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Cotton .....

## Sustainable cotton: myths versus reality

In our May 2019 magazine, we looked at the issue of cotton cultivation and asked whether there was enough information to justify industry shifts towards identity cottons such as BCI and organic. In a follow-up paper, VERONICA BATES KASSATLY revisits this issue, arguing that the paucity of credible data means claims about fibres are invalid, while also asking why industry stakeholders have yet to offer any answers to the serious anomalies and data inconsistencies her research has uncovered

**B**ig brands would have us believe we can carry on shopping as before, and that they can carry on producing as before, provided we all shift to organic cotton, BCI cotton, polyester and so on – all of which, we are told, are less harmful to the

environment than wool, silk, or conventional cotton. But is saving the environment really that simple? I have worked on evaluating comparative assertions of fibre sustainability, on a pro bono basis, for over 18 months. My research has raised far more questions than it has answered but, as this article

elucidates, a few things are clear:

- At the present time there is no data to substantiate claims that at a global level, one type of cotton is more sustainable than another. They are all equally unsustainable, and the only solution is for us all to buy less, buy better, and wear it more.
- Clothes are consumer durables, not paper napkins, so cradle to gate - as used in current sustainability measures - is seriously misleading.
- All the sustainability studies currently employed have directly or indirectly been funded for, and by, the brands who have a vested interest in the outcome.
- The main fibre scoring systems base their values for organic cotton on one industry funded LCA, despite the fact that the study itself says it can't be used to make comparative

assertions, or to attribute differences to the respective production systems. The LCA concerned also has notable errors and omissions.

- Much of the data employed in reports proffered to substantiate claims has not been independently collected, so, as I will illustrate, it probably isn't accurate.

- Manure is a by-product of the livestock industry, just like hides for leather. Arguably, organic cotton's most important input is manure. Therefore, omitting the impact of same, means current estimates of organic cotton emissions are seriously understated.

- Since, amongst other things, it is impossible for 400 more tons of rain to fall on organic cotton fields, than fell on neighbouring BCI or conventional fields over the same period, the fact that an LCA has been subject to a Critical Review, doesn't mean anything.

- Organic farmers in India are using Monocrotophos and other chemicals that are prohibited in organic farming. This has serious implications for the organic system.

**FIBRE SCORING**

Let's start, then, with the issue of fibre scoring – and, specifically, the question of how much credence we should give to fibre scoring tools.

Two of the most widely cited systems of measurement for environmental impact are the Sustainable Apparel Coalition's (SAC) Higg Index and Kering's Environmental Profit and Loss (EP&L).

The SAC is funded by its members who include Aditya Birla, ASOS, C&A, Invista, Dupont, H&M, and Kering, and its material scoring tool – the Higg Index - is used to make assertions of comparative sustainability by the likes of H&M, Global Fashion Agenda's Pulse of the Fashion Industry report, and others.

Kering's EP&L appears to incorporate some data from Higg, is financed by Kering, and is used to make assertions of comparative sustainability by both Kering itself, its various brands, and Stella McCartney Inc (whilst now part of LVMH,

they assured me in April 2019, that all their comparative assertions on cotton derived from the Kering EP&L).

So how do Kering and the Higg evaluate the comparative sustainability of cotton? Well, when it comes to concluding that organic is best - and by a huge margin - both use the 2014 Textile Exchange (TE) LCA: 'Life Cycle Assessment (LCA) of Organic Cotton – A global average' (citation 1).

I know this because Kering stated as much on page 36 of its 'Kering Environmental Profit & Loss (EP&L) Methodology & 2013 Group Results. Here it said: "To help us better understand the impacts of different agricultural practices in different countries for cotton production, Kering, in collaboration with others, supported the development of a Life Cycle Assessment conducted by PE International and the Textile Exchange. The results from this study contributed to our EP&L assessment."

Kering's 2012–2016 Sustainability Targets Final Report says: "Our most significant progress since 2012 has been a shift towards an increased use of organic cotton in our collections. In 2014, Kering, alongside other key industry partners, funded an expert study to evaluate the environmental impacts of organic cotton production. The results clearly showed the dramatic environmental benefits of organic cotton production, with a reduction of nearly 80 per cent on the total environmental impact as compared with conventional cotton cultivation. This 'Life Cycle Analysis' was then integrated into our EP&L." No other sources for organic cotton impact are given in any Kering report. I have asked them if they have other studies, but nothing has come.

As for the Higg Index, this rates the impact per kilo of conventionally produced cotton fibre at 60.6 units and of 'cotton fibre organic' at 11.2 units - so again, an 80 per cent reduction in environmental impact. Rather surprisingly, the source LCA is not named at all. But the 'Description' for cotton fibre organic

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It is strongly recommended to consider the full LCA Report (see LCA methodology report/ data handling (sic) report) when using this dataset  
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is a copy and paste of sections from pages 10, 55, and 57, of the 2014 TE LCA.

So that must be the Higg Index source too. The failure to actually name the LCA is particularly bizarre as, Higg users are instructed: "It is strongly recommended to consider the full LCA Report (see LCA methodology report/ data handling (sic) report) when using this dataset."

