>

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Levi Strauss does not appear to guarantee a higher price to the suppliers in return for the additional cost incurred and we are only looking at free feasibility assessments, and access to lower-cost financing. Back of the envelope calculations suggest that this may be inadequate.

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Indeed, Levis have been working with IFC's supplier finance program since 2014. In 2019, they announced "IFC will work with 42 designated LS&Co. suppliers and mills to reduce GHG emissions by helping suppliers identify and implement appropriate renewable energy and water saving interventions across 10 countries – Pakistan, Bangladesh, Sri Lanka, India, Mexico, Lesotho, Colombia, Turkey, Egypt, and Vietnam. The project follows the success of a 2017 pilot cooperation between the two organizations that helped six LS&Co. suppliers in four countries reduce their emissions by 20 percent and decreased their operating costs by more than \$1 million, collectively."

(See: Levi Strauss. (2019). *op. cit.*)

As of 2022, Levi Strauss is still referring to the success of the 2017 pilot, but provides no updates on the 42 mills designated in 2019, which rather suggests no concrete progress was achieved.

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Authors

Veronica Bates-Kassatly is an independent analyst of sustainability claims in the apparel and leather sector. She is a former Fellow of the Overseas Development Institute where she focused on agricultural economics, and a former economist and financial analyst with the World Bank, where she covered textiles, wood-processing, and technology development. She was also briefly the co-owner of a niche fashion brand.

<https://www.veronicabateskassatly.com/>

Dorothee Baumann-Pauly is a Professor at the University of Geneva's School of Economics and Management where she directs the Geneva Center for Business and Human Rights. She is also research director at the NYU Stern Center for Business and Human Rights. She has published widely in the context of Business and Human Rights (BHR) and co-edited the first textbook on BHR. She also co-leads the Global Business School Network for Human Rights and the PRME Working Group for BHR. Since 2021, she is the co-editor of the practice section of the Journal of Business Ethics..

<https://gcbhr.org/>

Veronica Bates-Kassatly and Dorothee Baumann-Pauly have co-authored three previous publications:

The Great Greenwashing Machine – Part 1: Back to the Roots of Sustainability

<https://gcbhr.org/insights/2021/09/the-great-greenwashing-machine>

The Great Green Washing Machine Part 2: The Use and Misuse of Sustainability Metrics in Fashion

<https://gcbhr.org/insights/2022/03/the-great-greenwashing-machine-part-2-the-use-and-misuse-of-sustainability-metrics-in-fashion>

The Rise of Life Cycle Analysis (LCAs) and the Fall of Sustainability Illustrations from the Apparel and Leather Sector

<https://gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf>

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If you are interested in supporting independent research into sustainable fashion, please contact Pascale Chavaz: Pascale.Chavaz@unige.ch

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Justine Gaxotte (justinegaxotte.com)

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GENEVA CENTER FOR BUSINESS
AND HUMAN RIGHTS
Geneva School of Economics
and Management
Uni Mail
40, boulevard du Pont-d'Arve
1211 Geneva 4
Switzerland

gsem-gcbhr@unige.ch



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