The French Product Environmental Footprint (PEF)

and Environmental Cost for Textiles - a Brief Primer

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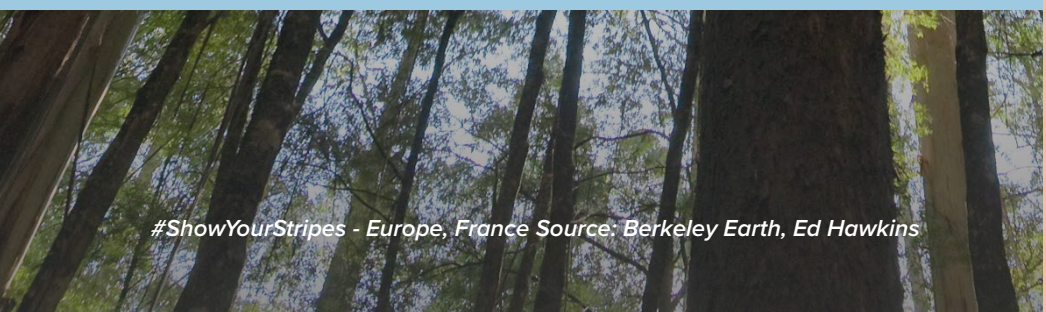

#ShowYourStripes - Europe, France Source: Berkeley Earth, Ed Hawkins

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Background

The French Climate and Resilience Law of August 2021,[1] made environmental labeling mandatory for any company selling clothing or footwear on the French market. It seems the original start date for implementation was January 2023.[2]

This was then revised *"to encompass finalization by the end of 2023, a voluntary labeling phase in 2024, mandatory in 2025."*[3]

This finalisation has not taken place. It appears that the label will be based on an augmented traditional Product Environmental Footprint (PEF) score - an Environmental Cost - which brands will obtain from a central database run by Ecobalyse/ADEME.[4]

But as of March 11, 2024, the Ecobalyse site still states: *"Attention : l'outil est aujourd'hui en phase de construction. Les calculs qui sont proposés ne constituent pas un référentiel validé."*

Or in English: Please note: "The tool is currently under construction. The calculations proposed do not constitute a validated benchmark."[5]

The following paper should, therefore, be considered indicative, not absolute, and since the Ecobalyse site is only available in French, lost in translation remains a possibility. The scores currently shown on that site are, however, sufficiently concerning, for the CRDC to commission this brief analysis focusing on:

a) consistency of the approach with France's global commitments,
and
b) consistency of the data shown with objective, authoritative sources.

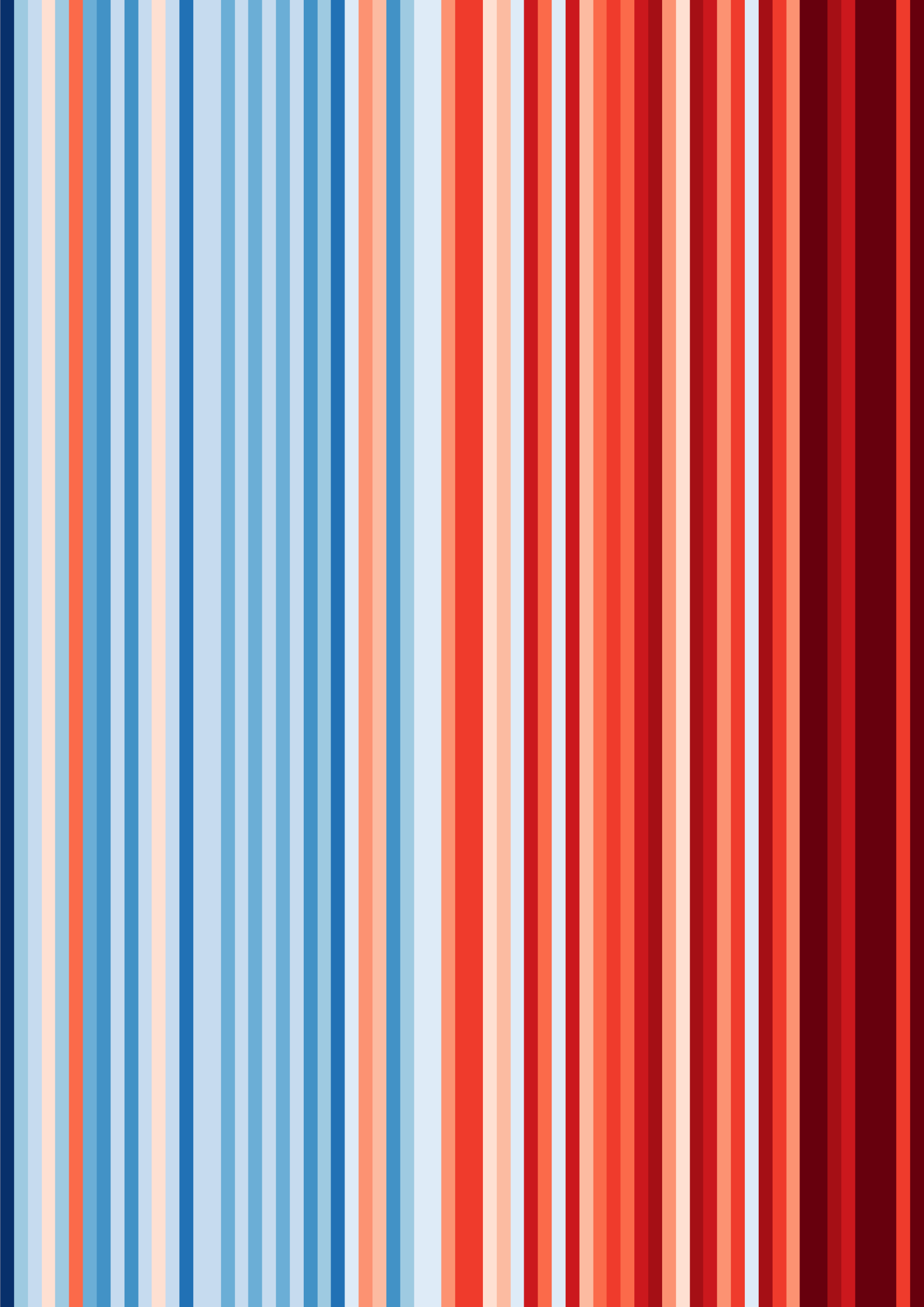
Our analysis does not address all the concerns that we have identified, nor does it fully examine the areas covered, and the actual scores may have changed by the time this paper is published. As the following makes clear, however, we believe the issue is not one of a few points up or down. Our research highlights just a handful of considerations that we believe are already sufficient to place a question mark on the advisability of the French scheme going ahead as planned.

1 *www.legifrance.gouv.fr/loda/article_lc/LEGIARTI000043957692*
2 *trustrace.com/knowledge-hub/the-french-climate-resilience-law-environmental-labelling-for-products*
3 *www.premierevision.com/en/magazine/eco-question-environmental-labeling/*
4 *fabrique-numerique.gitbook.io/ecobalyse/textile/demarche*
5 *ecobalyse.beta.gouv.fr/*

ECOBALYSE SCORES AS OF 13/02/2024 FOR A 170 GRAM T-SHIRT

Fibre Type	Climate Change $kgCO_2e$	Water Use m3	PEF Score µPts	Environmental Cost µPts
Polyester	7.28	0.19	873	1080
Cotton	9.46	1.31	1154	1264
Merino Wool	24.41	0.09	1828	1940
Silk	10.03	9.54	1997	2057
Sheep Wool	26.09	0.09	3183	3176
Cashmere	105	27.52	50316	46236

Default scores: Asia-Pacific, China. These scores still applied as of 11/03/2024



Introduction

The proposed PEF/Environmental Cost calculator shown on the Ecobalyse site[6] is an elegant, comprehensive, and democratic tool that anyone can access without the need to pass through an LCA intermediary or some complicated system of registration.