You can't consider an unnamed, unreferenced, LCA, so we have to ask: how are all who use the Higg organic cotton value - from Boston Consulting Group to H&M - going about this, when the specific instructions for its use are impossible to follow?

I have asked the SAC whether their 11.2 impact for organic cotton is based on any other studies and, if so, to forward them.

Nothing has come.

Here, it is pertinent to point out that TE, is also financed by Aditya, ASOS, C&A, Dupont, H&M, Kering, just like the SAC. My point being this: all of these brands are telling us their cotton is more sustainable based on analysis that they have indirectly funded.

The fact that a study has been funded by an interest group - be it Monsanto or Kering - or that one or more of the researchers has had a financial relationship with same, is certainly something readers need to know about.

However, this does not automatically mean that the research is worthless. Research should be evaluated based on its inherent merit alone, not discarded out of hand because you don't like the writers' friends and relations.

**FLAWS**

So, are there serious flaws in the studies being submitted for more sustainable fibres?

Yes there are.

Which brings us to the first fundamental problem with today's comparative sustainability claims: they are all cradle to gate. This means

they measure the impact of a fabric from its creation as seed/fossil fuel by-product etc, until it leaves the factory gate. No further.

But nobody buys a shirt, coat, and pants and throws them away having worn them once. The more times you wear a garment, the lower its environmental impact per wear.

If garments made of some fibres are worn more, cleaned less frequently, with less harmful impact (from chemicals to microfibre shedding), can be recycled, and bio-degrade more readily at the end of their useful life, then cradle to gate would be a misleading measure. If so, our focus on this measure and this alone is almost certainly leading to a global misallocation of resources, exacerbating rather than reducing both climate change and global poverty.

Bearing in mind then that current measures of comparative sustainability only cover half the story, do they at least cover that half accurately?

Let's take a closer look at cotton and then you can be the judge

As I wrote in May's magazine, Textile Exchange's 2014 LCA states quite clearly that it cannot be used to make comparative assertions under ISO standards (page 14). It also states that the very different blue water (irrigation) values for conventional and organic cotton reflect the fact that the areas studied for conventional cotton were irrigated, while those considered for organic cotton were rainfed. So, as the report states, the difference cannot be attributed to the different methods of cultivation (page 54).

Yet the Higg, Textile Exchange, Kering, and the Soil Association (SA), all claim that based solely on this LCA, organic cotton consumes 80-90 per cent less water than conventional cotton.

Think about that: here's a system of cotton cultivation which supposedly uses up to 90 per cent less water than conventional methods. Irrigation takes time and costs money; if that really was the case, wouldn't all

farmers employ organic production methods, especially in water-stressed parts of the world? Or are we saying that almost all cotton farmers are stupid?

I have asked the parties involved, how they justify their claims, when the study they all refer to does not substantiate them.

Most have not replied, and none have given an answer that addresses my very simple question:

How can it be asserted that TE's 2014 organic cotton LCA substantiates these claims about blue water consumption, when the report itself clearly states it does no such thing?

So, the TE LCA is being incorrectly employed, but what about the actual report? Are the data sources unimpeachable - because any and every study is worth no more than its raw data?

No they are not.

**THE DATA WAS NOT INDEPENDENTLY COLLECTED**

This is not to impugn TE, Kering, or any of the others, in any way, but simply to point out a given: data that is not independently collected is subject to reporting bias.

There is plenty of literature on this. Here, I will simply offer an example of how far reporting bias can distort findings.

Agriculture is like gardening: soil, climate, the year's weather: all matter, and all will impact how much of everything you have to use - from irrigation to pesticides - as well as how big a yield you obtain. So, if you want to make comparative environmental claims, you must study the production systems in the same place, at the same time.

I have only found one cotton LCA that attempts to do this: the C&A Foundation's (C&AF), 2018 study Life Cycle Assessment of Cotton Cultivation Systems in Madhya Pradesh, India, LCA (Citation 2)

C&AF simultaneously commissioned a social and economic study: Social and Economic Impact Assessment of Cotton Farming in Madhya Pradesh (Citation 3).

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This is, of course, required to make comparative sustainability assertions; a production system may have a lower environmental impact, but if it also makes farmers worse off - and in the case of cotton, most farmers are desperately poor small-holders - it is not sustainable.

The C&AF LCA was undertaken by Thinkstep - formerly PE - the same group that produced the 2014, TE LCA.

The SEIA was produced by AIR USA.

The interesting thing to note in this context is how the data was collected.

The AIR SEIA data was collected by an independent third party. This organization was called Outline India, a data collection firm based in Gurgaon, which was neither part of the three cotton production systems being comparatively evaluated - BCI, organic and conventional - nor of the group completing the study - AIR.

The LCA, on the other hand, describes two entirely different methods of data collection on two different pages (10 and 16). How this passed the critical review is baffling, and there is more about problems with critical reviews in the box-out on page 22.

For now though, it appears that the LCA data was submitted by "farmer representatives". Thus the BCI implementing partners submitted the BCI data, the organic partners, the organic parameters and so on.

Incidentally, the AIR study collected its data from over 3,600 farmers in the Khargone area (1,200 of each type), whilst the LCA data was collected from only 300 farmers (100 of each type). From a statistical point of view then, the SEIA is considerably more reliable, based not only on its method of data collection, but also on its sample size.

