

We need to talk about cotton

Identity cotton standards such as organic cotton, BCI cotton and Cotton Made in Africa (CmiA) are better from an environmental and social perspective, right? Actually, because the data on these issues is limited and sketchy, we simply do not know whether that is the case – and this raises a huge issue for apparel brands and retailers, argues former World Bank analyst and founder of concept brand Commun des Mortels VERONICA BATES KASSATLY

What is the most pressing sustainability challenge facing the global fashion industry today? Two words: underpaying and overconsumption. We're producing too much clothing and paying too little for it.

This ever cheapening of apparel production is reflected in the end cost of clothing. Figures from the European Environment Agency, for instance, show that the relative price of clothing in the EU is about 64 per cent of what we paid in 1996; in the UK and Ireland it's nearer 33 per cent. We get what we pay for, and a whole generation of consumers have come to expect that, where fashion is concerned, they shouldn't have to pay very much. It is taken as given that the burden of cost-cutting should be shouldered by unseen farmers, factory, and garment workers a world away.

As far as sustainability goes, this is surely the number one issue the global fashion industry needs to address. And yet, if one examines the websites of major brands and the environmental initiatives in the fashion industry, the sustainability debate is heading along a completely different path. Discussions around

sustainability are focused on fibres - and farmed fibres in particular.

The switch to 'more sustainable' fibres, particularly 'sustainable cotton' is what dominates the sustainability conversation at the present time. At the annual Copenhagen Fashion summit, the 'Pulse of the Fashion Industry' (Pulse) is measured, with the score based in large part on whether the brands concerned are moving to 'more sustainable fibres'. But who decides what makes a fibre more sustainable? This question is vital, for if the sustainability of fibres is the yardstick by which large swathes of the fashion industry are measuring progress, the information and data on which fibres are actually labelled 'sustainable' needs to be absolutely bullet-proof.

I want to focus attention here on cotton to illustrate how, where questions around 'sustainable' fibres are concerned, nothing is ever quite as it seems.

A quick look at the corporate responsibility pages of brands

generally cited as those at the forefront of environmental concern, from Marks and Spencer (M&S), ASOS, and H&M to Stella McCartney, reveals an array of claims that their cotton is more sustainable - primarily because they use Cotton Made in Africa (CmiA), organic cotton, or Better Cotton Initiative (BCI) cotton. One recommendation by last year's House of Commons Environmental Audit Committee (EACOM) report on 'Fixing fashion: clothing consumption and sustainability' was that the UK Government should reform taxation to reward fashion companies that move from conventional to organic cotton.

In February this year, with the support of the Prince's Trust and M&S, Textile Exchange (TE) launched the 2025 Sustainable Cotton Challenge (SCC 2025) aimed at promoting a move by fashion brands, away from conventional cotton, towards 'more sustainable' cultivation methods - once again,

that primarily means CmiA, organic or BCI cotton.

Concomitantly in terms of fibre 'scoring', the Higg MSI, used by the Pulse, sets the impact of conventional cotton fibre at 60.6 per kilo; switch to CmiA and that drops to 14.0; a move to organic cotton lowers it to 11.2. That is a drop in harmful impact of between 77 per cent and 82 per cent.

Higg is a widely used industry tool and has huge credibility in the apparel and textile space. And the use of these kinds of numbers is surely an important factor in the improved sustainability ratings that H&M and others regularly report and receive awards for.

The message from this tool then – as well as from the websites of brands and retailers - is clear: conventional cotton is bad, and a switch to a 'sustainable' alternative, such as organic, is a smart move for the environment and for farmers.



Is organic cotton more sustainable than conventional cotton? And if so, where is the data which proves this?

Actually, much of the published information on organic cotton sustainability – including that on brand websites – circles back to Textile Exchange as the origin. For example, TE's organic cotton Life Cycle Analysis (LCA) was the sole source for the EACOM recommendation.

Does this LCA show that organic cotton is more sustainable than conventional production? No. In fact, in terms of the global debate, it doesn't really prove anything. And why is that? Because, as the organic LCA itself points out on page 57, to assess comparative sustainability

Does Textile Exchange (TE) list an SEIA for the cottons that it recommends as more sustainable? No. The SCC 2025 lists no SEIAs at all. Arguably then, we can make no comparative assertions about the general sustainability of the different cotton production methods at this time.