If PEFs are to be rolled out, we would suggest that this is the model to adopt. We congratulate Ecobalyse and ADEME on both their work and their transparency. As always, however, the devil lies in the details - and that means in the data and the assumptions.

i) It is self-evident that if the environmental score is intended to guide consumer purchases it will effectively guide brand purchases and thus impact global trade. It follows automatically that whatever the PEF/ Environmental Cost score claims to be more sustainable must be consistent with France's global agreements - the SDGs, Kunming Montreal Biodiversity, and of course, the Paris Agreement and subsequent COPs (Conference of the Parties). In a nutshell, to abide by its global commitments, France must guide consumers to purchase those products that have the highest socio-economic benefit and the lowest climate cost. Since clothes are consumer durables, these impacts must be measured, not at the point of sale, but per wear.

ii) The data used must be robust, representative, and comparable.[7]

For textiles, as of 11/03/2024, the tool states: *"À date, le référentiel le plus avancé et exploitable par Ecobalyse est celui développé par l'ADEME. Les évaluations d'impacts environnementaux s'appuient donc sur:*

- *les procédés de la Base Impacts*
- *la documentation sectorielle textile"*

Which roughly translates as "To date, the most advanced benchmark that can be used by Ecobalyse is that developed by ADEME. Environmental impact assessments are therefore based on:

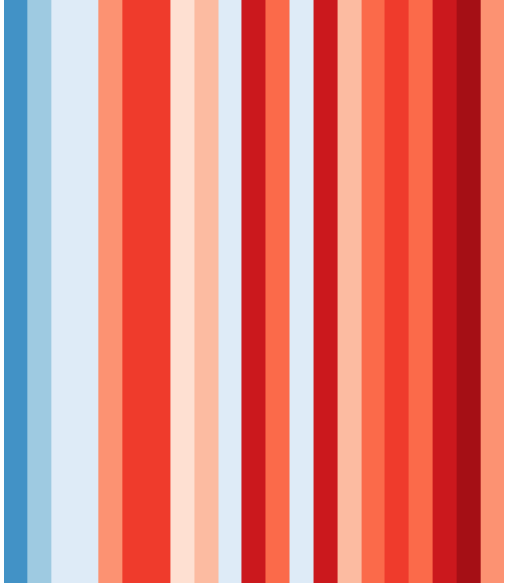
- the processes of Base Impacts
- textile sector documentation."

Kering, The Microfiber Consortium, Cascale (formerly the SAC), the Worldly (formerly Higg) Index, Mistra Future Fashion, Make the Label Count, Quantis, and McKinsey are all mentioned in this context.[8]

6 *https://ecobalyse.beta.gouv.fr/#/textile/simulator*

7 *gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf*

8 *fabrique-numerique.gitbook.io/ecobalyse/textile/demarche*



Impact per Wear

The first obvious problem with the Ecobalyse model is that the only person who knows how many times a garment will be worn is the person who buys it. Simple arithmetic tells us that if there are significant differences in the number of wears, then the item of clothing with the lowest impact at the factory gate may not be the least environmentally harmful - quite the opposite. A shirt that has a production impact of 500 - whether that is in water consumption, GHG emissions, or anything else - that is worn 500 times, has an impact per wear of 1. A shirt with a production impact of 30 that is worn 10 times has an impact per wear of 3.

In terms of global impact, it follows automatically that at 10 wears per shirt, to reach 500 wears, 50 such shirts will have to be produced. This will have a total production impact not of 30, but of 1500. In addition, 50 shirts will enter the waste stream.

In the first case, on the other hand, to reach 500 wears only one shirt is produced - with a total production impact of 500 - and only one shirt enters the waste stream.

This of course explains why, since people are buying significantly more clothing than before in absolute terms, fashion's total emissions and impact continue to surge. Since the ever-increasing volume of clothing purchased and disposed of is precisely the problem that France is trying to address, a production impact tool would appear to be a poor choice of guide.

The Ecobalyse tool does pay lip service to this concept in that it includes a utilization quotient. But this varies only by garment type. As of 11/03/2024, in default mode, utilization was 45 wears and 45 cleaning cycles for a tee shirt, 70 wears and 23 cleaning cycles for a skirt, 100 wears and 5 cleaning cycles for a coat, and so on - all regardless of fabric type. However, there are no studies anywhere that we could find showing that the number of wears varies systematically by garment type. There is one however showing that the most important determinant is fabric type.[9]

The Ecobalyse tool includes sliding scales for intrinsic quality and repairability which reduce/

9 *www.mdpi.com/2071-1050/12/21/9151*

increase the number of wears/washes within set limits. These vary by garment type and are based on ‘tests’ of durability and reparability. Intrinsically, a hole in any tee or sweater can be repaired - whether it will be or not is primarily determined by the cost in relation to the replacement price. As we have detailed in an earlier study,[10] a review of the literature shows that what limited information there is indicates that in reality the primary reason that consumers throw out their clothes is for affective reasons - not because they are worn out or damaged.

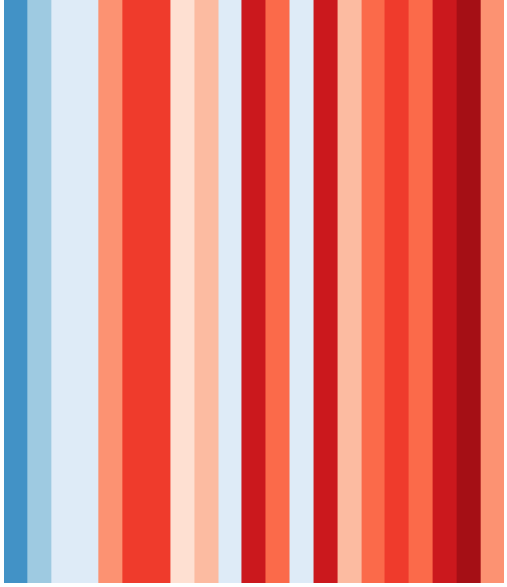
As Ingun Klepp of SIFO has repeatedly pointed out, durability tests favor plastic fibers.[11]

Yet, what little evidence there is suggests silk garments are worn the greatest number of times (to our knowledge, nobody has evaluated cashmere garments) despite silk being far less durable than polyester on standard tests.

This scale then, does little to improve the validity of the Ecobalyse tool, and how all this complexity is to be communicated to consumers is far from clear.

10 www.crdc.com.au/publications/ESPR-critique

11 clothingresearch.oslomet.no/2023/10/25/lasting-durability-and-lifespan-looking-closer-at-the-terms/



No More Poverty
No More Hunger

France is committed to the 2030 Agenda for Sustainable Development, its 17 Goals (SDGs), and its *"vision for transforming our world by eradicating poverty and ensuring its transition to sustainable development."*[12]

The French administration is well aware of the role that fiber production plays in the economies of many emerging nations. Indeed, France joined in sponsoring UN Resolution 78/169 Natural Plant Fibres and Sustainable Development of 19/12/23.[13]

This Resolution specifically: *"Stresses that the sustainable production, consumption and use of natural plant fibres may contribute to broader efforts towards the implementation of the 2030 Agenda for Sustainable Development, as well as of outcome documents of other related major United Nations conferences and summits and multilateral environmental agreements including the Paris Agreement, and the achievement of the Kunming-Montreal Global Biodiversity Framework.*[14]

But where is this to be found in the tool that France wishes to deploy to advise its 68 million concerned consumers which fibers to purchase? The answer is nowhere. The Ecobalyse tool treats cotton cultivated manually by subsistence farmers in Benin and Burkina Faso, identically to cotton cultivated in Australia or the United States.[15]

The tool does offer the option to switch between source nations, but as of 11/03/2024, Brazil, Benin, USA, Australia, and other major cotton-producing and exporting nations do not even show as options. Moreover, at present, switching makes no difference to the purported impact of the raw material - it merely changes the distance to the spinning mill, and so increases/reduces transport impact at that stage.