Unfortunately for those who promote BCI cotton as more sustainable cotton, the C&AF LCA does not substantiate this claim. It asserts that on average, one tonne of BCI seed cotton consumed 7 per cent more blue water than one tonne of conventional seed cotton; it made a 1 per cent greater contribution to

climate change; and a 30 per cent greater contribution to eco-toxicity. The one favourable statistic for BCI in the C&AF LCA is that the 100 BCI farmers made a significantly lower contribution to human toxicity than their conventional neighbours. Unfortunately, this is not borne out by the reporting of the 1,200-odd exclusive BCI cotton farmers studied in the SEIA. Almost all had used chemical pesticides, as had virtually all of their conventional colleagues.

**MONOCROTOPHOS**

Monocrotophos is an insecticide that is acutely toxic to birds and humans, and so it is banned in the US, the EU and many other countries. It is still available and heavily utilized in India, indeed roughly 75 per cent of both the BCI and the conventional

farmers used it during the crop cycle concerned. For the somewhat less toxic pesticides: Imidacloprid and Acephate on the other hand, 21 per cent more BCI farmers used the former, and 13 per cent more the latter, when compared with their conventional neighbours (page 89)

How does this data square with that of the LCA which reports that, per hectare: conventional farmers applied 9 times as much Monocrotophos, 7 times as much Acephate, and 11 per cent more Imidacloprid than their BCI fellows? Well it doesn't, and one possible explanation for the disparity is that the LCA uses data reported by BCI, and the SEIA does not.

Reinforcing this contention is the fact that consistency between the two studies is no better for organic cotton

than it is for BCI. The C&AF MP LCA found that the organic farmers studied used no chemical fertilisers or pesticides whatsoever. The sister SEIA on the other hand found that:

“Of the exclusive organic cotton farmers, 35 per cent self-reported to have used a chemical fertilizer and 33 per cent reported to have used a chemical pesticide in the last year.”

Indeed, of the exclusive organic cotton farmers, 32 per cent used Urea and 29 per cent used DAP as fertilisers; for chemical pesticides, 25 per cent used Monocrotophos, while 20 per cent of the organic cotton farmers used Acephate (pages 50-52).

Once again, the most obvious explanation for this huge disparity is that the LCA used data provided by the implementing agency; the SEIA

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In Northwest China ... the China Statistical Yearbook reports that about 60 per cent of the total farmland is irrigated. However, considering that relatively high yields are reported for Northwest China and there is less than 200 mm of rainfall each year, it is reasonable to assume that the irrigated cotton area approaches 100 per cent

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used an independent data agency to collect information directly, through one on one interviews with farmers. Of course, none of these pesticides - or fertilisers - are supposed to be employed in organic production at all. So the inconsistency between C&AF's and BCI's data, and that collected from the farmers themselves by AIR, raises another very serious question for the validity and viability of identity cottons in general. If organic farmers

are applying prohibited fertilisers and pesticides, whilst BCI farmers are applying more than accepted under the standard, is this because they are too poor and desperate to take crop risk? Or because they are illiterate/ semi-literate and so have not actually understood? And either way, when dealing with desperately poor farmers, of limited literacy and education, is actual adherence to prescribed standards sufficiently high for these systems to be deemed effective?

To return, then, to what we were discussing earlier, the 2014 TE LCA data appears to use data provided by TE itself, and we have just established how unreliable data that has not been independently collected can be. The obvious question then, of course, is: is there any evidence of inconsistencies between the TE data and that to be found in other published sources?

Yes.

**HUTUBI XINJIANG STUDY AREA**

I only took a closer look at the TE numbers attributed to Chinese cotton, but there are several things worthy of note here. The TE LCA states quite clearly that these figures are for Hutubi Xinjiang alone. But research from *World Agriculture Journal* in 2019 (Citation 4) shows that Xinjiang is a pure irrigation area – essentially, no irrigation, no production.

Now, the TE 2014 LCA, claims that organic cotton irrigation for Hutubi averages 150 tonnes/ha, for a seed cotton yield of 6,000kg/ha, or a lint yield of 2,143 kg/ha (pages 69-73).

On the other hand, while the Chinese experts in the *World Agriculture Journal* research only look at conventional cotton, they found that the norm for Xinjiang is

5,000-6,000 tonnes of irrigation per hectare, with an average lint yield of 2,300-2,900 kg/ha.

Indeed, another Chinese study in 2018 (Citation 5), shows 15mm or 150 tonnes/ha is normally a single water application.

**IT IS NOT THE ANNUAL TOTAL.**

We also note the 2018 report states annual rainfall during the growing season averaged 121mm. The TE study claims that rainfall for the growing season - April to September - averaged 253mm, and that annual rainfall averaged 373 mm (page 70).

The TE report frequently refers to a 2012 Cotton Inc LCA of conventional cotton production as a benchmark: 'Life Cycle Assessment of Cotton Fiber & Fabric' (Citation 6).

I quote from that study: "In Northwest China ... the China Statistical Yearbook reports that about 60 per cent of the total farmland is irrigated. However, considering that relatively high yields are reported for Northwest China and there is less than 200 mm of rainfall each year, it is reasonable to assume that the irrigated cotton area approaches 100 per cent" (page 27)."