Can we at least make some restricted assertions, such as “consumes less water” or “reduces emissions”? For this we need to look at LCAs. Does TE list LCAs for the cotton production systems that it represents as more sustainable? For BCI, there does not appear to be so much as an LCA - certainly none are listed in the SCC2025. With no LCA and no SEIA, can we make any



for comparative assertions disclosed to the public.

Of course, ISO is voluntary and whilst the LCAs adhere to its

standards, the textile and clothing industry in general appears not to. The anti-competitive nature of unsubstantiated sustainability assertions does not seem to be considered.

So neither of these LCAs can tell us whether, on environmental grounds alone (that is, even ignoring the crucial social and economic aspects), either CmiA cotton, or organic cotton, is more sustainable than conventional cotton.

Do they at least give us an indication that in terms of water consumption or emissions, CmiA and/or organic cotton are more sustainable than conventional cotton? No. SCC2025 states: For CmiA cotton: ‘Water Consumption: 1 m³ / 1,000 kg fiber (~100% reduction - LCA)’

For organic cotton: ‘Water Consumption: 182 m³ / 1,000 kg fiber (91% reduction - LCA).’

But the LCAs concerned show no such thing.

The CmiA study actually only considered Cotton produced in Zambia and the Ivory Coast. Zambian agriculture is almost entirely rain fed, so conventional cotton from Zambia will consume approximately the same amount of blue water as CmiA cotton - virtually none. The same applies to Ivory Coast cotton.

As for the organic cotton LCA, this considered data from India, Turkey, China and the USA, and of the nine regions considered, 4.5 were effectively, completely rain fed. So conventional cotton produced in those regions will have consumed approximately the same amount of irrigation water - none. Another three regions averaged 50-150 m³ of irrigation water per year. Again, conventional cotton from those regions probably used much the same amount of irrigation water as



you need more than just an LCA. To quote: “Life Cycle Assessment is a powerful standardised tool for quantitative evaluation of potential environmental impacts on product basis; however, given the social and socio-economic dimensions of sustainability, further aspects than those investigated in this study need to be considered for a holistic assessment of sustainability of a production systems or a comparison with another production system.”

In other words, to see if a method of agricultural production is really sustainable, you first and most importantly, need to look at how it impacts the farmers. In study speak, you need not just an LCA but also a social and economic impact analysis (SEIA).

comparative assertions about the relative sustainability of BCI versus conventional cotton on a global scale? No, we can't.

The 2025 Sustainable Cotton Challenge cites two cotton production LCAs. One for CmiA, and the TE organic cotton study mentioned previously. Both of these LCAs clearly state they cannot be used to make comparative assertions between different cotton production systems – basically because in agriculture you can only compare production methods if you are looking at crops grown (or livestock raised) in the same place, at the same time, under the same conditions. And because the ISO has strict standards on what sort of information needs to be provided

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the organic cotton - very little.

So how did TE arrive at the massive "Water consumption" figures shown? a) By only looking at blue or irrigation water, rather than water as a whole.

The organic LCA actually puts total water consumption at 15,000 m³ per tonne of fibre, rather than 182. The CmiA study claims the total freshwater used to produce 1,000 kg of CmiA lint cotton was around 3,400m³, not 1m³. And b) By comparing the CmiA and organic irrigation water consumption, with that of a now outdated LCA of conventional cotton (Cotton Inc. 2012), which studied primarily irrigated cultivation.

In this context the CmiA LCA states: "101. CmiA is rain fed, i.e. no water is used for irrigation. In contrast, all the regions under investigation in COTTON INC. 2012 were at least partially irrigated. It therefore comes as no surprise that blue water consumption, which is of environmental relevance here, was orders of magnitude smaller for CmiA (1m³/1,000 kg lint cotton) compared to the global average."

And the organic LCA states: "5.2.4 In the regions under study, organically cultivated cotton receives relatively little irrigation in addition to naturally occurring rainfall. The irrigation water requirement of a crop is obviously mainly determined by climatic conditions although the actual usage is also influenced by irrigation techniques. This is why low irrigation rates cannot be attributed exclusively to the organic cultivation scheme."

In short, the two LCAs themselves state that the comparative assertions on irrigated water consumption that TE is making are neither valid nor

permissible.