12 *www.agenda-2030.fr/en/*

13 *www.un.org/en/ga/78/resolutions.shtml*

14 *www.undocs.org/Home/Mobile?FinalSymbol=A%2F78%2F466%2FAdd.2&Language=E&DeviceType=Desktop&LangRequested=False*

15 *www.crdc.com.au/publications/ESPR-critique*

For the SDGs to be obtained, it is self-evident that consumption by the world's poorest must increase, which will in turn lead to increased carbon emissions. Smallholder farmers (less than 2 hectares of land), predominantly in the Global South, support a quarter of the world's population, and are among the world's poorest.[16]

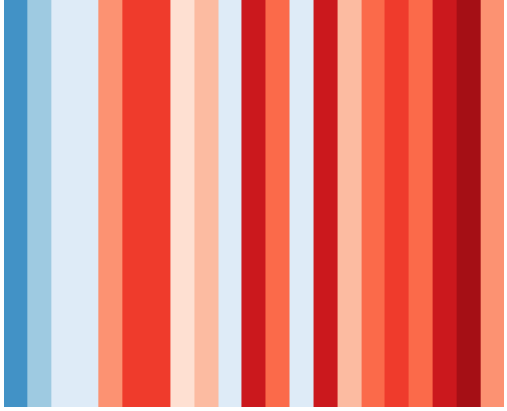
The only way that these people can increase their standard of living is by increasing their incomes by expanding their production. To lift them out of poverty and hunger - as France has committed to do - it must be accepted that these farmers' production emissions will increase, not fall. The Ecobalyse tool, however, treats carbon/methane emissions generated in oil/gas extraction and subsequent PET/Polyester production, and methane emissions generated by goats and alpaca raised by Mongolian and Peruvian herders, as if they were identical. This is unscientific, in the sense that this measurement is intended to enable France to meet its global commitments and stated objectives. A tool that achieves the opposite cannot be considered a robust scientific choice.

It should also be pointed out that the SDGs apply globally, not just in the Global south. There are socio-economic considerations associated with farmed fibers in France itself. Farmers are custodians of the land, *"of terroir....its special characteristics, its soil, its climate and humans' unique, enduring relationship with it."*[17]

As recent protests have amply demonstrated, compared to the rest of France, farmers are also economically disadvantaged.

16 www.crdc.com.au/publications/ESPR-critique

17 www.nytimes.com/2024/01/26/world/europe/france-prime-minister-protests-farmers.html



Fossil Fuels

France is on the record insisting, in the run-up to COP28, that: *"The EU should adopt a much stronger and clearer narrative on the exit from fossil fuel demand."*[18]

We quote the International Energy Agency (IEA): *"Petrochemicals are rapidly becoming the largest driver of global oil demand.*

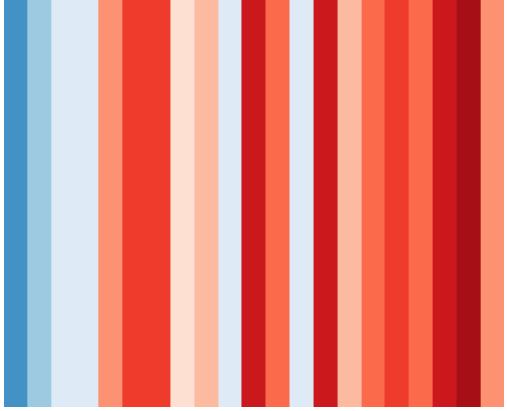
The growth in demand for petrochemical products means that petrochemicals are set to account for over a third of the growth in oil demand to 2030, and nearly half to 2050, ahead of trucks, aviation and shipping. Petrochemicals are also poised to consume an additional 56 billion cubic metres of natural gas by 2030, equivalent to about half of Canada's total gas consumption today."[19]

Phasing out fossil fuels means phasing out petrochemicals. But Table 1, compiled using the values shown on the Ecobalyse site on 13/02/2024, shows unambiguously, that far from being urged to phase out petrochemicals, if the PEF/Environmental Cost labeling comes into force as currently proposed, French citizens will be encouraged to buy more polyester, to buy more plastic, and hence, to buy more fossil fuel feedstock.

This is inconsistent with France's position on fossil fuel use within the global community as well as its commitments to mitigating global warming under COP28. It should further be noted, as explained in the appendix, that the Ecobalyse tool currently overestimates the quantity of CO_2 emitted in cotton cultivation by a factor of more than ten. We can find no explanation for this.

18 www.eceee.org/all-news/news/france-seeks-stronger-eu-stance-on-fossil-fuel-exit-at-cop28/

19 www.iea.org/reports/the-future-of-petrochemicals



Microfibers vs Microplastics

Microfibers and microplastics are not one and the same thing. But when microfibers are mentioned, many, if not most people appear to equate this with microplastics. Plastic micro and nanofibers specifically have been identified as potentially harmful to human and environmental health.[20] And unless it has been incinerated, every gram of plastic ever produced is, it seems, still with us.

The Ecobalyse tool currently includes a *“un complément à l'analyse de cycle de vie traduisant l'impact des microfibres”* or in English “a complement to the life cycle analysis reflecting the impact of microfibers”[21] This rather gives the impression that the scourge of microplastics is addressed by the French Environmental Footprint. The tool’s main source for this ‘complement’ however appears to be

"Biodegradability within the context of Fibre Fragmentation" (Décembre 2021)”[22] published by an industry initiative, The Microfiber Consortium (TMC).[23]

TMC is a UK-registered micro company[24] supported by fashion and home furnishing retailers such as H&M, Kering, Primark, Puma, Boohoo, ASDA, and others.

The most recent company filings state that TMC only has 4-5 employees, and it has no apparent research in scientific publications to its name. Which, it must be said, makes it a rather odd choice for France to defer to as the global authority on microfibers.

The TMC publication appears to be based on the premise that plastic microfibers are no more harmful than any other microfiber per se. The position taken is that ALL fiber release is harmful in and of itself. Fiber release concerns are then, only a matter of volume and persistence. As a result, animal fibers like silk or wool also have a negative microfiber impact. As of 13/02/2024, the Ecobalyse tool evaluates this at 72% of the impact of plastic fibers.[25]

When an increasing number of studies have shown, or at least suggested, that plastic microfibers have health impacts for humans, animals, and the environment, that are independent of surface treatments, and that have not been identified for natural fibers,[26] the French Administration’s lack of concern for the potential harm caused by plastic microfibers specifically, seems ill-advised. Indeed, we would question whether this treatment of plastic microfibers in apparel is consistent with France’s global commitments to adhere to the precautionary principle.[27]

20 *www.crdc.com.au/publications/ESPR-critique*

21 *fabrique-numerique.gitbook.io/ecobalyse/textile/complements-hors-acv/microfibres*

22 *www.microfibreconsortium.com/biodegradability-report*

23 *www.microfibreconsortium.com/team*

24 *find-and-update.company-information.service.gov.uk/company/11647708/filing-history*

25 *ecobalyse.beta.gouv.fr/#/explore/textile/materials*

26 *www.crdc.com.au/publications/ESPR-critique*

27 *www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf*

Utilisation des Resources en Eau - Use of Water Resources

The Ecobalyse tool states *“modélisation de l'indicateur "Epuisement des ressources en eau" à partir des données de la **base EP&L de Kering**,”* or in English, “modeling of the *“Depletion of water resources” indicator is based on data from the Kering EP&L database.”*[28]

Why the tool does not use the far more common AWARE water scarcity weighting is not divulged. Devised by Unilever and a group of LCA experts, AWARE is not without its critics. We find the weightings to be excessive, and as we have expanded on elsewhere, we are unclear what authority the EU or France has to rule on how other nations use their water resources.[29]

For the purposes of this paper, however, we restrict ourselves to demonstrating that the proposed Utilisation des Resources en Eau is unsatisfactory.

We use cotton as an example, but the same principle applies to all the natural fibers covered by the tool.

The screenshot in Figure 1. shows what the Kering EP&L claimed for “**Environmental impact group:** Water consumption **Material group:** Plant Fibers - cotton
Process step: Crop farming”on 28/01/2024.