PE/Thinkstep wrote that report in 2012.

Two years later they wrote the 2014 TE LCA, which refers repeatedly to the 2012 Cotton Inc report. But somehow, in the 2014 TE LCA we are told that:

Organic cotton received just three per cent of the irrigation conventional cotton had required two years earlier (150 tonnes/ha for organic, compared to 5,000 tonnes/ha for conventional)

Xinjiang average annual rainfall was over 90 per cent higher than it had been two years earlier (373mm for organic, instead of less than 200mm



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Of the exclusive organic cotton farmers, 35 per cent self-reported to have used a chemical fertilizer and 33 per cent reported to have used a chemical pesticide in the last year

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for conventional).

In this context it is also worth noting the more recent C&AF LCA of Madhya Pradesh farmers in India (Citation 1) found that when you standardise for rainfall (more on that in the box-out) all three production systems - BCI, organic, and conventional - required 600 plus tonnes of irrigation water per hectare, not 131 m<sup>3</sup>/ha as stated in the TE LCA.

Unfortunately, irrigation is not the only problem.

As already discussed, the C&AF LCA also stated that organic farmers used no synthetic inputs whatsoever; meanwhile, data collected from the accompanying SEIA showed something entirely different.

Well, the same thing occurs in the TE LCA. The latter found that globally, organic farmers use no synthetic inputs - at least no impact for same is evaluated. But some synthetic inputs are permitted by most organic certification standards, so their complete absence from the study seems curious, and in the case of Xinjiang cotton, remarkable.

Xinjiang winters are bitterly cold and summers, extremely hot and arid. The growing season is short, and all cotton farming employs a drip and film system to improve ground temperature and reduce surface runoff and evaporation. Petroleum based films are the norm and, of course, plastic mulch and covers (petroleum-based other than polyvinyl chloride (PVC)) are permitted in organic cultivation.

According to a 2014 study (citation 7), the thin (4-8 µm) polyethylene film used in China is slow to degrade, easily damaged, difficult to reuse for a second season, and difficult to remove. Research results showed that plant growth was affected when residual plastic exceeded 37.5 kg/ha in the soil; in the cotton fields of Xinjiang, the average residue was 259 kg/ha, and the maximum, 381 kg/ha.

**ENVIRONMENTAL IMPACTS**

Clearly, polyethylene film has serious environmental impacts,

both upstream, in its production, and downstream, in pollution and soil degradation. PE/Thinkstep was certainly aware of its use. The 2012 Cotton Inc conventional LCA says: "In the Northwest the growing season is short, there is only one crop per year. The plastic mulch protects the seedlings from the broad swings in temperatures during the day and minimises the loss of soil moisture." (page 40)

So where is the impact of plastic mulch discussed and evaluated for Xinjiang cotton in the 2014 TE LCA?

The answer, of course, is it isn't. And that is not the only impact evaluation that is missing

We have all heard about the serious environmental impact of leather, and of the need to eat less meat - all because of cows and their methane, their feed-stuffs, and their water.

Well manure is also produced by cows, so if it applies to the upstream impact of beef and hide, it likely also applies to manure.

By extension then, it also applies to organic cotton, for which manure is both the main fertiliser and the most important input (other than water). Yet in both the TE and C&AF LCAs, the upstream impact of manure is simply not included; it enters burden free.

The two justifications offered for this omission are:

The upstream impact of manure was not considered in the Cotton Inc LCA of conventional production.

The manure is a waste of another system and therefore without environmental burden.

We would not accept a conventional LCA arguing that the impact of chemical pesticides and fertilisers need not be evaluated, as they are not included in organic LCAs; and we do consider the upstream impact of cow hides in leather production, despite the fact that hides too, are "wastes of another system".

Surely, then, these justifications are invalid and the exclusion of manure's upstream impact from both the 2014 TE, and the 2018

C&AF, MP LCAs, means the environmental impact of organic cotton, in terms of both emissions and blue water consumption, is considerably understated.

There is another consideration when it comes to manure that is also ignored by the organic LCAs: toxicity. The World Health Organisation states that Diarrhoeal disease is the second leading cause of death in children under five years old and a major cause of child malnutrition. Given the risks of seepage, run-off, and generally poor hygiene associated with the use of manure in organic cotton production, combined with the lack of access to treated water in many emerging nations, the toxicity associated with manure is surely a concern

Yet while the toxicity of chemical pesticides is carefully evaluated, not only is the toxicity of manure not considered in organic LCAs, but the possibility that there could be an impact has never been raised.

**BACK TO BASICS**

Most of the world's cotton farmers are not plantation owners, they are small-holders farming less than two hectares. Many have little or no education and are desperately poor. Even small changes in revenue can leave these farmers unable to fund schooling/health care for their children, or incapable of servicing their debt. Before engaging market forces to push such farmers into organic production - by persuading consumers and brands that organic is the only sustainable cotton to buy - we need to be certain that this is unequivocally best for the farmers

themselves.