How about emissions then, does either study indicate that at least on that basis, CmiA and/or organic cotton are more sustainable than conventional? Not really.

Both of these studies take livestock inputs to be burden free. This is actually a major issue for organic cotton, due to the importance of cattle manure and urine as fertilisers and pesticides (manure is also a common input in Zambian and Ivory Coast agriculture). Manure, like leather, is a by-product of the beef and dairy industries. It is standard in the sustainability industry, to assign a significant portion of the livestock burden to leather, but - interestingly - none at all to manure.

The TE organic cotton LCA (page 44) actually considered the implications of abandoning this anomaly, and found that if as little as ten per cent of the livestock burden is assigned to cotton, the environmental impact of organic production roughly doubles.

I pointed all of this out to TE, in a series of emails throughout March, 2018. They were unable to help.

In summary, my own research into this issue suggests there is no clear and unambiguous evidence that either CmiA or organic cotton consume less water when grown under the same conditions

as conventional cotton. Nor is there any conclusive evidence that

emissions are lower. The data simply is not there to

make such a claim at the current time.

Is there any more information out there which rigorously compares the environmental credentials of cotton grown to different standards? Actually, there is. Last year, the

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C&A Foundation published an LCA and an associated SEIA comparing cotton production by BCI, conventional and organic cotton farmers in Madhya Pradesh, India. These studies were not included in the SCC2025 document, which is a shame because they are the most up to date research we have in this area and would be very useful reading for brands considering whether or not to sign up to this initiative.

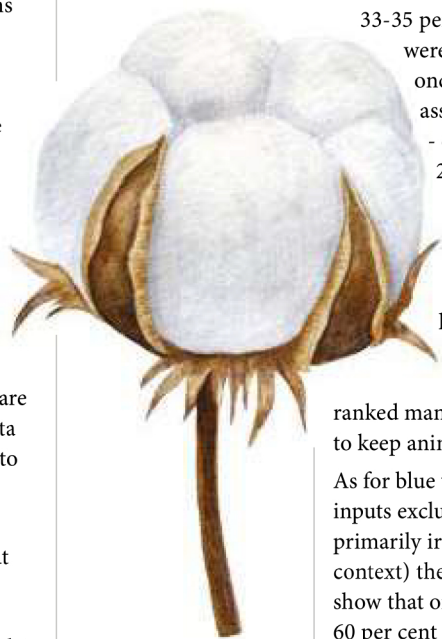
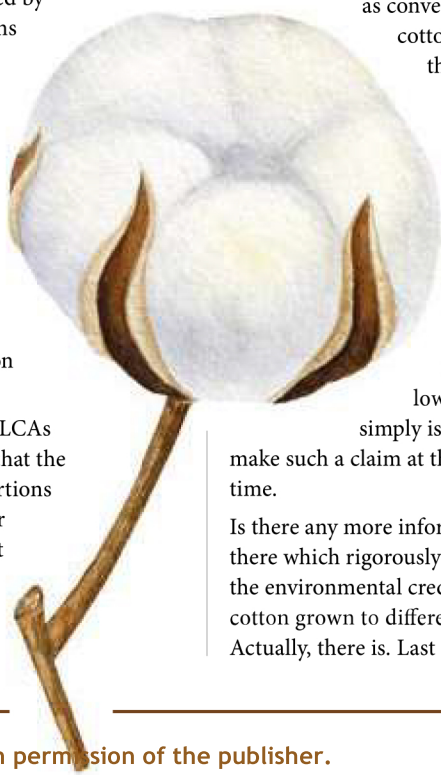
So what do they tell us? The LCA found that organic cotton consumed more blue water than conventional cotton. Moreover, in terms of water consumption, farmer income and farmer debt, the clear winner in the C&AF studies was actually conventional cotton.

In December 2018, the C&A Foundation issued a statement which said: "Organic cotton cultivation consumes 60 per cent less blue water when compared to conventional cotton cultivation," along with some other favourable statistics for organic cotton about eutrophication, climate change and so on.

For emissions etc these were certainly understated because: a) possibly as a result of a mix-up, or due to social desirability bias, the amount of chemical fertilisers and pesticides used by organic farmers was set to zero, despite the fact that the associated SEIA had found

33-35 percent of organic farmers were using them. and b) once again, manure was assumed to be burden free - despite the fact that a 2013 study found that for farmers in Maharashtra, India, Manure ranked second in a list of reasons to keep livestock after milk to sell. Indeed, 7 per cent of the farmers surveyed ranked manure as the main reason to keep animals.

