Under their skin

the planet

Leather's
impact on —

Full leather report
Under their skin:
Leather's impact on the planet

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Other reports in the series:

Leather's impact on people
Leather's impact on animals
A just transition beyond leather

Under their skin: a report series on leather

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Introduction

Leather has been seen as an unshakably prominent and important aspect of the fashion industry and dressing for millennia.

The oldest intact leather shoe, uncovered by archaeologists in an Armenian cave, is over 5,500 years old, made from cow skin and predating the Pyramids of Giza by 1,000 years.[1] Since this shoe was made, plenty about the fashion industry has changed: today, over 1.4 billion cattle have been bred and stand on once biodiverse land until they are slaughtered for production purposes,[2] leather is now often coated with plastic or tanned with harsh, carcinogenic chemicals,[3, 4] while the ever-increasing scale of the fashion industry is utterly unsustainable: leather supply chains are highly industrialized, harmfully implicating many workers and surrounding communities, while making luxury and mainstream brands massive profits.[5] At the same time, very little has changed: animals continue to be exploited and slaughtered for the production of shoes, clothes and other goods, and skins must be fleshed and altered to ensure they do not rot on our feet.

So many centuries later, as we finally come to grips with our responsibility to address not only a human-induced climate crisis, but an animal and social wellbeing crisis built on commodification and endless-growth capitalism, it is time to move beyond leather – a material produced by an industry disproportionately contributing to these serious troubles, compared to other international industries.[6] Such a move would allow the fashion industry to better align with the Intergovernmental Panel on Climate Change's (IPCC) targets and the United Nations Sustainable Development Goals such as 'clean water and sanitation' (6), 'reduced inequalities' (10), 'responsible consumption and production' (12), 'climate action' (13)', 'life below water' (14) and 'life on land' (15).[7]

A human ability to destroy, shown so clearly in the fashion and leather industries, is remedied by a human capacity for innovation and progress. Today, numerous materials replicate many of the properties which made leather so useful to us, produced with a far smaller, less harmful impact on our planet and those living on it. Material innovation only continues to grow, and rapidly, proving the possibility of a total ethics fashion future, one which has evolved beyond the skins we benefited from using millennia ago.

In this report series, Collective Fashion Justice – aided by the work and support of organisations including the Center for Biological Diversity, FOUR PAWS, Material Innovation Initiative, Defend the Wild, Fashion Act Now, Faunalytics, and numerous experts contributing in their specialist areas – explores leather production and its place in the global agricultural and fashion industry, in addition to its impact on domestic and native species, the planet and our fellow humans. The series also outlines available and soon-to-be-available total ethics alternatives, and the practical possibilities of a just transition towards more communally and environmentally beneficial production – a step that is sorely needed in efforts to ensure collective liberation. Fashion cannot be truly sustainable unless it is ethical, too. We cannot sustain environmental degradation, nor injustices facing humans and non-humans.

Leather is not a by-product: the importance of addressing hides

Despite common misconception, leather is not simply a worthless by-product, but a co-product.

While the leather industry likes to claim skins are tanned as a kind of waste reduction initiative, thus supposedly making leather neither cruel nor unsustainable, this is not the case.[1] Leather is a valuable co-product, with even meat and dairy industries labeling it as such.[2, 3]

The leather industry itself states the massive income losses involved in losing skin sales.[4]

Slaughterhouses purchase cattle from saleyards or farms, factoring in the likely profit gains from the flesh, skin and other parts of a cow's body. While some calves are raised specifically for their young, soft skins, even those cattle whose skins are considered a 'co-product' bring in profits for the animal-industrial complex and fashion industry.[5] On a micro-scale, individual slaughterhouses have reported multi-million dollar losses and the consideration of closing up when skins don't sell – often due to the rise in leather alternative popularity.[6–8] At a macro level, the global leather goods market was valued at $394 billion USD in 2020, with that number only increasing.[9] Leather is for-profit business, and the entire leather supply chain, farms included, must be considered when exploring the environmental and ethical implications of fashion's use of it.

Valuing hides versus flesh

Global raw leather and hide exports were valued at over $18.5 billion in 2019, with an expected rise of 9.46% by the end of 2022,[10] while global beef exports sat at over $45 billion USD in 2020. Leather can account for up to 26% of major slaughterhouses' earnings around the world.[11, 12]

In India, a leading leather footwear and garment producer, most exports by share go to the United States and Europe.[13] Here in India, the skins of bovine animals, including cattle and buffalo, are tanned, with particular complexity surrounding cattle skins given laws banning cow slaughter across the country. Despite these laws and high tariffs on hide but not meat exports, the value of exported hides from animals slaughtered in India is $3 billion USD, compared to all animal product exports such as meats and dairy equating to $10.1 billion USD.[14, 15]

In Brazil, slaughterhouses killing cattle in 2020 made $34.74 billion USD in revenue. Leather sales in the domestic market and through export made up over $1.1 billion USD, or over 3% of total value. Meanwhile, all beef sales made up approximately 88% of revenue. While it is clear that leather is not the primary product in Brazil, it is the second-most profitable aspect of the industry, and a highly valuable co-product, given it brings in over $1 billion in revenue.[16] About 80% of Brazil's leather is exported, making the impact of the industry globally relevant.[17]

It is important to note that hides once had a much greater value, accounting for a larger amount of the total revenue made from slaughtering cattle. As Meat and Livestock Australia once noted, after yet another price drop for hides, 'the hide market has fallen further as decreased demand, the increase of synthetic leather, and environmental regulations have an impact.'[18, 19]

As noted by Earthsight, some research suggests that prior to the steep rise of leather alternatives, a cow's hide accounted for up to 8% of an animal's total value at slaughter, and a much higher proportion of the sales value.[20, 21] Reduced hide prices are not a justification for further funding a harmful industry: they are a consequence of this harm, in a society evolving beyond a desire for destruction in the name of fashion.

Should the global leather industry lose the billions of dollars worth of revenue made through the sale of skins, the impact would be significant. Currently, leather sales effectively subsidise beef production, and by removing this 'subsidy', beef would become more expensive. The more expensive meat becomes, while plant-based meat alternatives become more affordable, the sooner price parity will be met – and this is when the meat industry, responsible for massive ecological, human and non-human harm, will significantly shrink.[22] In turn, our planet and those living on it will live better.

Industry overview

The Leather Council states that 67% of skins used for leather belong to cattle and buffalo, followed by sheep (12%), pigs (11%) and goats (10%).[1] It is estimated that less than 0.5% of leather is made from other animals, such as native kangaroos and even domestic species like dogs and cats.[1–3]

With labelling laws across the globe largely not requiring species identification for leather,[4] it can sometimes be extremely challenging to know what species has been killed, given the murkiness of global fashion supply chains.

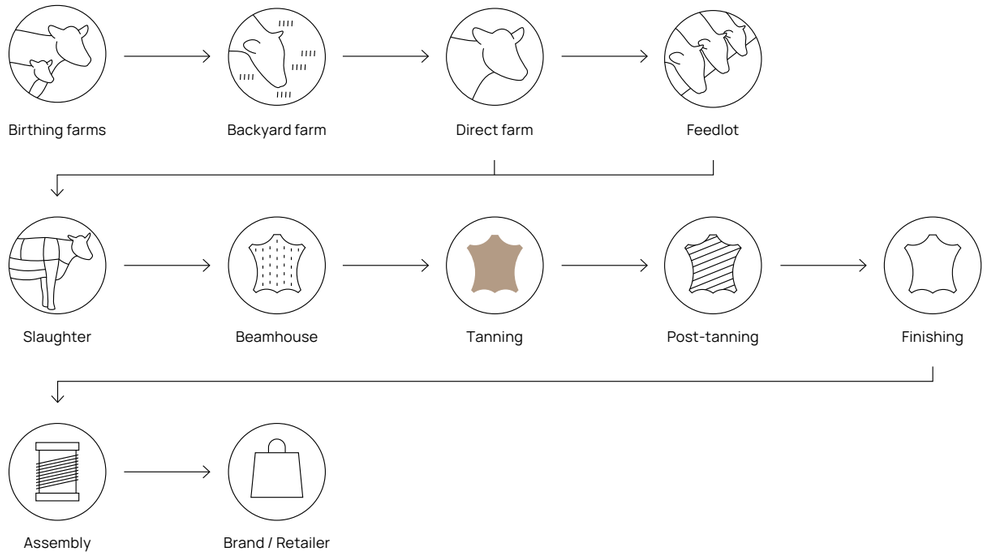
Alongside these sometimes misleading labeling laws, the lack of transparency across leather supply chains may result in a lack of consumer and industry understanding of where leather really comes from. On this topic, fashion writer Lucy Siegle once wrote for The Guardian that 'we're comforted by 'Italian leather' stamps, but this could mean that the leather was imported and finished in Italy. I'm fond of saying that if all the 'Italian leather' merchandise was of true provenance you wouldn't be able to move for cows in that country. They'd be drinking from the Trevi Fountain.'[5]

Indeed, Italy is the second largest importer of partly processed skins from cattle ranches in Brazil,[6] where such production is the leading cause of Amazonian deforestation.[7] In fact, Brazil is the third most significant producer of bovine skins, with the latest industry statistics citing 40.7 million bovine skins being produced in a single year. Brazil's massive output is surpassed by China's 47.6 million bovine skins pulled from carcasses in a year, and the output of India, the most significant bovine skin producer, slaughtering and skinning 48.7 million bovines each year. China, Brazil, Russia and India are the major producers of finished, tanned bovine skins.[1]

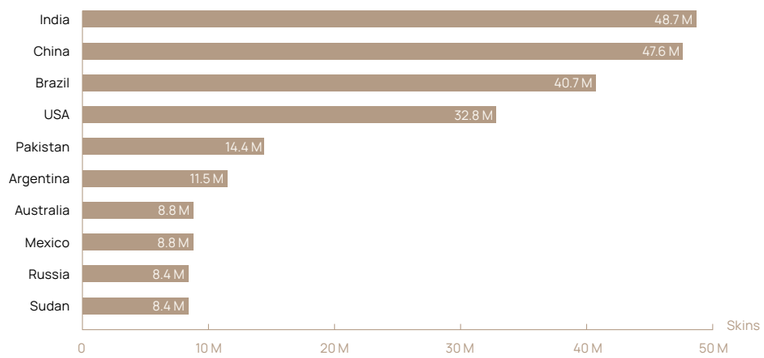
The complexity of global leather supply chains makes it difficult to trace environmental, human and non-human animal abuse and exploitation. Not only does the changing location between cattle farms, slaughterhouses and tanneries make this leather tracing challenging, but so too does the reality of multiple farms and ranches being involved in leather supply chains, due to the use of 'birthing farms', 'backgrounder farms', 'direct farms' and feedlots.[8]

This report will focus on the leather industry across India, China, Brazil, the United States and Australia – as these are all either major production and tannery countries, or countries considered to have 'improved' practices.