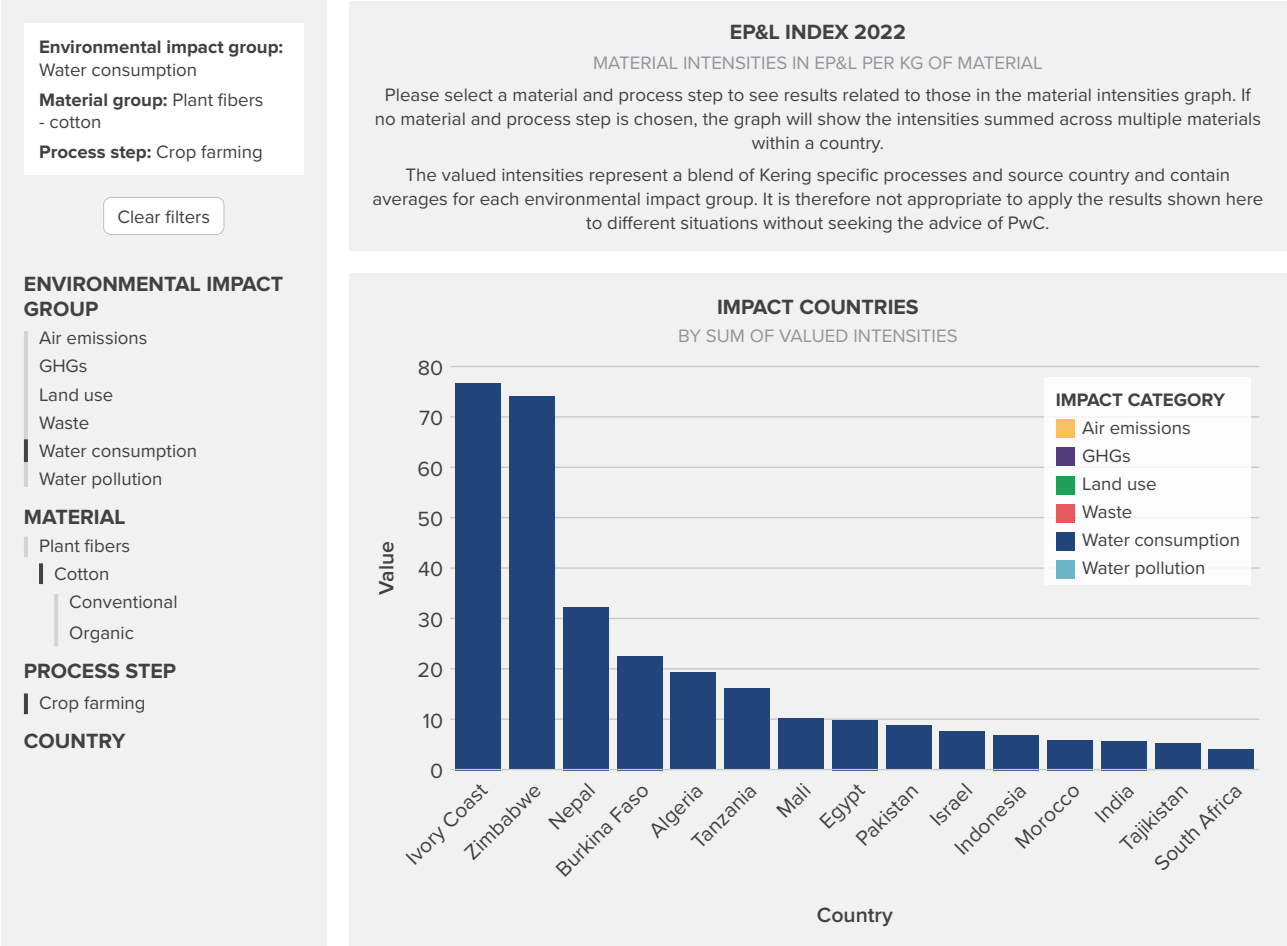
Examining Kering’s EP&L methodology reveals the following: *“Our valuation approach is aligned and consistent with recommendations of the European Commission, and is increasingly used by policy makers across the world. Valuation methodologies developed by PwC UK, including key assumptions and sensitivity analyses, can be found in the full methodology paper available at **PwC UK’s website**.”*[30]

28 *fabrique-numerique.gitbook.io/ecobalyse/textile/impacts-consideres*

29 *www.crdc.com.au/publications/ESPR-critique*

30 *kering-group.opendatasoft.com/pages/methodology/*

Figure 1. Kering EP&L Index 2022 Water Consumption in Cotton Farming



Source: kering-group.opendatasoft.com/pages/material-intensities/ accessed 28/01/2024

This is what the PwC website has to say about the underlying methodology for water consumption:

Water consumption is the volume of water that is evaporated, incorporated into a product or polluted to the point where the water is unusable (Mekonnem & Hoekstra, 2011). Consumption of water reduces the amount of water available for other uses, which, depending on the level of competition and the socio-economic context, can have consequences for the environment and people. It is valuing the impacts associated with corporate consumption which is the focus of this methodology.[31]

The objectives sound laudable, but according to the World Bank, in 2022, Global GDP per capita (current US$) was $12,744.[32]

For Cote d'Ivoire (Ivory Coast) on the other hand, It was $2,486. For Zimbabwe, it was $1,677. And for Nepal, $1,337. For Burkina Faso, it was only $830.[33]

The farmers consuming this water are not corporations. They are the people whose socioeconomic interests the PwC methodology - and hence the Kering EP&L - is supposed to protect. They are some of the poorest people on the planet. Moreover, as Figure 3 in the appendix clearly shows - Kering must be measuring the purported impact of farmers using rainwater. Neither Cote d'Ivoire, Zimbabwe, Burkina Faso, Mali, nor Tanzania has any irrigated cotton production, and Israel uses only recycled water to farm cotton. Moreover, Nepal, Algeria, Indonesia, and Morocco have no economically significant cotton production, which makes their appearance in this chart a little surprising.

31 *www.pwc.co.uk/naturalcapital*

32 *data.worldbank.org/indicator/NY.GDP.PCAP.CD*

33 *data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CI-ZW-NP-BF*

Rainwater is also referred to as green water - specifically to differentiate it from blue, or irrigation water that is withdrawn from rivers and aquifers.[34]

Not growing cotton will not make rainwater on fields available for the local population to drink or wash with. It will not even reduce the plant uptake. To quote one report on the topic *"in the absence of human interventions, natural vegetation would have also consumed green water. Indeed, it has been shown that land, and thereby green water, use by humans has led to reduced green water consumption compared to natural vegetation."*[35]

More to the point, in much of the Global South farmers have no other income-earning opportunities. They must farm. Subsistence farmers need a cash crop to enable them to purchase the goods and services that they cannot produce themselves - health care, education, clothing, transport, and even essential foodstuffs such as rice for example in much of sub-Saharan Africa. If they cannot sell cotton, these farmers will cultivate their second most profitable crop option instead. The net impact of the French PEF will be to make those farmers poorer. There will be no impact on water availability.

There are two further anomalies:

1. The very broad definition of water consumption employed in the Ecobalyse tool only applies to raw material production. Perhaps this will be amended, but time is running out, and as Figure 2 shows, as of 13/02/2024, the tool stated that 100% of a cotton tee's water consumption occurs in raw material production. According to Ecobalyse, neither dying and printing, nor the 45 wash cycles that will be undertaken by the average French consumer, will have any water impact whatsoever.

2. Whilst Kering applies a broad definition of water consumption to all natural fibers - both plant and animal, the same cannot be said for plastics.

   According to Kering's EP&L Index 2022,
   Environmental impact group: Water consumption
   Material group: Animal Fibers - cashmere
   Process step: Animal rearing in China, has an impact of €161 per kilogram of material. The same category for silk has a purported impact of €28, while for Indian silk it's €68 per kilogram. All Chinese silk production is rainfed - as is a significant proportion of Indian silk.

   What we are looking at then is - as the PwC methodology indicates, and as illustrated for cotton - what Mekonnem & Hoekstra refer to as the water footprint, of cotton, cashmere, and silk. Unlike the common LCA definition of water consumption which only includes blue water, the water footprint includes blue, green, and grey water.