But where are the studies that prove this? There is a lot of anecdotal evidence of individuals doing better since they switched to organic, of children laughing and going to school. But these candidates are not randomly selected, 'data' is not independently collected, causality is not demonstrated, there is a high probability of confounding ... generally, we are not even given a specific date or location, let alone any concrete values.

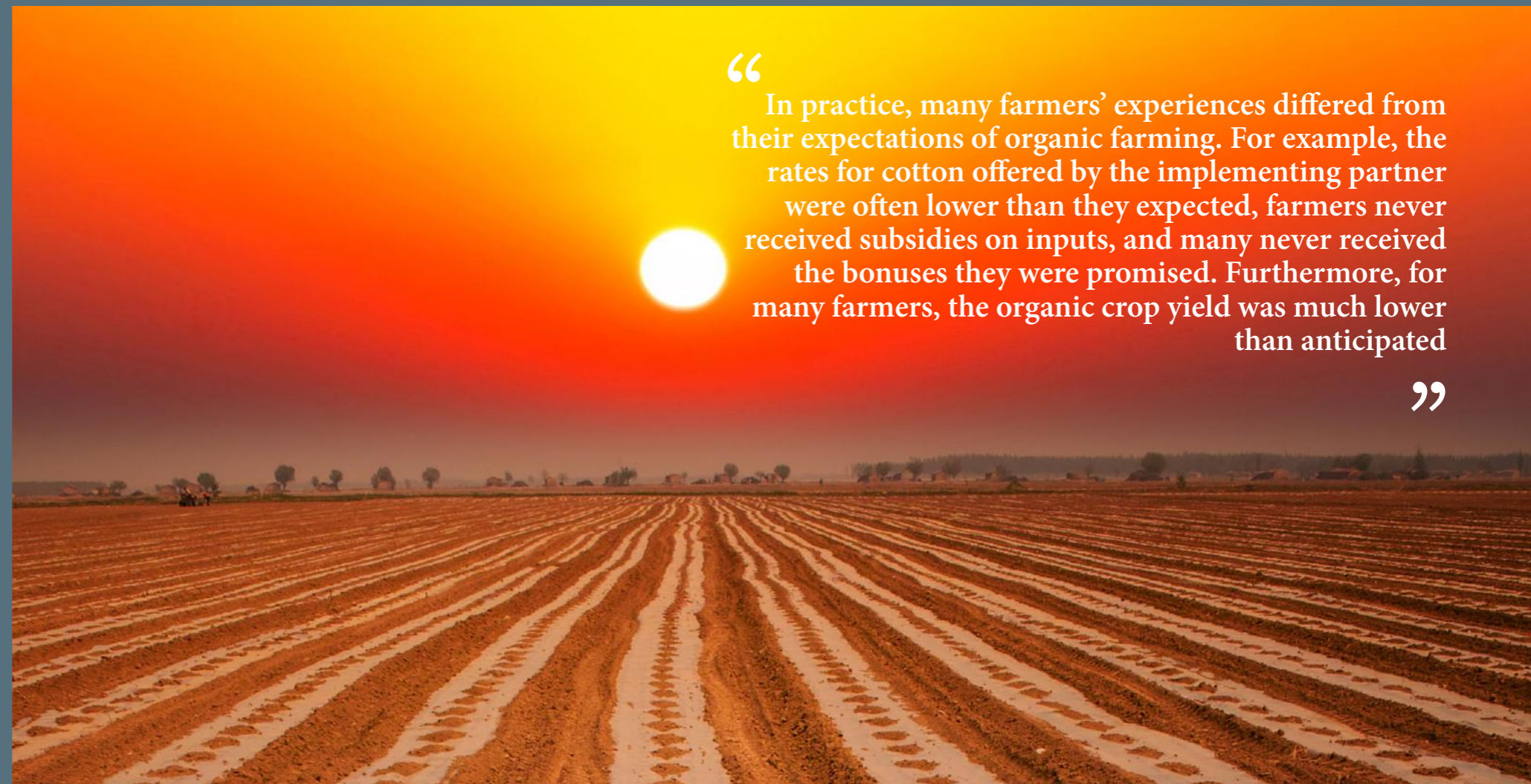
Consequently, none of this is evidence.

I have found only one independently collected and evaluated Social and Economic Impact Analysis that attempts to compare organic and conventional farmers: the 2018 C&AF SEIA already referred to.

This SEIA analysis found that on average:

- Exclusive organic cotton farmers owed 1.6 times the amount owed by the average conventional cotton farmer. Moreover, 88 per cent of that was borrowed to purchase agricultural inputs. Only 79 per cent of the conventional cotton farmers loans were for this purpose.
- Exclusive organic cotton farmers had material costs that were 20 per cent higher than material costs per acre for conventional farmers.
- Organic cotton farmers had expected a higher income (page 48). But this expectation was not realised: 17 per cent of the farmers stated that they had dis-adopted organic cotton farming because of disappointing results in terms of profits and yields.