As for blue water (all freshwater inputs excluding rainwater, so primarily irrigation water in this context) the LCA definitely does not show that organic cotton consumes 60 per cent less. Indeed it probably consumes 15 per cent more than



conventional cotton in the study. The raw data on irrigation and yield per hectare included in the report shows that in irrigation alone, blue water consumption was 350 tonnes per tonne of organic seed cotton. In a telephone discussion on March 12, 2019, CA&F confirmed this figure, but were unable to explain where the figure of 140 tonnes that they were using came from. Nor were they able to tell me what the upstream blue water consumption was for organic cotton.

We can however conclude that if, as stated, rainwater was estimated at 79 per cent, then of the 1880 tonnes of blue water used by organic farmers, rainwater provided 1485 tonnes. In that case, bluewater excluding rainwater, equalled 395 tonnes per tonne of organic seed cotton. That is 15 per cent more than the 344 tonnes of bluewater used to grow one tonne of conventional cotton.

What conclusions can we draw from all of this? The C&A studies were in one area, measured over one period of time, so to draw broader conclusions from them would be misleading. But this is the point: basing comparative assertions on the C&A Foundation's LCA has the same limitations as using the LCAs related to organic and CmiA cotton referred to above. None of these LCAs, in isolation, should be used to influence cotton sourcing on a grand scale, as appears to be the case at the present time.

So is the Higg overstating the negative impact of conventional cotton - probably. Is it understating the relative impact of CmiA and organic cotton - almost certainly.

So are brands such as H&M and Kering overestimating their progress to sustainability as a result - yes, by definition. And what about what I will loosely refer to as 'factory fibres' that the Higg prefers? Clearly, we should start looking at those closely on a case by case basis. One obvious issue is that most LCAs assume best practice. But much of the damage caused by the textile industry is precisely because, in order to cut costs, best practice is not followed. Effluent is dumped into lakes and rivers, untreated; harmful emissions are leaked... but the environmental impact of fibres is calculated as if everyone was purchasing their inputs from the pristine shores of Lake Como. But that conversation is for another time. For now, let's stick with cotton.

So where to from here? All of this is by no means intended to criticise apparel brands or retailers for shifting towards BCI-accredited or organic cotton. Instead, it is hoped that it can help kick-start a much-needed debate around issues of cotton sourcing and, particularly, claims around sustainable sourcing. Is the move towards cotton standards such as BCI, organic and CmiA actually more sustainable? Based on my own investigations into the issue, we simply do not know.

Do we need more data comparing the different ways in which cotton is grown? Of course we do. If brands are switching in their droves to various cotton standards, we need to be absolutely sure they are doing it for the correct reasons and based on top quality research and data.

Above all, we need to be sure we are doing the right thing by cotton farmers - many of whom are extremely poor. Switching from conventional to identity cottons comes at a cost to farmers, and the conversion can be challenging, particularly with organic cotton. This is not a switch to be undertaken lightly, and should not be made without comprehensive data to demonstrate that this is the right step for farmers - as well as for the environment.



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Further Reading:

Please find below links to all research material referenced in this article. If any reader has any questions about this article, please feel free to email the editor, Brett Mathews: brett@apparelin insider.com or the author Veronica Bates Kassatly: veronica@commundesmortels

Declining clothing prices, European Environment Agency: bit.ly/2VTIbpr

Textile Exchange Organic Cotton LCA: bit.ly/2Uo5zs8

UK Government fashion enquiry report: bit.ly/2DQEBDn

Higg cotton scoring: bit.ly/2GfDGO1

Contribution of Livestock to Livelihood of Farmers bit.ly/2GTgqaa

Textile Exchange organic cotton classification guide 2017: bit.ly/2XhUFpW

CmiA LCA: bit.ly/2IAr8U5

C&AF LCA: bit.ly/2v8Mmkd

C&AF SEIA: bit.ly/2GZvuVE

ISO 14040 (first edition) <https://web.stanford.edu/class/cee214/Readings/ISOLCA.pdf>