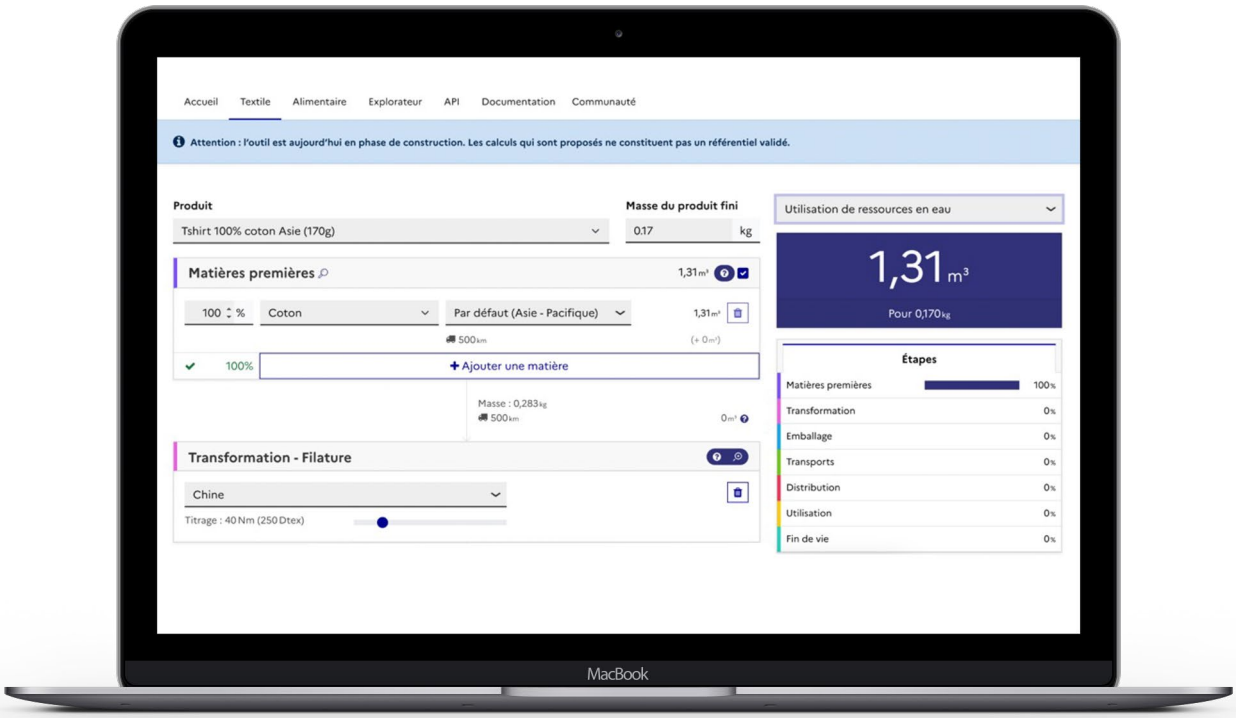
   The Blue water footprint is water that has been sourced from surface or groundwater. Green water is precipitation. Grey water reflects water pollution. It is the amount of freshwater required to dilute pollutants to meet specific water quality standards.[36]

   For polyester, Kering's EP&L Index 2022
   Environmental impact group: Water consumption
   Material group: Plastic - PET for China shows an almost nonexistent impact, evaluated at only €0.0185 per kilogram of material.

   This conflicts with the Water Footprint's own estimates which put the water footprint of polyester as high as 71,000 tonnes per tonne of fiber, or 71 tonnes (71,000 liters) per kilogram,[37] almost entirely in the form of grey water. By comparison, Mekonnen and Hoekstra, 2010, 2011, found that globally, an average of almost 10,000 litres of water is necessary to produce 1 kilogram of cotton fabric.[38]

34 *www.ncbi.nlm.nih.gov/pmc/articles/PMC6192425/*
35 *www.ncbi.nlm.nih.gov/pmc/articles/PMC6192425/*
36 *waterfootprint.org/resources/WFA_Polyester_and__Viscose_2017.pdf*
37 *waterfootprint.org/resources/WFA_Polyester_and__Viscose_2017.pdf*
38 *www.waterfootprint.org/resources/interactive-tools/product-gallery/*

Figure 2. Water consumption in the production of a 170-gram cotton tee.



In other words, the water footprint of polyester is **7 times greater** than that of cotton. Why Kering's EP&L does not show this is unclear.[39]

Unsurprisingly, since the Ecobalyse tool is based on Kering's EP&L, it demonstrates the same inconsistency. On 13/02/2024, the tool showed a raw material water consumption in the production of a polyester tee of only 0.19 tonnes. On the other hand, as Figure 2 shows, it claimed 1.31 tonnes of water are consumed in the cultivation of the cotton required to produce such a tee shirt, and for cashmere and silk, the purported impacts were 27.5 tonnes and 9.54 tonnes of water respectively.

If France wishes to use the water footprint methodology, it must apply this evenly across all fibers. The French PEF cannot include green water but exclude grey.

Moreover, it is important to understand the thinking behind the water footprint concept. To cite a 2017 publication "Understanding the LCA and ISO water footprint: A response to ***Hoekstra (2016)***."[40]

*"**Hoekstra (2016)** repeatedly states that water is a global resource because it is virtually traded via products – including between water abundant and water scarce regions. ....Following the logic of global virtual water trade, **Hoekstra (2016)** recommends that water-intensive goods should be produced in water-abundant regions and then exported to water-scarce regions."*

Automatically then, in using the water footprint rather than the blue water consumption of a product to guide consumer purchases, France is attempting to redirect global trade so that water-intensive goods are produced in water-abundant regions and then exported to water-scarce regions.

39 *waterfootprint.org/resources/WFA_Polyester_and__Viscose_2017.pdf*

40 *www.ncbi.nlm.nih.gov/pmc/articles/PMC6192425/*

We have not found anything to suggest that France has sought a global mandate to do this. Indeed, we are unclear whether the French electorate is even aware that this is what they are tasked with achieving through their consumption patterns.

Global trade is already determined by comparative advantage - including climatic. Benin is a water-scarce nation. Its primary export is cotton, and its primary import is rice.[41]

This is because cotton is a xerophyte - a plant that can grow in very dry conditions and can withstand drought.[42]

Grain crops, including rice, are in the grass family and have horizontal roots, good for stabilizing soil but leaving crops vulnerable to water and heat stress. Cotton is a woody perennial with vertical roots that typically descend 1.5 meters, allowing it to provide an economic yield in semi-arid and arid regions where food crops would fail. Cotton uses less water than rice, maize, soybeans, and many vegetable crops per hectare of production. In line with water availability. Benin grows cotton and trades it for rice. And all this without any need for French or EU intervention.

We would, moreover, point out that France is a signatory to the United Nations International Covenant on Economic, Social, and Cultural Rights of December 1966.[43]

In Part 1 Article 1, this states quite clearly: *"All peoples may, for their own ends, freely dispose of their natural wealth and resources without prejudice to any obligations arising out of international economic co-operation, based upon the principle of mutual benefit, and international law. In no case may a people be deprived of its own means of subsistence."*

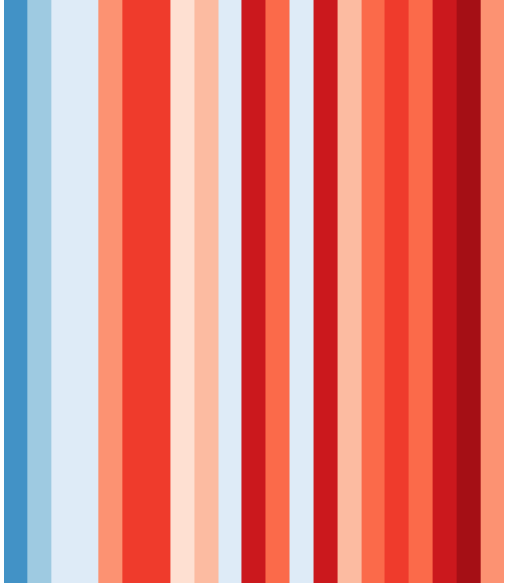
We would submit that attempting to prevent farmers in water-scarce regions of the Global South from using their own rainfall to maximize their income violates this principle.[44]

41 *wits.worldbank.org/CountryProfile/en/Country/BEN/Year/LTST/Summary*

42 *www.oxfordreference.com/display/10.1093/acref/9780198608912.001.0001/acref-9780198608912-e-7299*

43 *www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights*

44 *www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights*



Coarse Wool

As we can see from Chart 1, the Ecobalyse tool rates sheep's wool far more environmentally harmful than fine merino. As of 13/02/2024, such wool - which is the kind of wool normally produced in France - supposedly has a total environmental cost of 3,176 µPts for 0.170 kg. Fine merino - most of which comes from Australia - has a total environmental cost of 1,940 µPts for 0.170 kg, or more than 40% lower.