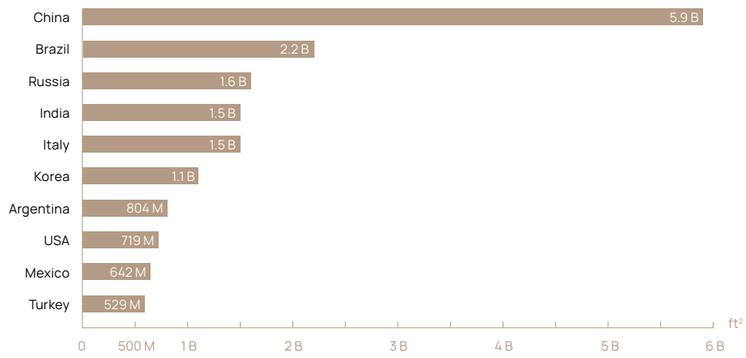
Supply chain



Top cattle hide producing countries*:



Top tanned hide producing countries*:



*(2015, latest available data from Leather Council)

Leather's impact on the planet

Introduction

Today, an estimated 1.5 million trillion microfibres are present in the ocean.[1, 2] These microfibres impact the entire marine ecosystem, which is intricately connected to so many ecosystems across the world.

Given these microscopic fibres are found in the bellies of wild animals,[3] in human newborn babies and even our own blood[4, 5] – and plastic-producing fossil fuel companies continue to dangerously heat our planet[6] – those who are sustainably minded in the fashion industry are eager to move beyond plastic-based materials.[7] This is clearly sensible and critical. In response, the animal-derived leather industry has marketed itself as a 'plastic free',[8] 'completely natural',[9] 'biodegradable'[10] and even 'recycled' choice.[11]

A clear dichotomy has been presented to the fashion industry: you can have fossil-fuel derived synthetic leather, or animal-derived, skin-based leather, referred to as 'real' leather.[12] The lobbyist messaging pushing this argument is forceful and persistent: animal leather is the natural, superior choice. In reality, this is a false dichotomy. Not only do plastic-free alternatives to leather exist today, more are being developed, and in fact, while fossil-fuel derived synthetic leather must be evolved beyond, in many impact categories it has a far lesser environmental impact than conventional leather itself.[13, 14] The lack of sustainability of one material – such as synthetic leather – is not the inherent sustainability of another, as has been over-simplistically presented.

The production of leather, a financially valuable co-product, is tied to intensive and inefficient land use, in many cases deforestation, and almost always biodiversity destruction, eutrophication, significant and often dangerous chemical use, pollution, water scarcity and massive emissions.[15] Plastic-free or not – though many animal-derived leathers are coated with plastic[16, 17] – these are not the hallmarks of a sustainable material.

In order for the fashion industry to meet climate targets set by the United Nations and IPCC and to prevent the currently unfolding biodiversity crisis from escalating, leather must be scrutinised and challenged unlike ever before. While cattle industry lobbyists have attempted to avoid ensuring environmental oversight in leather supply chains,[18–20] the fashion industry more broadly must look beyond green-washing in the way it is finally beginning to with oil industries. In order to be genuinely sustainable, the future of fashion's 'leather' must be free from both virgin fossil fuel and all animal inputs. While further innovation continues and rapidly intensifies, the industry must use the materials which have the current lowest impact on the planet.

Climate
Methane and carbon

In order to explore the climate impact of leather production, we must first differentiate between carbon and methane. Carbon dioxide (CO_2) is the most abundant and significant anthropogenic greenhouse gas emission in our atmosphere, with a long-lasting negative impact on our climate. Meanwhile, at least 20% of global emissions are made up of methane (CH_4),[1] a greenhouse gas estimated to be more than 80 times more potent and warming over the first twenty years following release, compared to carbon.[2] While more potent in the short-term, methane emissions are also shorter-lived which makes it the most significant greenhouse gas for which emission reductions can quickly slow climate change.[3] Methane has contributed 0.5 degrees Celsius of the 1.1 degrees Celsius of warming since the 19th century.[4, 5] In order to understand the effect of methane as compared to carbon effectively, global warming potential over a 20 year time frame is used and supported by the IPCC.[6, 7]

Despite this, cattle rearing industries are lobbying, as Big Oil does, to calculate emissions differently, through methods which would allow them to claim 'net-zero' while still emitting massive amounts of methane and without reducing the number of cattle slaughtered per annum.[8] While the industry further lobbies to undermine the impact of methane,[9] addressing methane remains a fast and effective way to reduce global warming now.[10] The latest IPCC report called for methane emission reductions of one third,[11] recognising the critical importance of addressing animal agriculture in this, supporting the adoption of a global system less reliant on the industry.[12]

The United Nations Food and Agricultural Organization recognises that current methane reduction targets are not sufficient,[13] and has long stated that farmed animal production is 'one of the most significant contributors to today's most serious environmental problems. Urgent action is required to remedy the situation'.[14] The FAO has shared data showing that 16.5% of all greenhouse gas emissions are from animal agriculture,[15] more than the exhaust from all global transport – planes, cars and trains included.[16–17] In fact, 62% of direct emissions in the sector are tied to the rearing of cattle,[18] with further emitted due to the rearing of buffalo, also reared and ultimately skinned for leather. Most of these emissions are due to enteric fermentation,[19] a process in which gas is passed by ruminant animals. These figures are substantial, even while excluding the additional climate opportunity to draw down huge amounts of carbon in a transition to more efficient, animal-free agriculture.[20]

Leather Panel, the UNIDO global forum for the leather industry, published data which shows that even when only accounting for emissions following the slaughterhouse gate are recorded, one square metre of cow skin leather has a carbon equivalent (CO_2e) impact of 17 kg.[21] This reporting egregiously claims that 'animal husbandry [is] not related to the leather industry' despite leather adding financial value to the industry, and being unable to exist without it. This is the justification for excluding all on-farm and slaughterhouse emissions in the above equation, which still finds synthetic leather – and the incineration Leather Panel assumes will occur at its end-of-life – to have a smaller footprint.

The same report also offers calculations for leather's climate footprint when the entire supply chain is accounted for. While some analyses provide both higher and lower CO_2e footprints, the report highlights a middle-range estimate of 110 kg of CO_2e for one square metre of leather. These emissions are those allocated only to the skins of cattle, not to the entire 'production' of these animals, which results in even further emissions. Cow skin leather then has a climate impact nearly 7 times greater than synthetic leather, even when inconsistently calculating synthetic leather's end-of-life impact, but not that of cow skin leathers. Using this data, CIRCUMFAUNA's further calculations, verified by Faunalytics, highlight the estimated impact of average leather and synthetic leather goods, with a cow skin leather jacket emitting just over 150 kg more CO_2e than even its synthetic counterpart.[22]

Leather industries argue 'zero allocation' of emissions should be given to cattle skins,[23] given their false claim that leather is a practically worthless by-product of beef production. Animal rearing industries simultaneously hold that synthetic materials are unfairly offered a 'free' raw material, where fossil fuels are not accounted for.[24] These claims are inaccurate, ▶

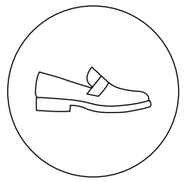
The carbon cost of leather goods, calculated:[22]

Cow skin leather tote bag:
100.5 kg of CO_2e

Synthetic leather tote bag:
14.4 kg of CO_2e

Cow skin leather boots:
66 kg of CO_2e

Synthetic leather boots:
9.5 kg of CO_2e



Cow skin leather shoes:
40.7 kg of CO_2e

Synthetic leather shoes:
5.8 kg of CO_2e

given impact assessment in most calculations beginning at fossil fuel extraction. Seemingly opposed to the common practice of using full life-cycle economic allocation of cattle carcasses and skins when it comes to attributing emissions, the leather industry makes illogical and inconsistent arguments in an effort to exclude the majority of leather's supply chain impacts from emissions calculations.

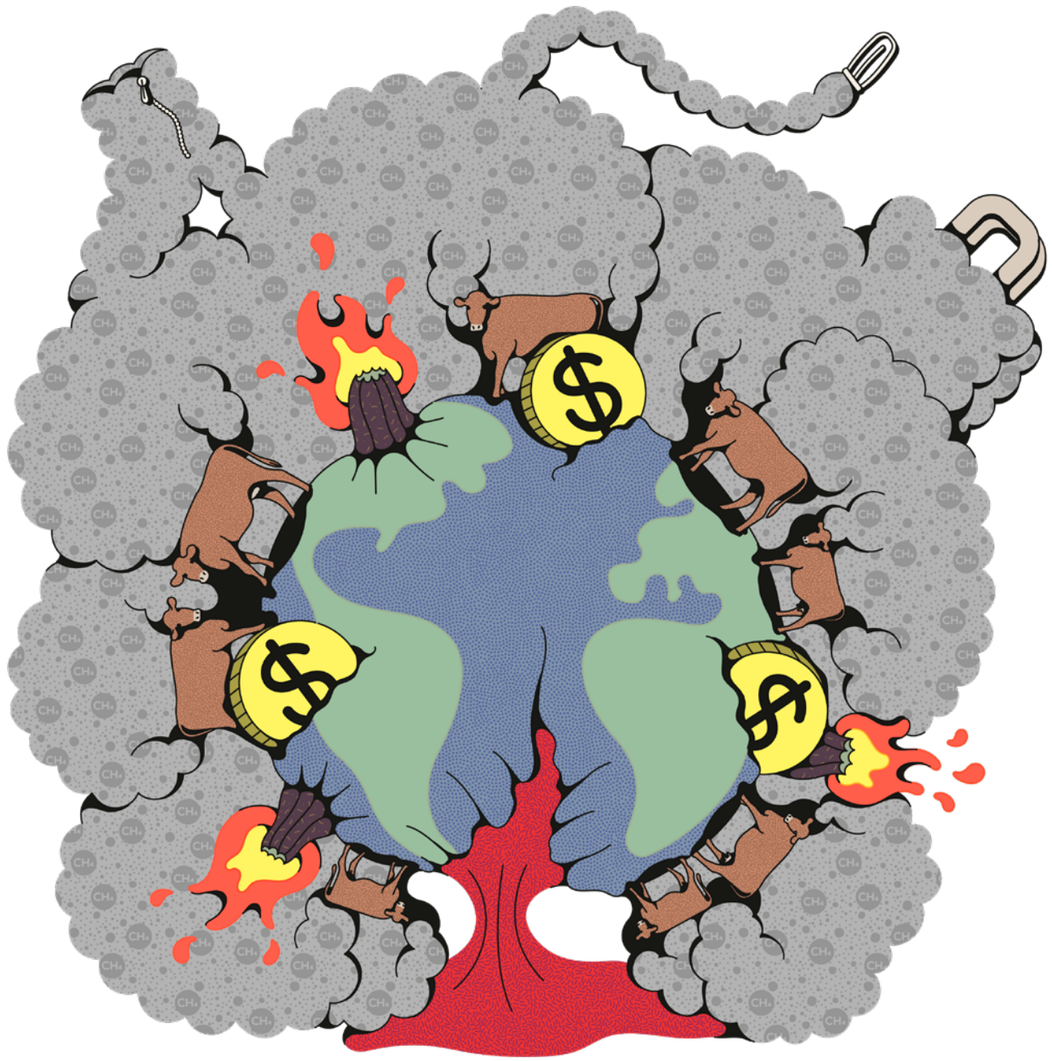
The carbon cost of sending hides to landfill

When the popularity of cattle skin leather declines – often due to the rise in alternatives that are both more widely available and sometimes more affordable – cattle farms, slaughterhouses and tanneries alike face a financial blow.[25] The leather industry also estimates that further hides being sent to landfill, rather than being chemically processed, will result in more financial burden, as disposal must be paid for. This would in turn increase the cost of other cattle industry products like meat, so that these costs could be recouped. This runs counter to industry claims that leather production does not impact the wider industry financially, and that the sale of leather exists for waste-reduction, rather than for monetary gain.

