

SUMMER 2026

Natural & Fibres

INSIGHT



Traceability Test

Regulation raising the bar on natural fibre claims

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Previous Issues



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Editorial

Two questions are driving much of the serious regulatory pressure on fashion right now. Can you prove where your fibre comes from? And can you back up your environmental claims with real data?

This issue has a heavy focus on those two questions, and why natural fibres are increasingly well placed to answer them.

For a long time, the language around natural fibres has leaned on words like renewable, biodegradable, traditional and regenerative. While some of that language might well be justified, the market is changing. Brands, regulators and, to some extent, consumers are no longer satisfied with a good story. They want evidence.

Traceability is a clear example. Our main feature (pages 20-23) shows how natural fibre supply chains are moving from marketing into compliance territory. Digital chain of custody, physical markers, forensic origin testing, satellite data: these were niche tools not so long ago. But they are now becoming standard infrastructure for anyone making credible fibre claims.

In this issue we cover a major traceability milestone for Australian wool, with the one millionth bale processed through the WoolClip platform tracked from a New South Wales farm to a textile manufacturer in China. We also look at Oritain's findings that prohibited cotton risk is still rising even as brands invest more in traceability, and at new systems combining DNA verification, farm data and digital supply chain records.

The direction of travel has been clear for some time. If a brand says its cotton is organic, its wool is regenerative or its mohair is responsibly sourced, it will need evidence that survives scrutiny beyond the label.

Similar pressures are reshaping environmental claims. Green claims rules, digital product passports, due diligence legislation and textile EPR are all pushing the industry away from vague sustainability language towards information that is precise and defensible.

I believe that creates a major opportunity for natural fibres.

In this issue, we report on a new US cotton life cycle assessment (pages 26-29) which may prove to be a turning point for the cotton sector. The study finds that US cotton can show a negative cradle-to-gate greenhouse gas footprint when biogenic carbon storage in fibre and soil is factored in (and follows similar work in the wool sector).

To be clear, the study does not invite sweeping claims that cotton products are "carbon negative." Instead, it provides a defensible way to communicate a specific cradle-to-gate result for U.S. cotton fibre, including the role of temporary biogenic carbon storage in fibre and soil.

We interviewed one of the report's authors, Jesse Daystar, about the U.S. cotton LCA findings. For brands seeking to make credible, legal claims about US cotton, this interview is a must-read.

This issue also covers the kind of difficult questions which we have always



said we won't shy away from. Human rights challenges in cotton supply chains, ongoing climate pressure on Indian growers, mohair welfare allegations, end-of-life pollution and cheap synthetic competition remain major challenges for the industry.

Moreover, natural fibres remain under huge pressure globally as supply chains continue to readjust and difficult economic headwinds show no sign of abating.

But the sustainability picture is genuinely encouraging. At a time when regulators are demanding traceability and evidence, natural fibre sectors are truly stepping up to the plate.



Brett Mathews
Editor



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Wheat straw pilot points to next-gen cellulosic fibre route

A pilot project using Indian wheat straw to make viscose and lyocell suggests that agricultural residues could be used as a viable alternative to wood-based pulp in man-made cellulosic fibres.

The project, called Project Latvus, was led by environmental non-profit Canopy and Fashion for Good, with participation from C&A, H&M Group and Reformation. Supply chain partners included Chempolis, TITK, Inovafil, Yee Chain, Shahi, Filpucci, DBL, Textile Genesis and wheat straw supplier A2P Energy. The findings are set out in Canopy's new report, *From Wheat Straw to Wardrobes: Fashioning a new fibre future*. The report tested whether pulp made from Indian wheat straw could be used to produce high-quality



viscose and lyocell instead of conventional wood-derived pulp.

In the project, the wheat straw pulp was able to directly replace wood-based pulp in viscose and lyocell fibre production. It was also used to create yarns and fabrics that met brand performance and technical standards across a number of product applications.

This is significant because viscose and lyocell are typically made from wood-derived pulp. These fibres are often marketed as lower-impact alter-

natives to synthetics, but Canopy says more than 300 million trees are cut down each year to make man-made cellulosic fibres, including from climate-critical and biodiverse forests.