“ In the Northwest the growing season is short, there is only one crop per year. The plastic mulch protects the seedlings from the broad swings in temperatures during the day and minimises the loss of soil moisture ”



“ In practice, many farmers' experiences differed from their expectations of organic farming. For example, the rates for cotton offered by the implementing partner were often lower than they expected, farmers never received subsidies on inputs, and many never received the bonuses they were promised. Furthermore, for many farmers, the organic crop yield was much lower than anticipated ”

Says the report: "In practice, many farmers' experiences differed from their expectations of organic farming. For example, the rates for cotton offered by the implementing partner were often lower than they expected, farmers never received subsidies on inputs, and many never received the bonuses they were promised. Furthermore, for many farmers, the organic crop yield was much lower than anticipated." (page 5)

As a result, of the 1,200 conventional farmers randomly selected for the study, every single one was still producing conventional cotton when interviewed. Of the 1,200 organic farmers on the other hand, 303 had ceased to cultivate it; 96 could not be found.

The SEIA concludes: "A potential area for future research would be to identify the reasons that farmers adopt, but then quit organic cotton farming."

Indeed!

Of course, all these issues may be India-specific, but we note recent figures from the USDA show that organic cotton production in Turkey has fallen to 10,000 tonnes pa from 30,000 tonnes pa in 2006. Why would that have happened if organic farmers were all earning so much more money and reaping so many additional benefits?

And, if we look at TE's own 2018 Organic Cotton Market Report, we see that by hectares, Australia is the world's largest organic producer by a considerable margin. Australia also claims to be the world's most sustainable conventional cotton producing nation, in terms of water, fertiliser, and pesticide use, per kilo of fibre. Yet, if the same TE Market Report is correct, Australia grows no organic cotton at all. Why, and why does the Market Report not address this glaring inconsistency?

The Cotton Australia website states organic production was attempted but proved "not economically sustainable." If all of this data is correct, and existing organic farmers are leaving the sector for economic reasons - as fast as the initiatives

recruit new ones - then global organic cotton production is, at the most fundamental level, completely unsustainable.

**COSTS VERSUS BENEFITS**

There is one topic missing from all current comparative evaluations: these initiatives cost millions of pounds a year to operate. Even if we do eventually find that they have an impact at a global level, are they cost effective? Or are there simpler, cheaper ways to obtain the same or better results?

By all reports, the boycott of Uzbek cotton instituted by global brands, in the face of forced and child labour, has been very effective. If, as has been claimed, the Indian Government refuses to heed local requests to permanently ban Monocrotophos, then surely a boycott of Indian cotton by global brands would be a much more cost efficient solution than attempting to persuade individual farmers to abandon the pesticide through BCI or organic initiatives?

**CONCLUSION**

Since the values they are claiming are not substantiated by their sole identifiable source (TE's 2014 report) I have asked Higg/SAC, as well as Kering, and Stella McCartney inc, and the Soil Association, where they are getting their numbers from. Despite the fact that ISO regulations clearly state that anyone making comparative sustainability assertions must be able to prove them, and must make that proof available to absolutely anyone who asks, no studies have arrived.

Failing any convincing response, I repeat what I said at the start of this article: at the present time there is no data to substantiate claims that at a global level, one type of cotton is more sustainable than another, and current assertions of comparative sustainability are completely misleading.

So, in an industry awash with money, shouldn't the next big 'initiative' be to fund a leading university to undertake independent

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There is one topic missing from all current comparative evaluations: these initiatives cost millions of pounds a year to operate  
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research - much as Inditex has agreed to fund US\$4m of research at MIT. Albeit, in the interests of both sustainability and Millennium Development, I would argue funding J-PAL (and this year's Nobel prize winners for economics Esther Duflo and spouse) would be a better place to start.

Finally, for those who might want to suggest the situation is too desperate for us to wait for data, here's a very simple solution we could all implement tomorrow: buy less, buy better, and wear it more.

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*Citation 1*  
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*Citation 2*  
<https://www.candafoundation.org/en/our-work/results-and-learning/lca-report.pdf>

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<https://www.candafoundation.org/en/resources/4333socioeconomicstudyweb.pdf>

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*Citation 6*  
<http://resource.cottoninc.com/LCA/LCA-Full-Report.pdf>

*Citation 7*  
[https://www.researchgate.net/publication/296353247\\_Plastic-film\\_mulch\\_in\\_Chinese\\_agriculture\\_Importance\\_and\\_problems](https://www.researchgate.net/publication/296353247_Plastic-film_mulch_in_Chinese_agriculture_Importance_and_problems)

*Additional named sources are available in the online version of this article.*

## CAN YOU COUNT ON A CRITICAL REVIEW?

**In an attempt to combat the dangers of misleading analysis, the ISO has settled on the construct of a 'Critical Review'. The idea here is that any LCA completed to ISO standards needs to hire several 'experts' in the relevant field to testify that the study has been completed to accepted standards.**

**The problem, of course, is that: a) 'Expert' is a very loose definition; and b) Even if the selected reviewers are indeed expert, this is a business transaction. If the budget allocated for the review is insufficient to cover detailed analysis by the reviewers, there will be no detailed analysis.**

**So how do these issues and concerns manifest themselves in the case of both studies carried out by Thinkstep/PE International: the 2014 TE LCA, and the 2018 C&AF MP LCA ?**