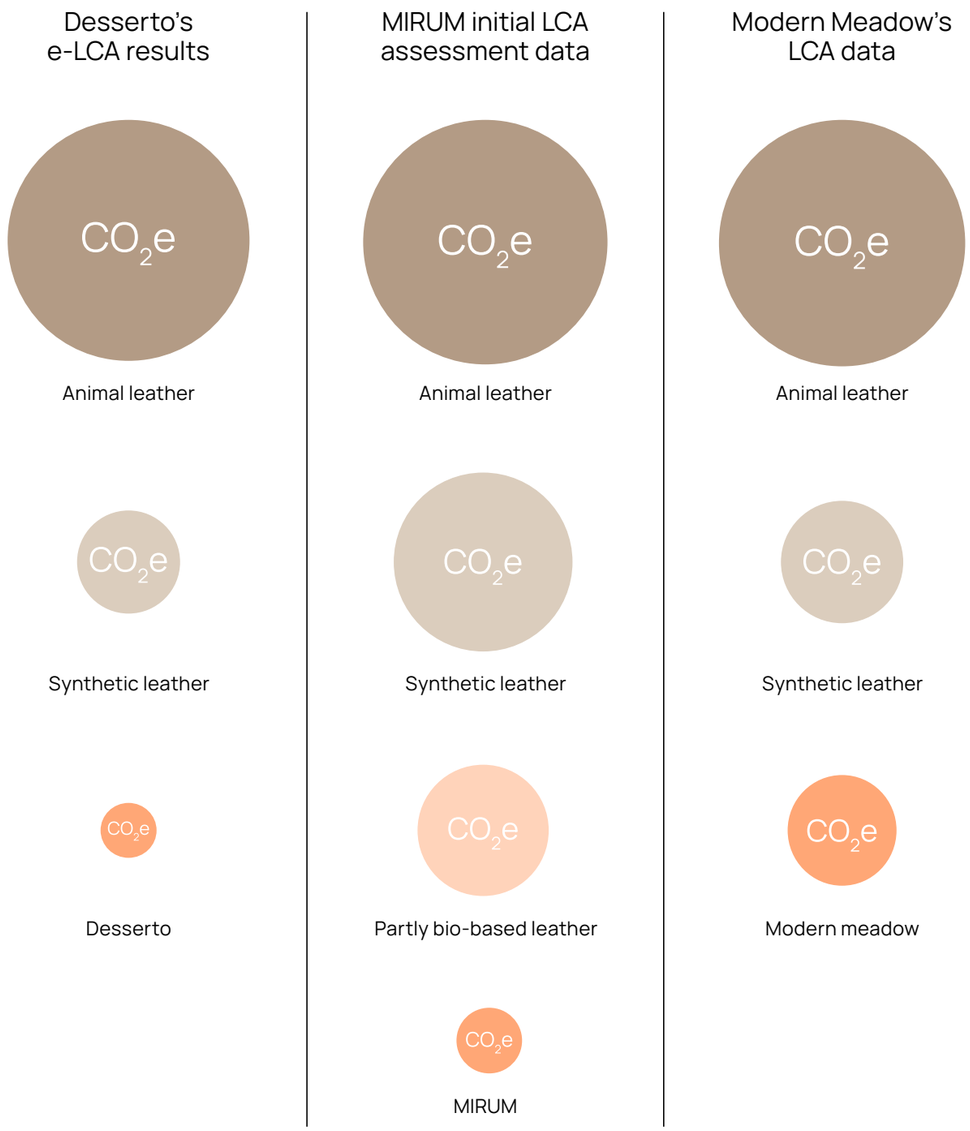
If cattle skins are sent to landfill the carbon stored in them breaks down, resulting in methane release as skins rot.[26] It should be noted though, that commercial composting would minimise such methane emissions and allow some carbon to be restored into soil,[27] but such practices are not currently considered viable by the industry due to cost, especially given the scale of animals slaughtered annually.[28]

CIRCUMFAUNA calculations found that the emissions caused by processing skins into conventional, non-effectively-biodegradable leather fit for fashionable use are greater than those emissions resulting from methane release from landfilled skins, combined with the emissions tied to producing leather alternatives in their place.[29] Essentially, sending cattle skins to landfill and producing less impactful alternative materials has a smaller combined CO_2e footprint than transforming said skins into leather.

While waste is never desirable, the solution is not to emit further greenhouse gases through the polluting tanning process, but to transition from heavily emitting cattle industries to more plant-based and lab-grown agricultural systems and supply chains which are more efficient and climate beneficial. In doing this, there will not be such an immense number of skins to send to waste or to treat with heavy metals for leather-making, and instead, there will be more sustainable systems to make materials from. Transforming skins into leather to prevent 'waste' from an unsustainable industry, and in turn further funding this industry, is a short-sighted 'solution'.



Climate impact



It's critical to note that the lower CO_2e footprint of synthetic leather such as polyurethane compared to cow skin leather should not be cause for celebrating synthetics, which must be transitioned away from in the creation of a genuinely sustainable fashion industry.

Instead, these comparisons exist to highlight the often overlooked climate impact of animal-derived leather, with its far higher impact on the climate during production. Early life-cycle assessments (e-LCAs) of bio-based alternatives to leather such as Desserto (a cactus and synthetic blend), and MIRUM (a wholly bio-based, plastic-free alternative), for example, show even further emission reductions:

Desserto's e-LCA found the cradle to gate CO_2e impact of one square metre of the material to be 19 times smaller than animal leather, and nearly 3.5 times smaller than that of polyurethane.[30]

Natural Fiber Welding's published assessment of its material MIRUM found one square metre to have a CO_2e impact nearly 14 times smaller than chrome-tanned leather from cradle to gate, over 7.5 times smaller than synthetic leather's impact, and almost 4 times smaller than that of partly-bio-based PU leathers, in the same category as Desserto.[31]

Modern Meadow's peer-reviewed life-cycle assessment found their bio-leather alternative to produce 80% less emissions than conventional cow skin leather, and 21% less than synthetic leather.[32]

Similarly, recycled synthetic leather has a lower impact than both virgin leather and synthetics, and materials like cork, used as wholly natural leather alternatives, not only have very small carbon footprints,[33] but are harvested through tree stripping which allows for some level of further carbon sequestration as cork regrows around unharmed trees.[34]

In line with United Nations Sustainable Development Goals,[35] the fashion industry must choose more climate-friendly materials and production systems, divesting from those which contribute most to global warming and further climate crisis. It is clear then, that animal-derived leather must be evolved beyond, and that it must be replaced with more innovative materials, rather than those which further fund fossil-fuel extraction. While some partly bio-based leather alternatives still include some level of plastic, an increasing number do not, and those which do must be seen as stepping stones to totally fossil fuel and animal free innovation.

Land use

The amount of land required to produce different materials is an extremely important yet often unconsidered aspect of sustainability in fashion. Land use, and related impacts such as biodiversity, are not factored into many life cycle assessments and tools, including in the Sustainable Apparel Coalition's Higg Index[1].

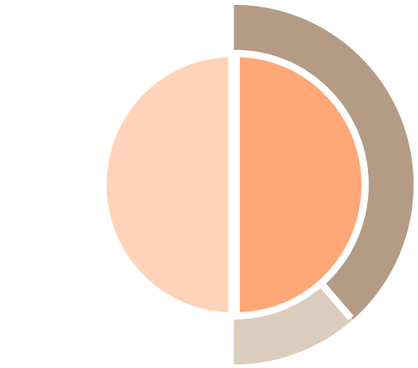
More land-intensive materials – those which require more land to produce the same amount of usable material than others – are generally tied to a number of negative environmental impacts. Such factors and impacts include increased carbon opportunity costs, greater biodiversity destruction, wildlife risks, desertification and land degradation.[2–5]

The rearing of cattle for beef and leather is highly land-inefficient.[6] A number of different factors vary the land footprint of leather from different locations. A large portion of cattle across Brazil, the United States, Australia, China and other major skin exporting countries spend at least a portion of their lifetime in a feedlot.[7–10] Feedlots require less land than pasture systems directly, though these are normally used in conjunction, and grain must be grown for cattle on feedlots. The 'stocking density', or number of animals kept on a portion of land, based on calculated 'bio-capacity' are all factors in the land footprint of leather. Importantly, 'bio-capacity' here refers to the capacity for this land to feed and sustain cattle bred for profit, but ignores whether such land can allow for thriving native wildlife on 'productive' land, too.

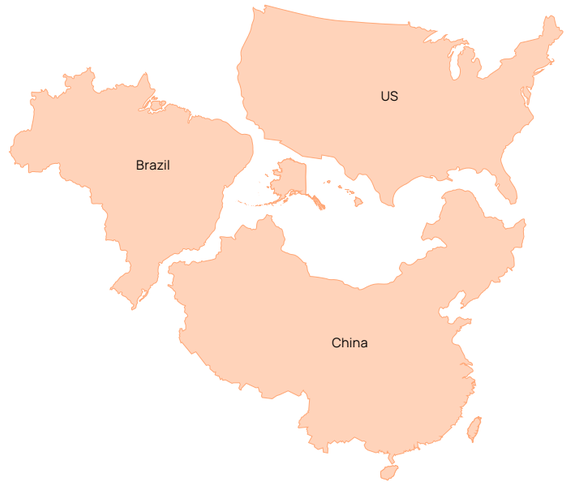
Half of all land habitable to humans on Earth is used for agriculture, of which 77% is used to raise farmed animals for use and slaughter.[11] A massive portion of this land is used to breed and rear cattle,[12] who require a particularly significant amount of land to grow in this system.[13] In fact, global agricultural land use would drop by over 3 billion hectares if the cattle and sheep which the fashion industry skins were not bred for use and slaughter,[14] as with other animals, due to how land inefficient these systems are.[15] For reference, the entire land area of China, the United States and Brazil combined equals approximately 2.7 billion hectares.[16]

41% of land in the contiguous United States is occupied by cattle rearing as well as pasture and cropland grown for animal agricultural industries.[17] Similarly, over 40% of the total land mass of Australia is used for cattle and sheep grazing,[18] with over 20% of more intensively-grazed lands at a high risk of soil acidification.[19] 19% of Brazil's land mass is tied to rearing cattle for slaughter.[2] Meanwhile, data on China's agricultural land use is more difficult to obtain, but peer-reviewed analysis has shown animal grazing to be a leading contributor to desertification in the country.[4]

All habitable land



Approximately 2.7 billion hectares



Other habitable land
Habitable land used for agriculture
Used for animal agriculture
Used for plant-based agriculture

CIRCUMFAUNA calculations based on Brazilian cattle rearing data suggests that in order to produce less than 10 typical leather bags, 1 hectare of land in Brazil must be cleared or kept cleared.[21] Such land is likely to be cleared illegally,[22] as so much land in the biodiverse Amazon Rainforest is.[23] To produce leather for less than 17 pairs of boots, land equal to nearly one and a half football fields must be cleared for cattle rearing.[24]

These numbers represent the amount of land grazed by cattle who are skinned for fashion, however, this land is also exploited and profited from by the meat industry. As such, if these skins were not sold, the land could still be used and profited from. However, such an enterprise would become less valuable, causing financial instability in many cases. An economic allocation of this land (where the land is divided based on the different products made on it, and how much profit is derived from them) based on Brazilian cattle industry reporting, would alter these calculations. In this allocation, 300 square metres of stripped land is tied to 10 leather bags, based on leather's 3% contribution to the industry's slaughterhouse gate value.[25] In other areas, where higher quality skins are being produced, particularly in the case of calf skins,[26] the economic allocation to skins would be much greater.