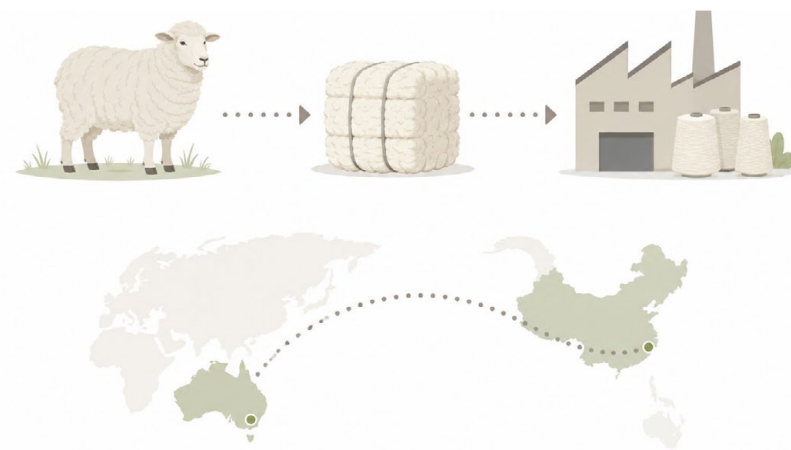
The pilot also points to a possible route for India to develop next-generation MMCF production from local agricultural residues. More than 90 million tonnes of crop residue are burned annually in India, creating both an air pollution problem and a missed raw material opportunity.

Australian wool hits traceability milestone

Australia's wool industry has marked a traceability milestone after the one millionth bale processed through the WoolClip digital specification platform was tracked from a New South Wales farm to a major textile manufacturer in China.

The 17-micron wool bale was pressed at the Jibolaro shed, near Cooma, and classed by wool classer Tiffany Clifford. It was sold through AWN and bought by Sentdale Wool for Nanshan Group, which is processing the bale in China. The Australian Wool Exchange's WoolClip platform is designed to replace paper-based documentation with a digital system that records and manages wool bale data. The milestone offers evidence of growing demand for greater transparency across the wool supply chain.

Nanshan Group Australia general manager Kevin Xing said traceability is becoming increasingly important for both buyers and growers. He said being able to trace wool from the farm in Australia to the mill in China gave the company greater confidence in



reliability and helped it provide more transparency to customers.

Nanshan is one of China's major textile groups and operates across the wool processing chain, from raw wool purchasing and processing through to garments and branded products. The company has been involved in the textile industry for more than 40 years and works across the full wool value chain. The bale will be used in research and development as well as the production of high-end fashion and outdoor performance materials, according to Nanshan Fashion Group China R&D director Wang Enqing. He said Australian

wool's fibre length and fineness made it well suited to higher-quality products. The development comes as wool, like other natural fibres, faces increasing scrutiny around origin, animal welfare, land use and supply chain documentation. Digital traceability systems are a way to give brands and processors more robust information on fibre provenance and movement through the supply chain.

Moreover, buyers increasingly want evidence of where fibre comes from, how it has moved through the chain and whether claims can be supported beyond the point of sale.



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Under Armour has joins U.S. Cotton Trust Protocol

MEMPHIS - Athletic performance retailer Under Armour has joined the U.S. Cotton Trust Protocol. The membership reflects Under Armour's commitment to supporting the U.S. cotton farmers. Through the Trust Protocol, the brand gains access to verified, field-level

data across key environmental metrics, including water use, greenhouse gas emissions, soil health, and land use. Under Armour will pilot the use of cotton tracked through the Trust Protocol this Fall, in all graphic tees within the Freedom collection. This is a line dedicated to supporting and honoring military personnel, veterans, and first responders. "Under Armour believes performance starts with the materials we choose. Where and how our cotton is grown matters," said Aaron Driggers, direc-

tor of sustainability at Under Armour. "We are thrilled to join the U.S. Cotton Trust Protocol and strengthen our ability to build better products for athletes while advancing transparency across our supply chain." The Trust Protocol is a voluntary, field-level sustainability and traceability program for U.S. Cotton distinguished by its measurable, verifiable approach to fostering responsible cotton production and driving ongoing improvements across key sustainability indicators.

Half of T-shirt cotton lost before sale

OSLO - Almost half of the cotton fibre used to make a T-shirt can be lost before the garment even reaches the shop floor. This is according to a new study which challenges the fashion sector's heavy focus on post-consumer textile waste. The study, published in the Journal of Circular Economy, found that 44 per cent of the original cotton fibre input was lost during manufacturing stages. Under current conditions, only 17 per cent of the original fibre could be mechanically recycled and used again in a new T-shirt.