**SEVERAL POINTS OF NOTE:**

1. The 2014 TE LCA, Critical Review team did not notice that the rainfall, irrigation and environmental impact data for Xinjiang was not compatible with the analysis in the 2012 Cotton Inc LCA. The former refers repeatedly to the latter, so the Critical Review team must have read both - or what were they reviewing?
2. The C&AF MP LCA states that two completely different methods of data collection were employed and the review team appears not to have noticed.
3. The impact of manure was simply ignored in the C&AF MP LCA. The TE LCA at least had a partial evaluation of the potential increase in impacts for organic cotton if manure were included, and the Critical Review made a point of drawing attention to its omission; a point apparently forgotten by all who have employed that LCA to make comparative assertions, since. The crucial role that manure plays in Madhya Pradesh organic production is even clearer in the C&AF MP LCA. Only irrigation water has a larger input by mass. Yet manure is allowed to enter the system burden free, despite the fact that, at over 10 tonnes per hectare for cow dung alone, it is certainly does not satisfy the requirement that impacts of any input making a contribution of more than 1 per cent of the cumulative mass of the model be included. ISO requires that any decisions to omit data shall be clearly stated and justified, and the potential impact on the outcome of the study assessed and described. For the omission of manure in the MP LCA, no reasonable justification is provided, and no such impact assessment was made. Yet the Critical Review does not even mention this omission, the possibility of resultant emission understatement, or the violation of assumptions about mass and value that occur, by allowing manure to enter burden free. Why not?
4. When C&AF first published the MP LCA, in December 2018, it showed two completely different values for organic cotton irrigation: 615 m3/ha on pages 48 and 79, and (implicitly) 244 m3/ha on page 7. You can no longer see this because when I contacted C&AF in February 2019 and pointed out the inconsistency between pages 7 and 48, they

redacted page 48 of the report to read 244 m3/ha. When I contacted them again in June 2019, and pointed out that the input table on page 79 still showed the same "typo" of 615 m3/ha of irrigation for organic cotton, C&AF redacted that page too. For one LCA to list two completely different figures for the same thing - organic cotton irrigation in this case - is neither consistent, transparent, nor scientifically and technically valid. A clear violation of ISO standards occurred - why was this not mentioned in the critical review?

5. Under Assumptions, the C&AF MP LCA states: "Regional average data were considered for the parameters such as rainfall, soil erosion rate and evapotranspiration rate specific to Madhya Pradesh, India" (page 74). But no precipitation data is provided anywhere in the report. Instead, we found on pages 28, 33, 39, 44, 50, that rainwater consumption was actually estimated at 79 percent of the blue water total - this assertion was made even in the table for organic cotton on page 50, where that percentage was patently incompatible with the numbers shown. This too has, of course, been redacted by C&AF since I pointed it out, but if you wish to see the original December 2018 report, please email and I will forward the pdf. How did the Critical Review team not notice this discrepancy?

6. When I queried all these numbers with C&AF/Thinkstep, I was sent a chart revealing the actual methodology employed to calculate rainfall for each of the production systems. The statement on page 74 of the LCA notwithstanding, this chart shows that no rainfall data entered the calculations. Instead it states: "The crop water requirement (CWR) for cotton cultivated in Khargone region, Madhya Pradesh, India is 330 mm/year for all the three cultivation systems." ( which is equivalent to 3,300 tonnes/ha). But the whole purpose of an LCA is to calculate what each crop requires. So they are not using standard LCA methodology. Who estimated this "water requirement", where, when and why? And if the blue water calculations are based on this single statistic, why is this not mentioned in the LCA itself, as ISO transparency standards require? And that is not the only concern. The report states: "The precipitation was assumed to follow the natural hydrologic cycle regardless of the land use type " (page 74). But this is categorically not the case in the Thinkstep table. They simply deduct the irrigation water applied, from the crop water requirement, and the remainder is deemed to be rainfall.

Since the revised figure for organic irrigation of 244 m3/ha is almost 400 tonnes less than the original 615 m3/ha (and than the 633 m3/ha reported for conventional cotton, and the 688 m3/ha for BCI), the Thinkstep method compensates by simply increasing "estimated rainfall" per hectare for organic cotton by 435 tonnes (they claim 3,060 tonnes of rain fell on organic fields, whilst in the same place and at the same time, only 2,625 tonnes of rain fell on BCI/Conventional fields).

**The question here of course, is how was I able to identify all these errors and inconsistencies in a report that had already been Critically Reviewed? I have, of course, asked, C&AF/Thinkstep and the Review team themselves, this very question.**

**I have received no answer.**

**There are a number of other concerns, including the deliberate exclusion of chemical fertilisers and pesticides used by organic farmers, already mentioned but I think this suffices to illustrate my point - the fact that an LCA has been Critically Reviewed doesn't seem to mean very much.**

# Cotton special: right to reply

Our cover story for this issue made reference to a number of organisations and, in the interests of balance, all were offered the chance to respond. Here we summarise who said what

**W**e try to be transparent at Apparel Insider. With this in mind, we'd like to offer a little insight into how this issue's cover story was developed.

Our writer had been discussing the concerns covered in the article, in emails with the relevant parties, for many months. Some of this contact also related to the previous article she wrote for us in May. As a result, most of the interested parties have had since the summer to address the questions raised.