Bolt Threads' analysis of 19 LCA's found that rearing cattle to produce 1 kilogram of leather requires an average of 97 square metres of land.[27] Meanwhile, the same volume of mycelium leather alternative material can be grown vertically, requiring less than 1 square metre of land.[27] Similarly, one square metre of land is required to grow 16 pineapples and their plant leaves, which are otherwise discarded and can be transformed into 1 square metre of leather alternative material which increases farmer income.[28] All leather alternatives have a significantly reduced land footprint compared to cow skin and most other animal-derived leather, even after economic allocation calculations.

The Kering Group, which owns luxury fashion brands including Gucci, Saint Laurent, Bottega Veneta, Balenciaga and Alexander McQueen, has its own 'Environmental Profit and Loss' tool, which measures the environmental footprint of their products and supply chains, then calculating their monetary value.[29] This tool shows that the total cost of Kering's land use impact for all raw material and garment production, processing and manufacturing in 2021 was €171.9 million.[30] Nearly €80 million, or 46.5% of this cost was attributed to calf and cow skin leather production.[31] Another €13.6 million was attributed to sheep skin leather, while animal fibres like cashmere and wool cost €44 million. ■

Habitat destruction and biodiversity loss

According to the United Nations Environment Programme, 'protecting habitats and biodiversity is crucial' and 'protecting forests is key to this',[1] as they cover almost a third of the global land area and harbour most of the Earth's terrestrial biodiversity.

Despite this, approximately 15 billion trees are cut down every year.[2] The destruction of primary forests – previously unharmed forests rather than those which are human-planted on cleared land – is particularly devastating for biodiversity. Today, we are in the midst of an extinction crisis, with one million species facing extinction in the coming decade if action is not taken to address the key drivers of biodiversity destruction.[3] Agriculture is the greatest threat to biodiversity and its capacity to recover, responsible for the threatening of as much as 86% of listed threatened species.[4]

73% of all deforestation and land clearing in Queensland, Australia, is tied to cattle production.[5] As a result of intense habitat destruction, koalas in the state are now endangered.[6] Australia is considered one of the worst offending countries for animal extinction.[7] Similarly it's estimated that 80% of Amazonian deforestation – across Brazil, as well as Peru and Bolivia – is caused by cattle ranching,[8] with evidence of clearing only increasing since these estimates were published.[9] Skins from these areas are imported and tanned in top leather processing countries like China, Italy, and the United States.[10–14] Meanwhile, deforestation and devastating habitat destruction for cattle production in other top ten hide producing countries like Mexico, Pakistan and Argentina has also been documented.[15–17] This is a widespread issue, with cattle ranching hotspots often aligning with global deforestation hotspots.[18]

Across these countries, this destruction is tied to the threatening and endangerment of great gliders, swift parrots, spot-tailed quolls, jaguars, giant otters, toucans, tapirs and many other animal species.[17, 19–25] The rearing of farmed animals for production is a major driver of vertebrate extinction.[26] Meta-analysis has shown that across countries and over 100 studies, the exclusion of farmed animals like cattle from land increased the abundance and diversity of animal life.[27] Even fish populations are recorded to be impacted by heavy farmed animal grazing.[28] While animal life is critical to healthy soils, native and sparse grazing by wild animals being replaced by domesticated farmed animals bred for profit does not benefit soil, land or biodiversity.[29–32] ▶

A loss of biodiverse plant life is also a major concern tied to increased land transformed for cattle grazing. While we regularly hear about the impacts of monoculture plant agriculture, the effects of monoculture pasture are less considered.[33] While rolling green hills and vast, flat green pastures may appear natural, the opposite is closer to reality, especially when clearing is required to create them. These lands are generally not biodiverse, but largely full of a single or few grass species – which are often non-native – and in many cases, kept in a state of arrested development due to grazing pressures and often destructive human clearing and maintenance to optimise profit and ease of production.[34–36] Such pastures also increase wildfire risks,[37] have devastating impacts on native pollinators and other insects, and are not biodiverse and environmentally beneficial in the way indigenous grasslands are.[34, 38] Further, an estimated 42% of global pasture land was once forest or woody savanna.[39] If these ecosystems were even partly restored, it could greatly benefit the climate and biodiversity.

Certified 'sustainable' leather and deforestation:

As 'deforestation-free leather' is increasingly explored and demanded, brands are seeking to know more about their leather supply chains. While a number of brands have temporarily banned leather sourced from Brazil or the Amazon specifically,[40–41] often implying this will stamp out the problem, others have sought certifications for 'sustainable leather'.

The Leather Working Group (LWG), considered the world's leading environmental certification for leather,[42] is heralded by many brands which use the stamp of approval to claim their leather is sustainable.[43] Despite this, the LWG certification primarily involves auditing tanneries, not farms and ranches.[44] As a result, Stand.earth reporting found a large number of brands selling leather goods labelled with the LWG certification to be connected to and likely funding Amazonian deforestation.[45] Deforestation is only escalating, with an area of the Amazon five times the size of New York City being cleared in the first half of 2022.[46] As of 2022, LWG has set a target to only certify deforestation-free leather by 2030, and work towards this has begun.[47] However, remaining years up until 2030 would be more effectively spent transitioning the fashion industry to more holistically sustainable, climate friendly and land efficient materials, free from cattle ranching entirely.

Land degradation and soil health

It's not only deforestation and land transformation which has an environmental impact, but the degradation of land. Land degradation and consequential soil erosion impact marine and freshwater systems, and are drivers of climate change.[1]

Healthy soil is rich in carbon, nitrogen and other nutrients,[2–4] and is an essential building block of a healthy ecosystem.[5] Globally, soil stores more carbon than all plant biomass, making soil a critical part of combating the climate crisis.[6] Today, the United Nations states that 'the majority of the world's soil resources are in only fair, poor or very poor condition',[5] and, as noted in a Nature published study, a growing reliance on the rearing of cattle and other animals for production is 'undoubtedly enhancing the pressure on fertile soils', leading to erosion problems.[5] A shocking 73% of soils grazed by domesticated animals raised for production and profit are estimated to be degraded.[7]

The rearing of cattle for meat, dairy and leather can lead to soil erosion,[8] especially when land is 'overgrazed' and when cattle are introduced to land which has not evolved to withstand the hard hooves of these animals,[9] as is the case in some major hide exporting countries, such as Australia and the United States.[10–11] Overgrazing results in deteriorating plant life and the destruction of soil productivity and biodiversity.[12] Before the introduction of cattle to Australia, for example, 'deep soft soils' helped to cultivate native grains, daisy yams and other plant foods and resources.[10] These soils were compacted by the hard hooves of cattle and sheep.[10] Soil compaction results in lessened drainage and water infiltration, harming the health of soil.[13] Such issues are documented across top hide producing countries beyond Australia and including Brazil, China, and the United States, among others.[14–18] Cattle grazing can not only erode soil, leaving it less nutritious, but it can also reduce plant cover, microbial growth, and the ability for soil to sequester carbon from decaying plant matter.[19] Positively, soil quality restoration following the removal of cattle from land once used by rearing industries has been documented, including in Amazonia.[20]

Unpacking claims of 'regenerative leather'

In response to understandings of leather's massive impact on climate and land becoming more widespread, the leather industry has begun to push what they call 'regenerative leather'. To explore these claims, we must first understand what regenerative agriculture is.

While 'regenerative agriculture' as a whole lacks a broadly agreed upon definition,[1] the Climate Reality Project defines it as a 'system of farming principles and practices that seeks to rehabilitate and enhance the entire ecosystem of the farm by placing a heavy premium on soil health'.[2] Legitimate and important conservation agriculture methods such as the use of cover crops, reduced tillage, polycropping and other practices are included within the regenerative agriculture movement. While less explored in the space, 'veganic' farming practices which eliminate the need for both synthetic fertiliser and manure are included, too.[3]

Despite this wealth of broadly scientifically supported work, one aspect of supposedly regenerative agriculture receives more coverage and attention than the use of organic fertilisers and compost, natural principles, intercropping and most other techniques: the use of cattle and other farmed animal grazing, with a particular focus on 'holistic grazing' and 'rotational grazing practices'.[4] While there are certainly more and less environmentally impactful ways for cattle to be reared, many of the claims surrounding these 'regenerative' grazing methods are far less supported by replicable evidence for ecosystem benefits. In fact, peer-reviewed reporting and analysis has debunked many claims made by thought-leaders in the supposedly regenerative grazing space.[5, 6]

'Regenerative leather' is claimed to be produced in a system in which the grazing of cattle allows more greenhouse gas emissions to be sequestered than is released through enteric fermentation, resulting in net-positive climate outcomes, while benefiting the land. Footwear brand Timberland, for example, has an official partnership with notable pro-regenerative animal agriculture proponent Allan Savory's organisation.[7] The brand claims that their 'regenerative' boots could '[put] more carbon back into the land than was emitted during production',[8] and that the leather production system is 'not only minimising negative impact, but potentially having a net positive impact on the land'.[9]

While agriculture which works with rather than against the land is important, and improved pasture management is certainly legitimate, Allan Savory's grazing methods ▶

and holistic management claims have been critically reviewed and disproven.[10, 6] One major analysis states that 'some claims concerning holistic grazing are directly at odds with scientific knowledge [on] the causes of land degradation and the relationship between cattle and atmospheric methane concentrations', and that unlike it promises to, 'holistic grazing can thus not reverse climate change.'[6] Important to note too, Savory's work has long been bankrolled by large corporations from McDonald's to Shell Oil, with other big-ag funders documented to have potentially compromised the quality and results of research for the sake of marketing.[11]

Other claims by the cattle industry have also been fact-checked, with one particularly misleading claim, ironically made by Farmers Against Misinformation, stating that 'the emissions of cows are part of a closed and self-completing carbon cycle in the atmosphere',[12] implying that no new carbon is created when cows belch and pass gas, when the contribution of cattle rearing to the climate crisis is well documented. White Oaks Pastures, considered a 'leader' in the regenerative space and selling leather goods alongside beef,[13, 14] has had their claims of generating net-negative emissions disproven,[11] yet continue to advertise the carbon benefits of their products. This is despite even industry scientists stating they are far from carbon neutral and even use 2.5 times more land than conventional grazing.[15]