We quote Segard Masurel:
Over the last decade, French wool has become a mere shadow of its former self. Burnt, massively exported, and sold off with prices per kilogram plummeting from €1.30 in 2012 to around 10 cents in 2022."[45]

The Eastern Market Indicator in Australia for Merino wool, clean, was around US$9 to $10 during 2022.[46]

When the conversions from greasy wool to clean, and from Euro to US$ are made, the price of French wool in 2022 was about 50 times lower than the price of Merino wool in Australia over the same period.

As Table 2 in the appendix shows, France's sheep population in 2000 was a third greater than it was in 2022. But wool exports were significantly more than double (2.2x). As France's fashion sales have boomed, France's farmers have been forgotten - doubly excluded as both prices and sales volumes have plummeted. Net of the cost of shearing, non-merino wool's contribution to the lifetime value of the sheep is insignificant. By definition, its share of the environmental impact of that sheep is also insignificant.

The fact that the environmental impact of wool rises and falls with its relative price may initially appear unscientific - it certainly did to us when we first encountered the notion[47] - but If wool is being landfilled, burned, or otherwise entering the waste stream, using it in clothing and home goods has zero environmental impact. On the contrary, this would be effectively recycling waste and eliminating disposal costs. Using economic allocation for wool, the environmental impact of a sheep would be allocated to its co-products - primarily wool and meat/dairy - in proportion to their relative contribution to the lifetime value of the animal.

45 *www.segardmasurel.com/en/french-wool-a-guarantee-of-quality/*
46 *www.wool.com/market-intelligence/weekly-price-reports/)*
47 *committees.parliament.uk/writtenevidence/97851/html/*

This value is, of course, what farmers use to determine whether to raise sheep rather than some other livestock or crop in the first place.

If the wool has zero, or almost zero value, then the climate change impact associated with the raw material cannot be anywhere near the 20 kilos CO_2e per 283 grams of wool shown in the Ecobalyse tool. On the contrary, it is likely that in terms of climate impact, non-merino wool from France (and elsewhere) is one of the least environmentally harmful fibers available - whilst also demonstrating valuable socio-economic benefits.

It is self-evident that since the tool shows a far lower impact value for fine Australian merino - which has a far higher market value - Ecobalyse is not using economic allocation. Perhaps some form of allocation by protein is being employed.[48]

If so, this would be unscientific. LCA theory and ISO standards - indeed, data analysis in general - are clear. Values can only be compared if identical methodologies have been employed. At a minimum, this means that to compare purported fiber impacts, identical methods of allocation must be used. Since fibers like polyester and cotton contain no protein, some allocation by protein - and here it should be noted that there is more than one method of protein allocation, and they all produce different outcomes[49] - obviously cannot be used for polyester or cotton.

The only method that can be applied identically across all fibers, and - apart possibly from System expansion which is generally regarded as too complicated to apply[50] - the only method that captures when a co-product is going to waste, and so the only system of allocation appropriate for use in comparative impact tools like the PEF, is economic allocation.

Since non-merino wool from France and elsewhere has very little economic value - some 10 cents per kilogram, less the cost of shearing - applying economic allocation would show that it also has very little environmental impact.

Furthermore, as we can see from recent protests in France, farmers are already tired of time-consuming bureaucratic form-filling. As proposed green regulations on both sides of the Atlantic cascade through, farmers will increasingly be required by brands to account for how much carbon their cotton, wool, or flax sequestered. How much water, fertilizer, or pesticide was consumed, and so on.[51]

If bureaucratic demands are already equivalent to “reading Kafka on a tractor” for French farmers,[52] what will such bureaucratic demands represent for their fellows in Benin, Burkina Faso, or Laos?

We would moreover point out that accounting for impact does not automatically equate to reducing it. Wool, silk, and other animal fibers represent 1% of global fiber production. Even cotton represents less than 25%.[53]

48 *gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf*

49 *gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf*

50 *gcbhr.org/backoffice/resources/the-rise-of-lcas-and-the-fall-of-sustainability.pdf*

51 *www.crdc.com.au/publications/ESPR-critique*

52 *www.nytimes.com/2024/01/23/world/europe/france-farmers-barricades-protests.html*

53 *www.crdc.com.au/publications/ESPR-critique*

More than half of global fashion - and an even higher percentage of fast fashion - is made of cheap polyester. As we can see from Chart 1, the Ecobalyse tool already rates that far more sustainable than wool. Polyester also comes with no performance requirements commensurate to those proposed for farmed fibers under the ESPR.[54]

What possible positive impact can all this regulation have on total GHG emissions in the fashion value chain when it is almost entirely targeted at less than one-quarter of the output? And this, at the cost of a significant negative impact on the incomes of the poorest, including within France itself.

The UN Resolution on Natural Plant Fibres and Sustainable Development recognizes *"that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development"*.[55]

And *"Encourages Member States: (e) To develop and implement policies and plans to incentivize the sustainable production, consumption and use of natural plant fibres."*

The planned PEF/Environmental Footprint will achieve precisely the opposite. Based on values for which we find inadequate factual or scientific basis, the Ecobalyse tool actively discourages French consumption of natural plant fibers like cotton, despite France being fully aware that the fibers concerned are produced by some of the poorest on the planet. Indeed, judging from Kering's EP&L, if the country of production option becomes effective, the tool will specifically discourage French consumers from purchasing natural plant fibers produced by those whose poverty is most extreme.

Prime Minister Attal surely genuinely means it when he says *"Without our farmers, we are no longer France."*[56]

In this case, overhauling or canceling France's planned environmental footprint labeling would appear to be necessary.

54 *www.crdc.com.au/publications/ESPR-critique*

55 *www.undocs.org/Home/Mobile?FinalSymbol=A%2F78%2F466%2FAdd.2&Language=E&DeviceType=Desktop&LangRequested=False*

56 *www.nytimes.com/2024/01/26/world/europe/france-prime-minister-protests-farmers.html*