After this issue's cover story article was completed, we sent a copy of it to all parties mentioned. We told each of them: "If you have any independent data/analysis that

contradicts/clarifies/modifies [the assertions in this article], we are happy to incorporate these."

We also offered each party the chance to send a free-standing response piece, provided it was purely analytical and data based, and stuck to the topics raised in the attached article.

We received a range of responses. The head of sustainability at Stella McCartney made a few comments but also pointed out that most of her email was 'off the record' and suggested that we told her if we wanted to print any of her response so her PR team could approve it. We chose not to pursue that avenue.

The C&A Foundation told us

“**The SAC pointed out a number of minor factual errors. Specifically, that Koch Industries is not a member of SAC, its subsidiary, Invista is. This is correct**

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it would not be answering or commenting on our cover story.

BCI similarly stated they would not be submitting a response. We sent the Soil Association the full article. They did not respond to our email.

Like Stella McCartney, Kering instructed us that their comments were not quotes. They did not explain how they justify claiming that organic cotton has an 80 per cent lower impact than conventional, or indeed, respond to any of the issues actually raised in the article, other than telling us that they plan to analyse usage and end of life impacts, to give as full a picture over their products' entire life cycle as possible (see story page 8).

This is, of course, an important step in the right direction, but Kering does not state how or by whom the data is to be collected and evaluated. There is then, presumably a risk that this study may be subject

to some of the reporting biases afflicting their previous studies, as outlined in our article. Kering also appeared to suggest they thought some of the industry data is not up to scratch. We'd certainly go along with the call for better data – a message we have repeatedly pressed in this publication. But surely the real question is how does Kering propose to adapt its EP&L in the light of the findings outlined in our cover story?

The SAC pointed out a number of minor factual errors. Specifically, that Koch Industries is not a member of SAC, its subsidiary, Invista is. This is correct.

Indeed, Invista is not just a member. It also supplied the Higg evaluation of Elastane as one of the world's most sustainable fibres - setting the impact at 44 (for comparative purposes, that of silk is set at 681).

On this note, the SAC also said: "Without allowing the support and funding from material production companies and brands, the SAC, and the industry, would face substantial obstacles to collecting and providing high-quality life cycle inventory data. The result of that scenario would be a huge loss of expertise and would require governments to step into this space to fill the voids that exist. If that is what is really being requested, then pressure should be put on the parties that are able to provide independent data."

We agree that governments may need to step into this space. Indeed, if we are serious about halting climate change, we need expert and independent analysis of every aspect of our consumption, rather than the muddle of serious scientific analysis and interest group interpretations, that currently prevails. Moreover, the article itself clearly states: "*The fact that a study has been funded by an interest group - be it Monsanto or Kering - or that one or more of the researchers has had a financial relationship with same, is certainly a conflict of interest. However, this does not automatically mean that the research is worthless. Research*

*should be evaluated based on its inherent merit alone.*"

Here, it is not the case that data is effectively being funded by and for the apparel/textile industries that is the real problem; but, as our cover story points out, that the studies have major errors and omissions. On top of which, the data is then being marketed, misinterpreted and presented in such a way that is both misleading to end consumers and anti-competitive. The SAC did send the GaBi data sources for both conventional and organic cotton, which was helpful. Interestingly these show that a) The sole source for its contention that the impact per kilo of 'cotton fibre organic' is 11.2 units, is indeed the 2014, TE LCA. and b) The source for evaluating conventionally produced cotton fibre at 60.6 units, is not the 2012 LCA used by Kering, but an update produced by Thinkstep in 2016. This update added environmentally friendly Australian conventional cotton into the equation and so has significantly lower impact values.

For example, it found that globally, on average, total blue water consumption was around 1,560 m<sup>3</sup> per tonne of cotton fibre, whilst the 2012 study claimed around 2,120 m<sup>3</sup> of water was used to produce 1,000 kg of cotton - so an 26 per cent reduction. Yet both Kering and Higg claim switching to organic cotton generates an 80 per cent reduction in environmental impact.

Textile Exchange told us that it did not agree with our cover story's statement that there is "no data to substantiate claims that at a global level, one type of cotton is more sustainable than another. They are all equally unsustainable."

However, TE provided no new data. It did not explain how it justifies claiming that based solely on the 2014 LCA, organic cotton consumes 80-90 per cent less water than conventional cotton, when that LCA itself states it does no such thing. Nor indeed did it explain how it justifies allowing manure to enter burden free, or address any of the

many issues raised in the article, so we are unclear upon what basis it refutes this assertion.

TE did include links to a number of studies covering biodiversity and such, but while we agree that these aspects are important, they are covered neither in the three LCAs referred to, nor in the article itself, so we will not be discussing this here.

Whilst none of the studies proffered by TE actually cover cotton, for those who would like to see them nonetheless, we provide links to the articles below.



Further Reading:  
[bit.ly/320CN4W](https://bit.ly/320CN4W)  
[bit.ly/2N1JS0z](https://bit.ly/2N1JS0z)  
[bit.ly/2N1JS0z](https://bit.ly/2N1JS0z)  
[bit.ly/320WXvq](https://bit.ly/320WXvq)

“**No data to substantiate claims that at a global level, one type of cotton is more sustainable than another. They are all equally unsustainable**

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