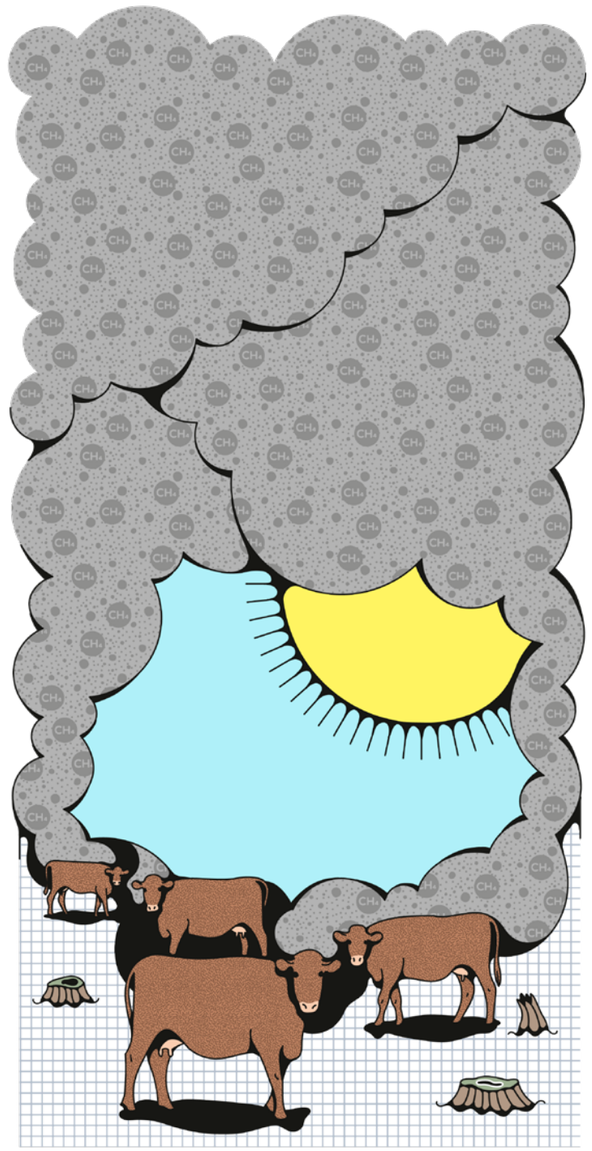
Further, the Grazed and Confused report from Oxford and Cambridge university,[16] citing 300 sources related to soil health, 'regenerative' and other grazing methods, methane and farming, found that 'only under very specific conditions can [grazing] help sequester carbon. This sequestering of carbon is even then small, time-limited, reversible and substantially outweighed by the greenhouse gas emissions these grazing animals generate'.[17] The report found that after some years, soil reaches soil-carbon equilibrium and no longer sequesters any more such emissions, and that ultimately, even the best animal agricultural practices are not as environmentally sustainable as plant-based agriculture. In the words of one report author,

> "this report concludes that grass-fed livestock are not a climate solution. Grazing livestock are net contributors to the climate problem, as are all livestock. Rising animal production and consumption, whatever the farming system and animal type, is causing damaging greenhouse gas release and contributing to changes in land use." [17]

Some proponents of regenerative grazing practices argue that animals are a part of healthy ecosystems, and thus agriculture, which does not include animals such as cattle, could never be as sustainable.[18] It is correct that all healthy ecosystems include animal life, however domesticated cattle cannot be used as replacements for indigenous herbivores.[19–21]

The most effective and thorough way to regenerate our planet is by increasing the amount of land which can exist in its natural state. Agricultural soils contain between 25 to 75% less soil organic carbon than their counterparts in 'undisturbed or natural ecosystems'.[22] This is highly relevant to the fashion industry, as animal-derived materials such as leather come from an inefficient agricultural system. A transition away from animal-based agriculture would free up 75% of agricultural land,[23] as not only grazing land would decrease, but land used to grow crops for animal feed, too. If by 2050 land currently dedicated to animal agriculture such as cattle ranching was rewilded, carbon equivalent to the past 9 to 16 years of fossil fuels could be sequestered, equal to 99–163% of our global carbon emissions budget consistent to 1.5C.[24] This is because such land comes with a 'carbon opportunity cost', which, when rewilded, is sequestered through regenerating soils and plants which grow to become richly biodiverse, in a far more natural state than in agricultural systems.

Contrarily, if more leather were to be sourced from wholly pasture-raised systems, much more land would be required for agriculture,[25] as concentrated animal feeding operations confining cattle skinned for leather would be phased out. Farmland growth has historically seen massive emissions through carbon released from soil top layers,[26] and even more holistic and integrated agricultural systems are not exempt from the reality of agriculture's continued encroachment on natural spaces.[27] 'Regenerative leather' is not a climate solution, even if some methods of cattle ranching are more sustainable than others: more sustainable is not equivalent to genuinely sustainable. The fashion industry needs to prioritise the use of next-gen leather alternatives which are land efficient and genuinely broadly sustainable, and do so while producing less, on our finite planet.



Hide tanning

There is broad recognition of the environmental impacts associated with leather tanning, often overshadowing exploration of ecological harms caused prior to the tanning phase, such as leather's significant climate, water and land footprint at the farm-level.

However, a different set of environmental impacts such as water pollution, waste and chemistry at the tannery stage are significant, too. The conventional leather tanning process is complex, resource intensive and wasteful in nature, resulting in solid and liquid waste, as well as gaseous emissions.

Common substances used in tanning include:

- sodium chloride ⚠
- sulphuric acid ⚠
- ammonium ⚠
- sodium sulphate ⚠
- lime ⚠
- chromium sulphate ⚠
- non-ionic wetting agents ⚠
- bactericides ⚠
- soda ash ⚠
- caladium oxide ⚠
- ammonium sulphate ⚠
- ammonium chloride ⚠
- sodium bisulphate ⚠
- sodium chlorite ⚠
- sodium hypochlorite ⚠
- formic acid ⚠
- sodium bicarbonate ⚠
- vegetable tannins ⚠
- syntans ⚠
- polyurethane ⚠
- fat emulsion ⚠
- formaldehyde ⚠ and more.[1]

- Lead ⚠
- arsenic ⚠
- mercury ⚠
- cadmium ⚠
- and chromium ⚠

are particularly notable for their toxicity.[2]

Over 90% of leather around the globe is tanned with chromium.[3] Chromium, along with other common tanning heavy metals and substances like formaldehyde and arsenic are considered carcinogens.[4–6]

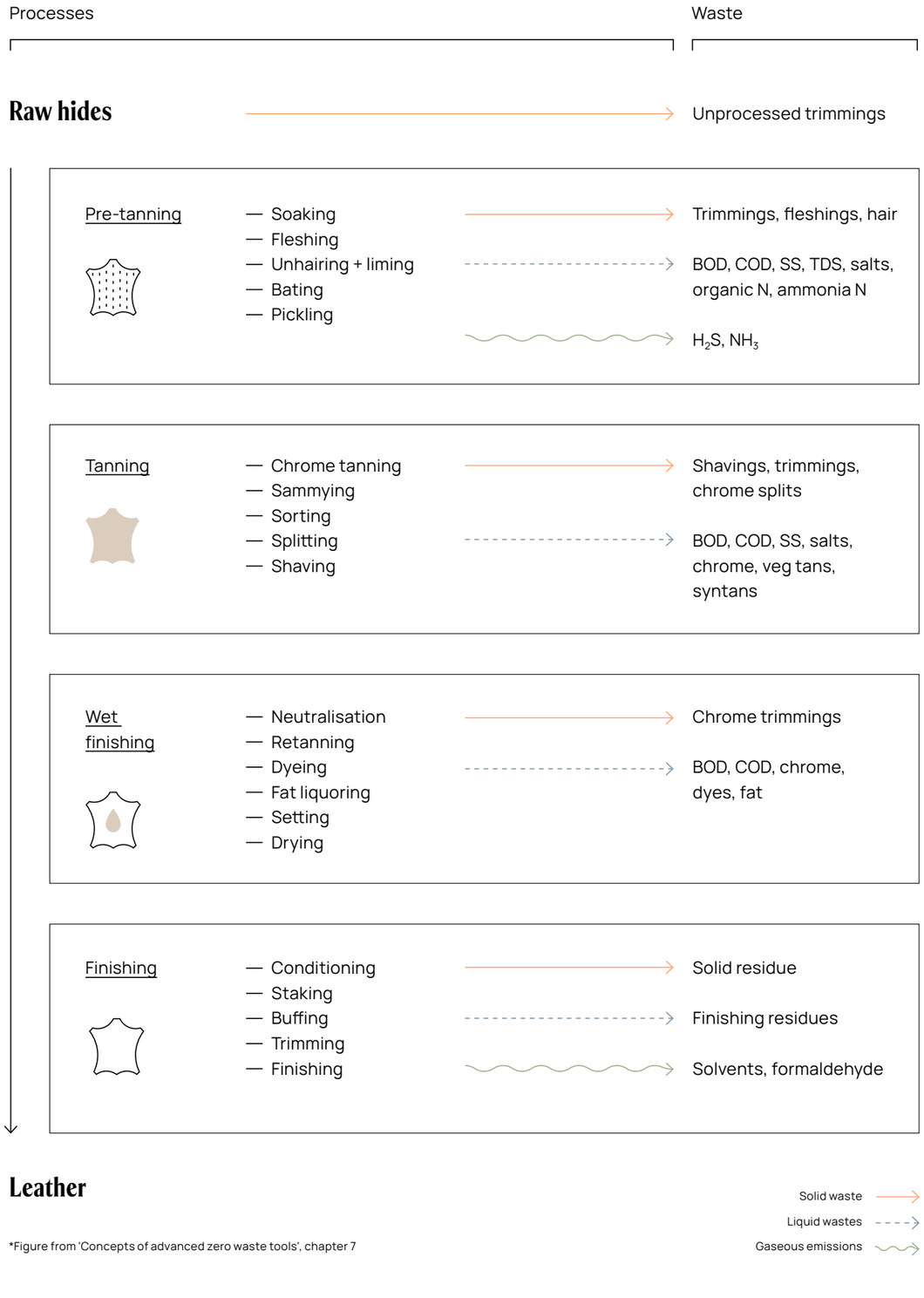


*Figure from 'Concepts of advanced zero waste tools', chapter 7

In the face of criticism relating to the common, carcinogenic, chemical-heavy tanning process, leather proponents cite the existence of vegetable tanned leather.[7] 'Veg-tanned' leather is processed with the use of tannins found in specific tree barks,[8] rather than with synthetic tannins and other chemicals.[9]

Just about 10% of all leather is produced with vegetable tanning methods,[10] which are heralded as more sustainable and natural. While chrome-free tanning methods can reduce harmful pollutants flowing into waterways,[11] which is an important negative impact reduction, vegetable tanned leather is less different to conventionally tanned leather than it is assumed to be. Indicative findings from a study spanning twelve tanneries found there to be 'no significant differences' in the carbon, water and energy footprints of vegetable and chrome tanned leathers.[12] Many brands refer to 'natural' or vegetable tanned leather as sustainable due to its supposed ability to fully biodegrade,[13, 14] potentially misleading consumers interested in making more sustainable choices. However, findings published in Tannery Magazine showed that chrome tanned, metal-free and vegetable tanned leathers all failed to meet the biodegradation rates required to be considered effectively biodegradable, even under controlled conditions.[15] While innovation in the tanning space may allow for improved biodegradation, all tanning processes exist to make an organic material, skin, inorganic, in order to prevent rotting.