ISO standards for Environmental Declarations: bit.ly/2IAGybe

Cotton in Zambia: bit.ly/2IFJeEa

Cotton production: a US perspective

We reached out to Cotton Incorporated to get some insight from the conventional US cotton sector about the debate around cotton sustainability, including the findings of our cover story

A key message of our cover story relates to how LCAs have been used to forward sustainability claims. To gain some further insight on this issue we reached out to Cotton Incorporated, a non-profit organisation funded by cotton growers in the United States. Dr. Jesse Daystar, Cotton Incorporated chief sustainability officer, was instrumental in compiling the 2015 Life Cycle Analysis of Cotton Fiber and Fabric for the company. His background in LCA, however, goes far beyond cotton with more than 20 peer reviewed journal publications on LCA and sustainability surrounding biofuels, bioproducts, and LCA methodology.

Daystar told *Apparel Insider*: “LCAs can be a valuable tool when properly applied. Essentially, non-comparative LCAs are benchmarking tools that examine a distinct set of parameters as snapshots in time to determine the major drivers of environmental impacts and potential levers for improving sustainability.

“These non-comparative LCAs are not designed to compare

to other standalone LCAs, as differing assumptions and datasets make comparing separate studies scientifically invalid. Only an ISO-conforming comparative LCA with consistent assumptions and data should ever be used in a comparative way. Unfortunately, many in industry fail to follow the standards and best practices surrounding proper use of LCAs, and enforcement of this is a major challenge for the apparel industry and LCA as a science.”

As indicated, there are implications here for apparel and textiles and, particularly, how some fibre types – or cotton production standards – are ‘scored’ by tools such as, for example, the Higg Index. The Sustainable Apparel Coalition’s Higg Materials Sustainability Index (Higg MSI) is a tool which attempts to help the apparel, footwear, and textile industry to assess the environmental impact of materials used in global manufacturing.

Michele Wallace, Cotton Incorporated director, product integrity told us: “In the case of the Higg MSI, creating single scores from the life cycle data of different technologies, times, geographies,

Our main feature suggested that conventional cotton production in countries such as the US has improved its sustainability performance in recent years. The most recent example of how the sustainability agenda is increasingly being pushed for conventional US cotton growers could be found at the Cotton Sourcing USA Summit which took place in the US on Scottsdale, Arizona in late 2018. At the event, Cotton Council International president Ted Schneider updated the more than 400 attendees on how the US cotton industry intends to meet its 2025 sustainability goals.

The US cotton national sustainability goals aim for the following by 2025:

- 13 per cent increase in productivity - reduced land use per pound of fibre
- 18 per cent increase in irrigation efficiency
- 39 per cent reduction in greenhouse gas emissions
- 15 per cent reduction in energy expenditures
- 50 per cent reduction in soil loss
- 30 per cent increase in soil carbon

In terms of historical figures which offer an indication of long-term trends about US cotton and sustainability, Cotton Inc pointed us to the 2015 Field to Market National Indicators report. The report shows that, over the study period (1980–2015), U.S. cotton production increased by 35 per cent, with yield increases of 42 per cent.

Results show that irrigation water use has improved consistently over the study period, illustrating improvements driven by irrigation technology. Volume of water applied per incremental pound of lint produced as a result of irrigation was reduced from over 0.09 acre-inches to 0.02 acre-inches between 1980 and 2015 (see table).

Also over the study period, the greenhouse gas emissions indicator improved (decreased) from approximately 2.1 pounds CO₂e per pound lint in 1980 to 1.3 pounds CO₂e per pound lint in 2015. Improvements in greenhouse gas efficiency per pound are driven in part by improvements in irrigation water efficiency, resulting in decreased pumping energy and associated emissions.

However, the land use and soil conservation indicators show slightly higher values for the 2011–2015 than for the 2001–2005 time period.

“These non-comparative LCAs are not designed to compare to other standalone LCAs, as differing assumptions and datasets make comparing separate studies scientifically invalid

etc. blurs the complexity of the data, itself. The challenge of using single scores to make comparisons is that it oversimplifies and masks the existing trade-offs when evaluating a product’s environmental sustainability.

“The current version of the Higg MSI contains no information about how much error exists in each component of the score or the overall range that a single score covers. Using LCIA data to create single scores introduces subjectivity, and possibly biases, into a scientific assessment of impacts – something not allowed in the ISO standard.”