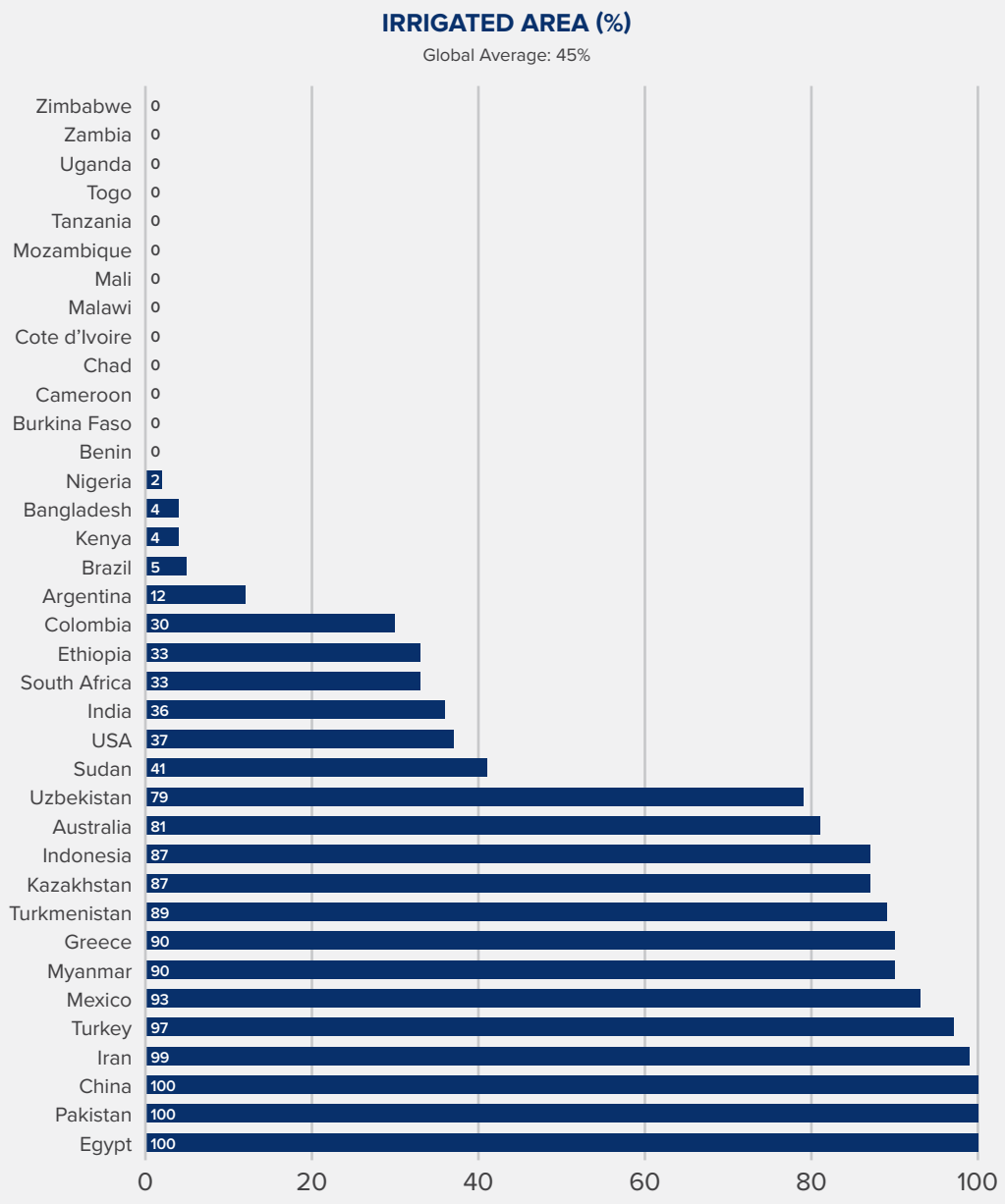
Appendix - Additional documentation and analysis

Table 2. French Wool Production and Exports 2000-2022e

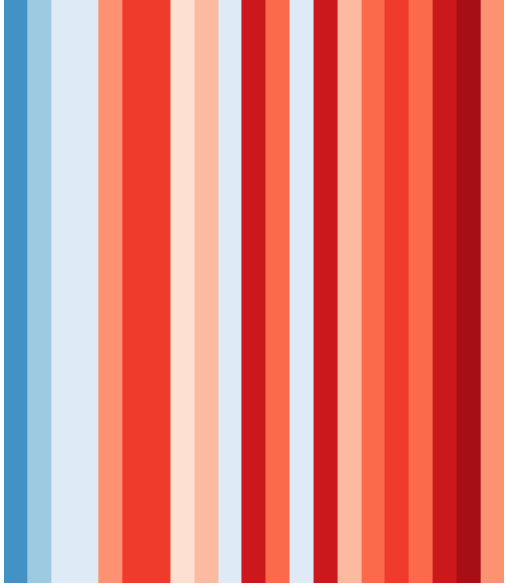
FRENCH WOOL PRODUCTION AND EXPORTS 2000-2022e								
		2000	2005	2010	2015	2020	2021	2022e
Sheep Population	Number	9,324,000	8,760,000	7,955,000	7.057,000	6,999,000	6,995,000	6,978,000
Wool Production, Greasy	Tonnes	21,825	14,000	14,000	14,124	13,508	13,500	13,467
Production/Sheep	Kgs	2.34	1.60	1.76	2.00	1.93	1.93	1.93
Wool Production, Clean	Tonnes	8,260	8,250	7,000	7,062	6,754	6,750	6,734
Production/Sheep	Kgs	0.89	0.94	0.88	1.00	0.96	0.96	0.97
Ratio Clean/Greasy	Ratio	0.38	0.59	0.50	0.50	0.50	0.50	0.50
Exports of Raw Wool	Tonnes	12,378	10,132	9,770	9,324	7,908	3,882	5,543

Source: International Wool Textile Organization, Market Information, Ed. 18, 2023

Figure 3. Irrigated Area in Global Cotton Production



Source: International Cotton Advisory Committee, Cotton Data Book, 2022



Supplementary analysis

GHG Emissions - A technical discussion of the best available data on the GHGs emitted in the production of a 170g cotton tee.

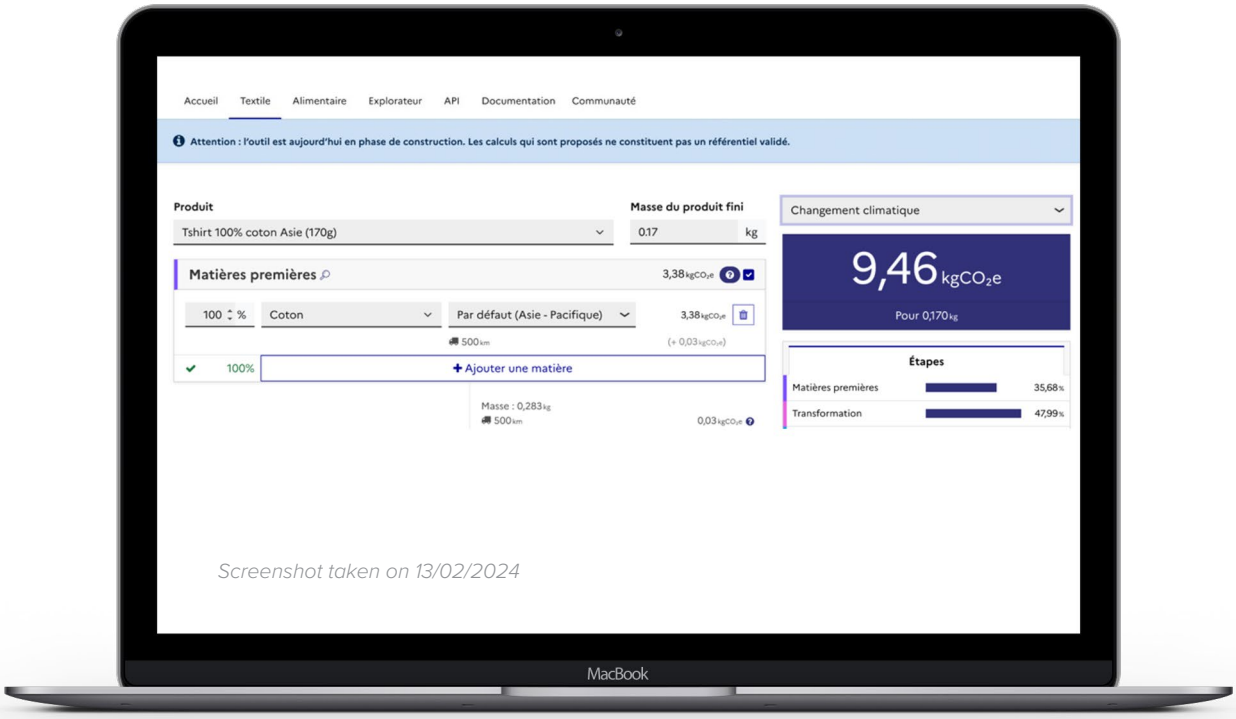
As of 13/02/2024, the Ecobalyse tool asserts that the cultivation of the 283 grams of cotton needed to produce a 170-gram cotton tee emits 3.4 kg of carbon dioxide equivalent or CO_2e.