Further impeding biodegradation and in contrast to industry promotion of leather as vastly different to synthetic, polyurethane alternatives, substances such as polyurethane and acrylic resins and lacquers are regularly used to finish leather.[16] These are fossil-fuel derived plastics, often used alongside non-biodegradable and toxic dyes.[17, 18]

Biodegradability should not be considered the only measure of material sustainability, as product longevity,[19] and other production impacts, such as those explored earlier, are all important, too. It is for this reason that some brands may choose a material like Global Recycling Standard certified post-consumer polyurethane as a leather alternative, over more climate, water and land impactful animal-derived leather, or partly bio-based leather alternatives which have had less time to be tested for longevity, and which cannot be recycled so effectively.[20, 21]

Leather tanning pollution

Up to 170 unique chemicals utilised in conventional leather tanning pose significant risks for soil, agricultural land, and air pollution, along with risks to plant and animal wildlife.[2] Waste generation from this process is immense, and found in solid, liquid, and gaseous, hazardous forms.[2]

While water pollution is a major problem associated with tanneries, other waste outputs should not be ignored: one tonne of processed animal skins can result in up to 2,650 kg of solid residues, up to 50 kg of solvent air emissions, and 2,500 kg of sludge, which usually contains high levels of chromium, lead and cadmium.[22] These sludges are often the result of wastewater processing, meaning that while these toxins do not enter waterways, they must go somewhere.[23]

Tannery sludge associated with different leather goods*:

*Based on tannery sludge data from Malaysia, noting that the amount of sludge produced and how it is discarded varies across countries and tanneries.[24]

1 pair of cow skin leather boots =
nearly 9 kg of tannery sludge

1 cow skin leather jacket =
over 17 kg of tannery sludge

1 cow skin leather tote bag =
over 13.5 kg of tannery sludge

As little as 150 kg out of 1,000 kg of raw cow hides are actually generated into finished leather in some supply chains, while the remaining 850 kg are left as waste throughout the pre-fleshing, lime fleshing, shaving, buffing, and trimming processes.[2] In Bangladesh, around 8.57 million litres of liquid waste and 98 million metric tonnes of solid waste are produced in tanneries each day.[25] In general, regardless of tannery location, solid wastes such as leftover materials and shaving waste are often disposed of by burning the materials, releasing chemicals into the atmosphere.[26] A few consequences of this air pollution include an increase of chromium levels in the environment,[26] ozone damage, and increases in greenhouse methane gas from hydrogen sulphide.[27]

The waste footprint of 1 kg of leather tanned in Italy

The Tough Story of Leather report supported by the European Commission shows that when looking solely at tannery impacts:

1 kg of leather is equal to: [23]

- up to 2.5 kg of chemical substances used and transformed into wastes for disposal
- up to 6.1 kg of solid wastes
- up to 250 litres of water used and requiring purification.

Chemical pollution affects not only the land, but agriculture, plants, and animals that rely on it. Chromium is one of the most frequently referenced metals to be found in soil in significant amounts, present in amounts that are above those naturally occurring,[28] which is particularly notable due to its toxicity.[26] The source of chromium soil pollution often stems from industrial waste effluents, including those derived from tanneries, transmitted by the use of effluents as irrigation water.[28]

When crops are planted on chromium-polluted soil, higher levels of chromium are taken up by the plants, causing reduced yields and crop quality, diminishing the amounts of usable food produced. Plant growth may additionally be hindered by lead, cadmium, and arsenic, all chemicals found in tanning, in turn harming local communities.[28, 29]

Wild, native animals can be further harmed by tannery pollution. For avian species, whose feathers can be studied to determine the presence of metals as a reflection of both their dietary intake and contamination from atmospheric pollution, chromium may cause harmful effects on reproductive health and cadmium may be toxic.[30] Other species which have been examined for potential health complications related to tannery substances include grass carps and quail chicks. Grass craps have been recorded living with altered spleens and kidneys, while quail chicks have been shown to face heart and gizzard damage, including the splitting of longitudinal muscle, degeneration of cardiac muscle, necrosis, and dislocation. Regarding toxic levels of cadmium, pheasants were found to have negative effects on testicular function.[2] These tannery waste impacts are beyond those more broadly discussed, with significant impact on biodiversity and wildlife health.

Water: Fresh water

The fashion industry is estimated to be responsible for as much as 7% of global freshwater extraction each year,[1] equal to 93 billion cubic metres of water.[2] That's equivalent to 37 million Olympic swimming pools worth of water.[3] Responsible water use by the fashion industry is critical — half of the world's population is at risk of facing water scarcity as early as 2025, according to UNICEF.[4]

The climate crisis is exacerbating water scarcity risks,[5] and by 2040, an estimated 1 in 4 children worldwide could be living in areas of 'extremely high water stress' if changes are not made today.[4] Discussions around fashion's water use often focus on cotton irrigation and textile dyeing.[6] Now, leather's water footprint is increasingly highlighted in fashion media.

While water use in tanneries is often highlighted as significant, and water pollution at this supply chain tier is even more concerning, the farm tier of leather production requires the most freshwater by far, accounting for as much as 99.7% of a standard leather shoe and its water footprint,[7] if average tannery specific water intake is measured.[8] Some tanneries use more water than those used in this estimate.[9]

Collective Fashion Justice's CIRCUMFAUNA calculations, as reported in Vogue Business,[10] highlight just how water intensive bovine leather goods are. Based on UNESCO-IHE and industry data,[11] it was found that after allocation, an average cow hide has a water footprint of 104,310 litres, with the amount of leather required for a standard pair of boots equating to just under 12,334 litres of water.[7] This is only the water required to rear cattle to slaughter, exclusive of post-farm-gate water usage. When including both farm and tannery water use, this footprint increases to about 12,370 litres, equal to 199 showers,[7] based on American recommendations for shower length.[12] Further intensive water use at the slaughterhouse level of the leather supply chain would increase this footprint again.[13]

Despite the tannery stage of leather production being less thirsty than the farm stage, tanneries in leading leather production countries consume enormous amounts of water. The water footprint of the tannery industry in China, for example, is estimated to be over 1.4 hundred million cubic metres per annum, while in Brazil, annual water consumption by the sector is equal to that of 5.5 million residents in the country.[9] In the Italian tanning region of Santa Croce alone, an estimated 6 million cubic metres of water is used each year.[14]

Synthetic polyurethane leather can have a water footprint as much as 24 times smaller when compared to leather, using global average cow hide data.[15] Similarly, partly plant-based alternatives like Piñatex have far smaller water footprints.[15] Desserto's partly cactus-derived, polyurethane coated leather alternative has a water footprint 1,647% smaller than some bovine leather, according to their early stage LCA.[16] Modern Meadow's bio-leather aLCA claims to reduce water consumption impacts by over 95% compared to conventional leather,[17] and MIRUM is produced without any water inputs beyond what is represented within the natural ingredients (such as coconut water).[18]

The water footprint of different average cow skin leather goods:[7]

Leather shoes:
7,612 litres
or
enough water for a person to drink for over 10 years

Leather boots:
12,370 litres
or
enough water for a person to drink for 17 years

Leather tote bag:
17,127 litres
or
enough water for a person to drink for over 23 years

Water pollution

Farms and slaughterhouses

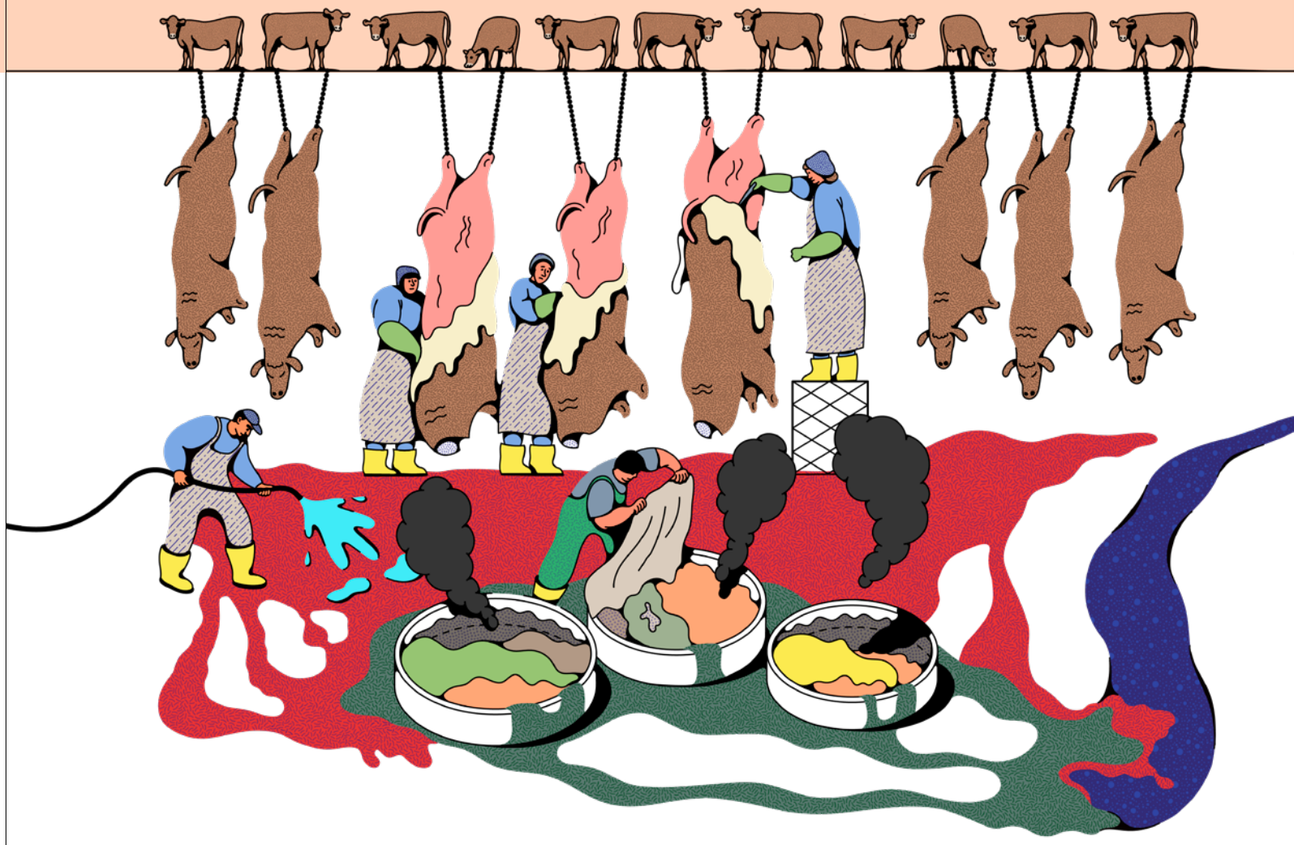
Before the tannery phase where water pollution can be a major issue, potential water pollution problems occur at both the farm and slaughterhouse level of the leather supply chain. On farms, cattle produce significant amounts of waste. A steer (castrated bovine) in the cattle industry can excrete as much as over 34 kg of manure each day.[19] This significant amount of waste can enter waterways nearby both farms and feedlots through runoff and soil erosion where cattle are confined in leather supply chains.[20, 21] As a result, this phosphorus-rich faecal waste can contaminate water and lead to eutrophication,[22] where the over enrichment of nutrients leads to excessive algae growth and in turn, oxygen depletion which can lead to 'dead zones' where aquatic life cannot survive.[23] Further, fertilisers and pesticides used to grow pasture and monoculture crops used to feed cattle can contribute to eutrophication and water contamination.[24–28] As more land is deforested for cattle ranching, erosion and sediment run-off also impacts aquatic ecosystems. For example, sediment from land cleared for cattle ranching in Queensland has been shown by Wilderness Society to lead into the Great Barrier Reef, where it reduces sunlight onto seagrasses and smothers coral and a range of reef organisms.[29]

Slaughterhouses, an essential but frequently overlooked aspect of leather supply chain environmental impacts, also contribute to water scarcity and pollution. Slaughterhouses are responsible for nearly 30% of international agricultural sector water use.[30] Different studies show that between hundreds if not thousands of litres can be used to process each individual slaughtered bovine's carcass and skin in slaughterhouses.[31, 32] Even in highly industrialised countries, slaughterhouses contribute to significant water pollution, even if to a lesser degree than in poorer nations.[33] Across numerous countries which produce significant amounts of leather – from China and India to the United States,[34–37] weak or near to non-existent laws exist to limit the harmful dumping of dangerous pollutants from slaughterhouses.[38, 39] At the same time, slaughterhouses regularly flout existing rules to dump waste into surrounding waterways.[40] In fact, in 2018, three quarters of large slaughterhouses in the United States were reported to be violating regulations protecting waterways.[41] Discharged effluent made up of blood, bones, urine, faeces, fats, remnant chemicals and medications fed to farmed animals and used to clean slaughterhouse floors after killing and skinning are released into waterways, harming local communities and environments.[42] Again, these toxic sludges and contaminants can result in eutrophication and dead zones which kill aquatic life, if they are released.[30, 44]

Tanneries

It's estimated that each year 600 million cubic metres of poorly biodegradable tannery wastewater is produced, with 350 million cubic metres of this discharged back into the environment after treatment, which can vary in efficacy.[9, 44] Meanwhile, as much as 300 – 400 million tons of heavy metals, solvents, toxic sludges and other wastes in the form of discharged tannery wastes are dumped into water bodies each year.[45] The diverse and detrimental impacts of this pollution is severe, with tannery effluent causing lethal effects, genotoxicity, mutagenicity and carcinogenicity to microorganisms, aquatic organisms, plants, animals and people alike.[46] Strengthened government policy to halt industrial water pollution, and compliance with such legislation is critical to reducing negative outcomes.[47, 48] While tanneries in wealthier countries such as the United States and those across parts of Europe are highly mechanised and able to more effectively recycle substances, this is not the norm in a number of leading leather production countries, which still have limited infrastructure which can prevent water pollution.[49] Numerous wealthy, western countries have outsourced a vast amount of their tanning to poorer, largely Global South countries,[50] allowing them to avoid stronger environmental oversight penalties and export pollution problems,[51] in a form of environmental racism.

The leather tanning process is inherently wasteful and inefficient without tanning substance and water recycling, given just 20% of chemicals used in the tanning process are absorbed into skins, with the rest largely being wasted.[45] As much as 300 kg of chemicals can be used for the processing of 1 tonne of raw cattle skins, and at least 60% of raw materials are converted into solid and liquid waste during this process.[45] Pollution loads into the environment can be significantly reduced with safer practices in place.[52]



Industry green-washing

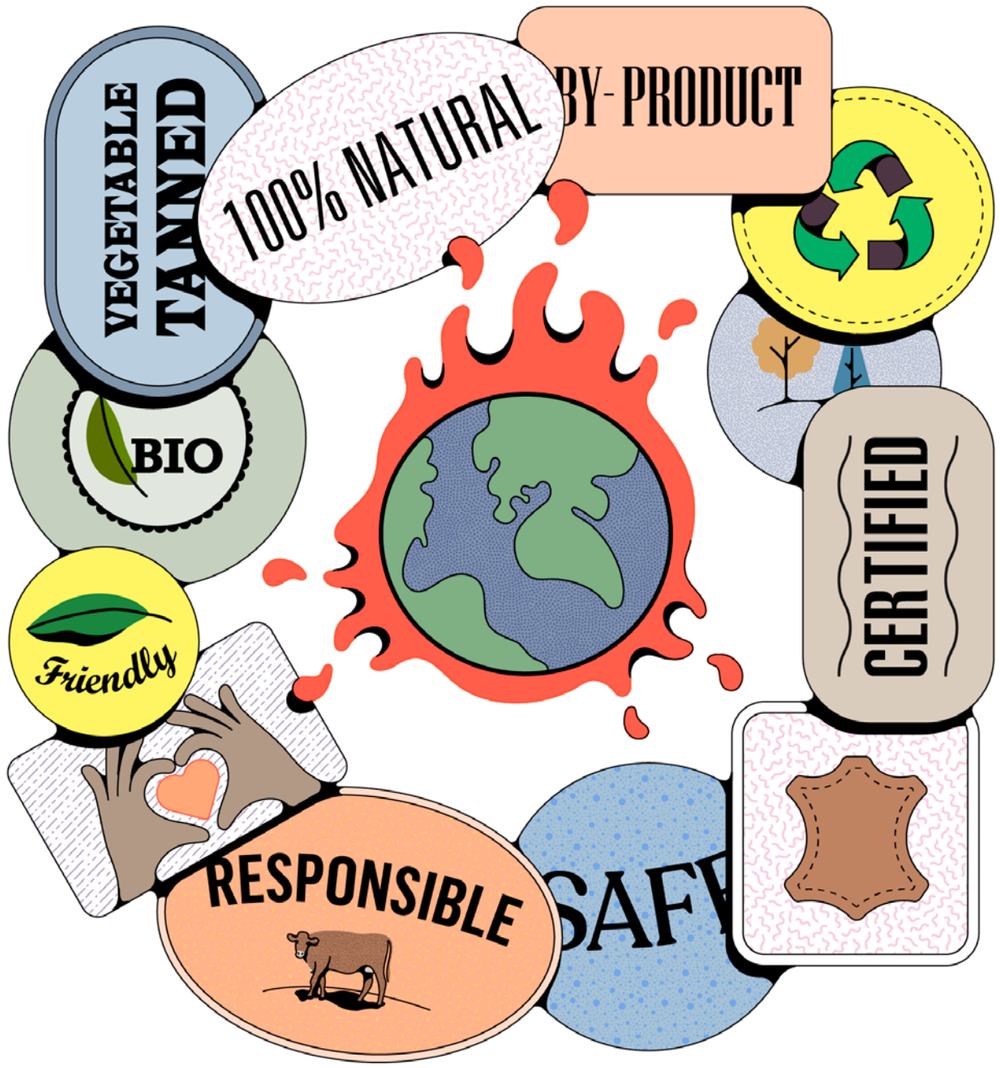
Demand for green products and consumption has grown alongside increased awareness of the climate and biodiversity crises.[1] In response, much of the fashion industry is pushing green-marketing strategies to communicate their supposedly sustainable credentials and commitments. However, ongoing reports show many of these claims to be green-washing.[2-4]

Green-washing is complex and multifaceted,[5] but always involves misleading consumers in relation to the environmental practices of a company, product or service.[6]

Methods of green-washing can include:[5]

- diverting attention
- overstating impacts
- twisting the truth
- omitting key information
- providing vague / ambiguous communication / outright inaccuracies
- promotion of empty green claims
- dubious certification
- co-opted NGO endorsements
- misleading visual imagery

Despite the broad and major harm leather production causes the natural world, leather continues to be promoted as 'natural', 'sustainable' and 'responsible'. While skins are natural, leather is no longer so, and the breeding of 1.4 billion domesticated and selectively bred cattle on native land is not particularly natural, either.[7] In attempts to conceal this and other industry harms, the cattle and leather industry spends significant funds on campaigns which aim to promote the sustainability of leather, and lobby media and policy-makers for the industry's economic benefit, too.[8, 9] In 2022, cattle industries spent over an estimated $420,000 USD lobbying politicians in the United States.[10]



Misleading leather industry campaign and lobbying efforts

Collective Fashion Justice analysed public communications from major players across the leather supply chain; the trade industry, third-party certification bodies, and the fashion industry. The three most notable and recurring green-washing practices documented were the dissemination of false or misleading claims, the omission of significant evidence, and the creation of a false dichotomy between leather and fossil-fuel filled fast fashion. The leather trade industry is particularly explicit in their green-washed claims:

The Leather Naturally campaign

Leather Naturally is an industry members association that promotes the use of globally manufactured 'sustainable leather'.[1] Made up of over 140 leading companies across the leather supply chain, the organisation spends millions on campaigns, reportedly raising $1.5 million USD in 2019,[2] used to spread misleading and false information.

In their most recent global campaign, #LeatherTruthfully, the organisation claims that leather is a natural, renewable, biodegradable by-product that diverts waste from landfill.[3] The campaign also attempts to highlight leather's position as a valuable material with potential to reduce plastic fibres. Such claims are misleading, with even the industry itself urging cattle producers to treat hides and skins 'as an important co-product.[4] The campaign perpetuates the industry-developed myth that the sale of leather does not impact the scale of cattle production, referencing a research report commissioned by the Leather and Hide Council of America.[3] Yet, this report found that in the U.S. cattle industry a 10% increase in the price of hides is likely to cause an additional 163,400 head of cattle to be bred and reared.[5] It's clear Leather Naturally cherry-picks data and misleads consumers by hiding evidence.

Leather Naturally's campaigning directly contradicts scientific consensus. Their website states that 'burping cows killing the planet is great clickbait', which is wrongly based on a 'misunderstanding of the biogenic cycle'.[3] They continue, stating that 'methane is part of the natural carbon cycle that after 12 years breaks down into natural CO_2 and water',[3] despite farmed animal emissions accounting for 32% of human-caused methane,[6] and United Nations recognition that cutting methane emissions can significantly slow global temperature rise.[7]

Trade associations

Leather UK and the Leather and Hide Council of America (L&HCA) represent the leather industries of the United Kingdom and United States respectively.[8, 9] In Leather UK's magazine-style publication 'The Art of Leather',[10] similar greenwashed, false and misleading claims like 'leather is a by-product and by its very nature sustainable, durable and beautiful – all qualities synonymous with the slowing of rapid consumption required in today's world' are made.[11] Leather co-products are far from inherently sustainable and leather is not at the helm of slow fashion. According to Statista, revenue in the luxury leather goods segment is expected to grow annually by 6.08%, from $66.21 billion USD in 2022 to $85.93 billion USD in 2026.[12] Slow fashion is critical, and beyond material selection, it must focus on degrowth.[13]

Meanwhile, L&HCA's global campaign 'Real Leather. Stay Different' has reportedly reached 750 million people and counting.[14] The campaign positions leather as the 'natural alternative' to petrochemical industries and fast fashion.[14] This is a ploy to distract consumers from the vast and extensive environmental and social impacts of leather. Such claims also ignore that brands make products from plastic-coated leathers, and from a mix of both animal and fossil-fuel based sources. L&HCA's campaign includes blatant falsehoods, such as the assertion that leather is a sustainable resource that sequesters carbon,[15] and involves regional design competitions across Europe, the U.K. and Asia. These prize-driven competitions aim to 'spark the interest of young designers to work with natural, sustainable, responsibly produced real leather – a by-product of the meat and dairy industries – which puts hides that otherwise go to landfill to good use'.[14] This is another false, vague and misleading statement.