The first thing to note is that the tool also shows that 0.283 kilos of cotton are required to produce a 0.170 kg tee. In other words, 0.113 kg of cotton is lost in manufacturing. An estimate of 40% of waste in a t-shirt is high. Available research suggests that you need 205 grams on average to produce a 170-gram tee, not 283 grams - only 0.035 kg of cotton is lost in manufacturing.[57] That is a total waste factor of 17%, not 40%.

Moreover, when we say a certain amount of fiber is “wasted,” we don’t mean those fibers are thrown away and landfilled. We mean those fibers are collected and used again in another product. Cotton comber waste from producing a 60-count dress shirt can be perfectly fine for use in an 8-count denim yarn. The tool uses the same waste factor for a merino wool tee. Merino fibers are about 5 times more valuable than cotton, and none of the waste from a t-shirt is going to be thrown away. It will be collected, blended with virgin fiber, and used in another product, maybe a ski cap. In short, the Ecobalyse tool overestimates the quantity of raw cotton required, first by exaggerating the quantity of raw material needed by a factor of 20% (1.4/1.17 = 1.2), and second, by then ignoring the use of fibers recovered during the manufacturing process. The sum of this exaggeration is equal to almost the entirety of the estimated waste of 40%.

57 *www.ers.usda.gov/topics/crops/cotton-and-wool/market-outlook/*

Figure 4. Carbon emitted in the cultivation of the raw material required to produce a cotton Tshirt



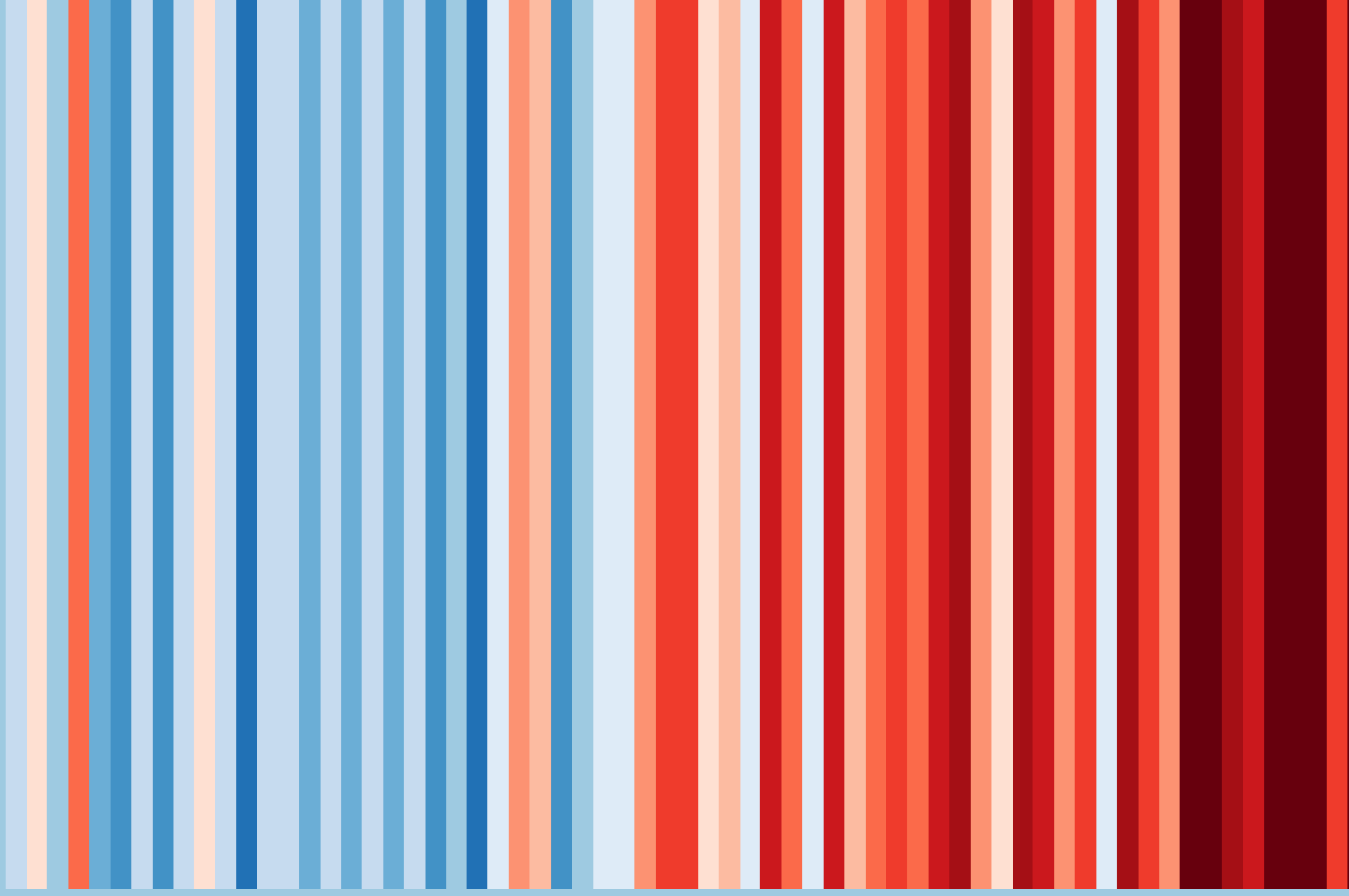
This overestimation of the quantity of raw cotton required to produce a 170-gram tee, however, does not come near to explaining the carbon impact claimed by the Ecobalyse tool. As shown in Figure 4, as of 13/02/2024, this was stated to be 3.38 kg CO_2e.

This is not consistent with the values shown in any current, authoritative source. The Sphera (formerly Thinkstep) 2016 cotton LCA, funded by Cotton Inc. is ISO-compliant, peer-reviewed, and open-access.

It found that the average GHG emissions in cultivation across the 4 major cotton-producing regions included in the evaluation, was only 1.4 kg CO_2e/kg of fiber.[58]

Accordingly, the cultivation of 205 grams of cotton would result in only 0.287 kg CO_2e per tee, less than one-tenth the calculation shown by the Ecobalyse tool.

58 *https://resource.cottoninc.com/LCA/2016-LCA-Full-Report-Update.pdf (p.71)*



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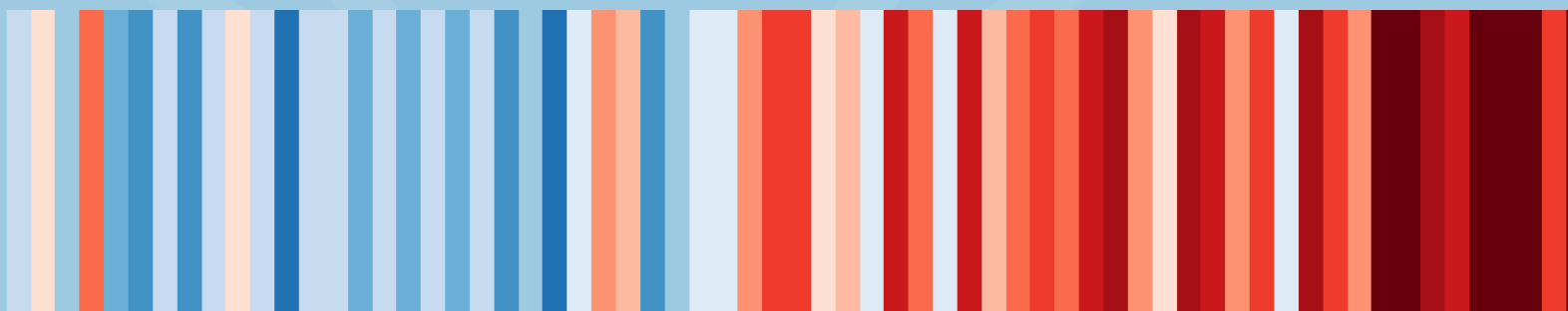
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