Perhaps worst of all, L&HCA spearheaded the leather industry in a concerted lobbying effort during the 2021 United Nations Climate Change Conference (COP26).[16] Thirty-one signatories of the industry, including Leather Naturally, Leather UK and the Leather Working Group, signed the 'Leather Manifesto'.[17] This manifesto called for COP26 to acknowledge leather as sustainable, renewable, recyclable and biodegradable, declaring leather a 'natural material' with the potential for helping to reduce the 'climate impacts of consumer products'.[17, 18] The manifesto also pushed for leather to be seen as a means of directly mitigating climate impact.[18] This industry action attempts to continue business as usual under the guise of environmental protection, and coincided with additional political lobbying at COP26, where the leather and beef industry attempted to escape COP26 climate targets, urging politicians to ignore significant methane emissions from their industry.[19, 20]

In 2022, the French Leather Council, along with the European Confederation of the Footwear Industry, lobbied to escape EU deforestation policy,[20] sending letters to members of the European Parliament urging them to exclude their industry from proposed legislation to exclude deforestation from the supply chains of products sold across the EU. Fortunately, these efforts were unsuccessful.[21]

Misleading claims by brands using leather

The Leather Working Group (LWG), considered the world's leading environmental certification for leather, encourages companies to make claims such as 'LWG promotes responsible environmental practices across the leather supply chain',[1] despite the majority of supply chain tiers with major environmental impacts being largely excluded from the certification.

Collective Fashion Justice analysed LWG member brands to assess the validity of their environmental claims about leather. The analysis spotlighted ten brands representing varying segments of the fashion industry, including Louis Vuitton, Michael Kors, Marc O'Polo, Steve Madden, Ba&sh, New Balance, ASOS, Massimo Dutti, Hugo Boss and Green Pilot. These brands were chosen as leather is profuse in their collections and they make explicit claims relating to leather.

Of the 25 claims analysed, the framework identified specific forms of green-washing defined as selective disclosure, no credibility, political spin, no evidence, vagueness, empty claims, and misleading symbols.[2] The most prolific form of green-washing across the analysed claims was selective disclosure; claims based on a narrow set of attributes, distracting consumers from more significant environmental impacts tied to leather.[3]

All brands heavily focused on the LWG certification as evidence for their green claims, yet failed to disclose that the certification does not yet eliminate deforestation, or assess significant environmental impacts such as methane emissions, biodiversity destruction, on-farm water use, or any other major environmental impacts at all, likely skewing consumer perceptions.

Here, we highlight three brands with particularly green-washed marketing:

Massimo Dutti

Low-end luxury clothing, owned by Spanish multinational company Inditex.

Environment claim:

The brand promotes LWG certified leather as sustainable, with it making up 46% of items listed in their women's 'Join Life' sustainability collection.[2, 4, 5] These leather products are promoted with a 'Care for Planet' label in the product description. This label is given to garments made using processes that reduce emissions.[6]

Green-wash issue:

Massimo Dutti is equating sustainability to a single environmental attribute, the LWG tannery certification, without attention to the extensive and cumulative impacts of leather.[7] This has been identified as a green-washing practice called the hidden tradeoff.[7] What's more, the majority of leather's production emissions are at the farm-level, where LWG certification has near to no impact.

Marc O'Polo

International casual fashion brand.

Environment claim:

The brand lists LWG certified leather as 'responsible leather' and includes it as a 'sustainable natural material'.[8] The brand's sustainability category for products includes an entire section for 'sustainable responsible leather (LWG)'.[9] The leather products are accompanied with a green sustainable label and a product description which states 'this product contains one or more sustainable materials'.[10] Thus, LWG leather is classified as sustainable.[11]

Green-wash issue:

Categorising leather from LWG certified tanneries as sustainable, responsible and natural is misleading, particularly when the brand only focuses on LWG certification as evidence, overstating the environmental benefits of this while omitting other and more significant impacts involved with leather production at farm-level not covered by the LWG certification.

Michael Kors

Luxury accessories and ready-to-wear brand.

Environment claim:

The brand displays a sustainable badge on leather products made from at least 50% environmentally preferred materials or made with leather from LWG certified tanneries.[12, 13]

Green-wash issue:

Despite LWG certification failing to address major climate, biodiversity, water and land impacts, it is the only evidence Michael Kors uses to justify their use of a sustainable badge, and the only sustainable sourcing commitment for leather the brand has. Again, this distracts consumers from the greater environmental impacts of leather.[3]

Degrowth in fashion

Estimates suggest that in 2020, 20.5 billion pairs of shoes were produced worldwide. While a large portion of shoes are made of harmful animal-derived leather, this scale of production is itself unsustainable, regardless of the materials used. While the choice of materials used in fashion production results in significantly different environmental outcomes, in order to create a more genuinely sustainable fashion industry, we must address material impacts alongside scale-based impacts.

Numerous experts are now calling for the fashion industry to focus on 'degrowth', using less resources to create less products and less waste. Leather production is as inefficient as synthetics are extractive, but more circular materials which effectively biodegrade, require less land, emit less greenhouse gases and so on should not aim to replace the total output of virgin leather and synthetics available today. To propose that today's leather output be totally replaced by alternative and sustainable materials would be irresponsible and out of alignment with genuine environmental protection and restoration efforts.

As reported in Vogue Business, University of the Arts London professor Kate Fletcher states that 'the only way we can address the climate crisis is by producing and consuming less', 'citing conservative estimates by academics including Ernst Von Weizsäcker (author of Factor Four, 1997) that fashion needs to reduce its resource use and waste by fourfold to exist within planetary boundaries.'

Degrowth in the fashion industry is not the destruction of the fashion industry, but the carefully planned evolution of it. Embracing radical degrowth means recognising the impossibility of a continually enlarging fashion industry on a finite planet, by prioritising repairs, upcycling and recycling, composting, consumption and production limits, a shift away from the ever fastening trend cycle, and the encouragement of personal style cultivation.

The incorporation of degrowth in brand sustainability strategies means, fortunately, that brands do not need to wait until the most innovative alternatives to leather have scaled to meet today's leather output, in order for a full transition beyond leather to occur. Brands should be exploring long-term degrowth strategies which position them positively in the future of fashion while simultaneously shifting beyond animal-derived leather and to next-gen, circumfaunal materials.

Leather's impact on the planet

Degrowth in fashion

Conclusion

A wide range of serious environmental harms are documented across the leather supply chain: from the major emissions, water use and land inefficiency attributed to cattle ranching, to the polluting of waterways across slaughterhouses and tanneries, these environmental problems are varied and immense.

A number of these environmental issues can be remedied. For example, less environmentally impactful tanning processes are available, while improved chemical and water recycling and treatment at the tannery level would better protect surrounding waterways and ecosystems. Similarly, efforts to legislate deforestation out of leather supply chains, only using previously deforested land, can be effective for some biodiversity and land protection.

However, some environmental harms and inefficiencies are inherent to a system which relies on the long-term and intensive process of rearing animals for production. Animal-derived leather production should be considered one of fashion's most serious climate and biodiversity concerns, eating away at an absurd amount of land, which, even if not deforested or cleared for production, are often forced into a state of arrested development, unable to support the richness of biodiversity it could without being grazed for profit. Similarly, the emissions tied to rearing ruminant animals cannot be ignored if we are to reach IPCC recommended climate targets.[1] Now is not the time for conservative, incremental change, but for radical action reflective of the scale of the environmental crises we collectively face today.

While more challenging than attempts at partial industry reform, and requiring more scientific and culturally-driven imagination for a better future, a just transition away from leather production is a far more effective and all-encompassing solution to create a more sustainable future of fashion. But what would this look like?

James Arbib, the co-founder of RethinkX – an independent think tank forecasting the speed and scale of technology-driven disruption – states that while cost and distribution vary the speed, it can take about 15 years for a new product to effectively disrupt a market.[2, 3] Positive feedback loops can allow for such disruption to begin following a tipping point in which 10% of a market is made up of such a new, more sustainable solution.[4] In the case of circumfaunal, next-gen leather, these materials will not be widely available for another few years, even with existing investment. Nicole Rawlings, CEO of Material Innovation Initiative, estimates that with this in mind, and with a healthy, expected growth of investment in the space, broad disruption will likely occur around 2040.[5]

RethinkX also estimates in their agricultural report that by 2030, demand for some cow-based products will have fallen by as much as 70%.[6] This shift will greatly help us reach IPCC goals of reducing methane emissions by about one third.[7] Meanwhile, experts suggest that the fashion industry must work to reduce in size fourfold in order to stay within planetary boundaries, and these critical calls cannot be ignored.[8] With this in mind, it is entirely reasonable to recommend the following actions from fashion:

1. Fashion industry initiatives, certifications and media publications, alongside the not-for-profit ethical and sustainable fashion sector, should update their language to acknowledge the harm leather production causes to the planet, as well as the humans and non-humans living here. Terms like 'ethical', 'conscious' 'sustainable', 'natural', 'circular', and 'eco-friendly' should not be used in reference to animal-derived leather.

2. Fashion brands should publicly commit to reducing leather use by at least 50% by 2027, fully phasing out leather no later than 2035. These timelines should be used as conservative targets, with more immediate change being both critically needed and achievable for many brands.

3. In phasing out animal-derived leather, brands should embrace alternatives that shift the fashion industry away from a reliance on fossil fuels, and towards greater circularity.

4. Large fashion brands should invest in the research and development of leather alternative material innovation – ensuring these materials consider the need for a just transition, and will ultimately be open-source and available for wider industry use.

These recommendations are certainly significant asks of the fashion industry, but their substantial scale is reflective of the urgent need to divest from the interconnected harms of leather production, and from the environmental crises which it perpetuates, as explored throughout this report series. Brands which primarily profit from leather goods will find more challenges in attempting to fulfil the outlined time-based recommendation than brands which include leather goods as one of many offerings. This recommendation should be seen and used as a clear target for what is hypothetically possible for a large portion of brands, should the industry act together effectively and quickly, as it must. For those brands which could not feasibly reach this particular recommendation, serious consideration as to what the closest practical possibility is should be explored and set as a brand-specific target. Immediate action to reduce leather reliance and the environmental impact of leather supply chains must be made in the interim. ■

Leather's impact on the planet

Conclusion

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