The research was carried out by Rakib Ahmed and Christina Meskers of SINTEF, together with Johan Berg Petersen of the Norwegian University of Science and Technology.

The researchers modelled a typical cotton T-shirt made in Bangladesh, used in Norway and then handled through Norwegian waste and recycling systems. They looked not only at one product life cycle, but at two consecutive loops.

In simple terms, they followed what happens to the cotton fibre in a first T-shirt, and then what could be recovered and used again in a second T-shirt. Many life cycle assessments look at a garment as a single product journey, from raw material to disposal. This paper instead tracked fibre retention across two cycles and across a global value chain. It also combined material flow modelling with life cycle assessment, giving a clearer picture of how much fibre is actually retained, lost or recoverable.



Much of the policy debate in Europe has centred on collection of used clothing, sorting, reuse and recycling after the consumer has finished with a garment. The study argues that this misses a major part of the problem because a large share of the fibre is already gone before the consumer buys the item. The losses occur during normal production steps. These include yarn production, wet processing and garment manufacturing. The researchers said the largest losses occur early in the value chain, rather than at the point of disposal. The study also assessed five environmental impact areas: global warming, freshwater eutrophication, freshwater ecotoxicity, water consumption and land use. Its scenario analysis found that recycling pre-consumer waste could raise material recovery to as

much as 44 per cent. Improving process efficiency in yarn, wet processing and apparel production could reduce global warming impact by around 10 per cent and other environmental impacts by 20 to 25 per cent.

This suggests that if brands want higher fibre-to-fibre recycling rates, they may need to pay closer attention to production efficiency, factory waste streams and the recovery of pre-consumer cotton waste.

For manufacturers, the study suggests waste reduction in spinning, processing and garment making may deliver environmental gains before more complex end-of-life recycling systems are fully scaled.

Further reading:

<https://circulareconomyjournal.org/ojs/JoCE/article/view/250>

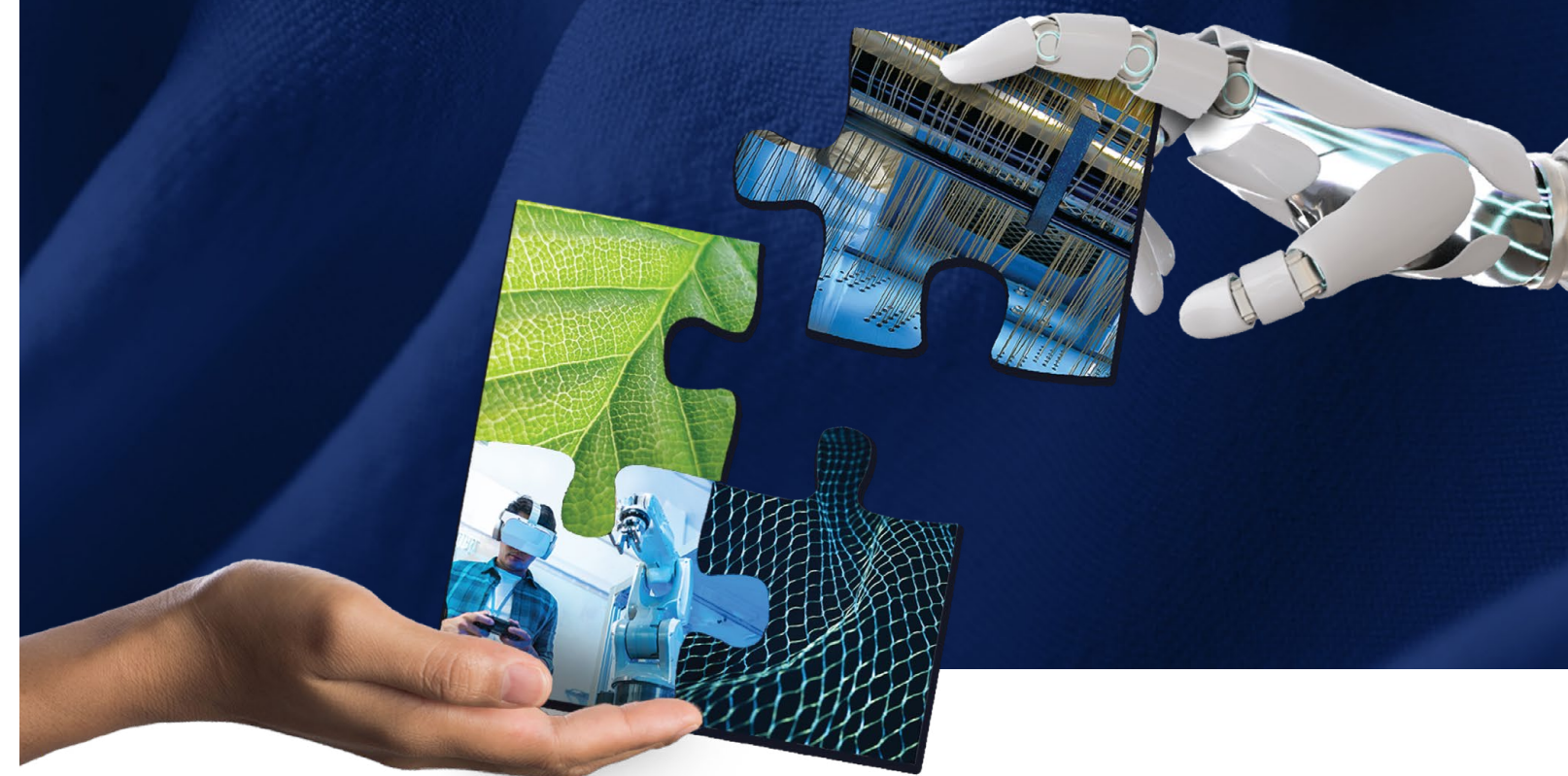


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New test could help spot mislabelled cashmere



Researchers in China have developed a new method to measure the amount of cashmere and wool in blended fibres. The findings could potentially support faster quality control and help tackle adulteration in the cashmere market.

The study, published in the *Journal of Natural Fibers*, combines near-infrared spectroscopy with a machine-learning model to predict the content of cashmere and wool in fibre blends. The researchers say the method offers a rapid and accurate way to analyse fibre composition without relying on slower, more complex laboratory techniques.

Cashmere is significantly more expensive than wool because it is rarer and has different performance characteristics. It is collected from the fine undercoat of goats, with each goat producing only around 150 to 300 grams per year. By contrast, a sheep can produce around 7 to 8kg of wool annually. This large difference in supply is one reason cashmere commands a premium price. However, that premium also creates a risk of fraud. It is relatively easy for lower-cost wool to be blended into cashmere products, making it hard for brands, retailers and testing laboratories to verify claims quickly.

Current identification methods include peptide analysis, chemical dissolution and scanning electron microscopy. These can be accurate, but they also have limitations, with some requiring expensive equipment, complex data interpretation, destructive sample preparation or time-consuming procedures. This limits their usefulness for fast, large-scale testing.

The new study used near-infrared, or NIR, spectroscopy. In simple terms, this technique shines near-infrared light on a sample and measures how the material absorbs or reflects that light. Different materials leave different spectral “fingerprints,” based on their chemical structure and these can then be analysed to estimate the composition of a blend.

The team prepared 21 different mixing ratios of cashmere and wool, from 0 to 100 per cent in 5 per cent steps. The samples included cashmere and wool from different regions, including Qinghe long wool, Chifeng fine wool, Shaanxi fine wool, Albas white cashmere, Alashan cashmere and Hanshan white cashmere.

The samples were processed using a potassium bromide tableting method and then scanned with an NIR spectrometer. The researchers then cleaned up the spectral data to remove abnormal samples and reduce baseline interference.

A key part of the study was selecting the most useful wavelength bands. Rather than using the full spectrum, the researchers compared different feature selection methods to identify the parts of the spectrum most closely linked to cashmere and wool content. Their best-performing method, called IVSO, selected six important spectral regions and removed less useful data.

The selected bands were linked to chemical differences in the fibres, including features associated with keratin structures and bonds in protein fibres. Cashmere and wool are chemically similar, so the model needs to detect subtle differences rather than obvious contrasts.

The researchers then tested several prediction models. Their best model, known as IVY-DHKELM, achieved a coefficient of determination of 0.9743 for cashmere content and 0.9625 for wool content on the test set. In practical terms, the closer this figure is to 1, the better the model’s predictions match the real composition.

The study also found that prediction errors for both components were controlled within 5 per cent. In validation tests, including blind samples and blends involving Pashmina wool and Hanshan white cashmere, the model still achieved strong results, with R^2 values above 0.9.

For the natural fibres sector, the research is relevant because fibre authenticity is central to trust, pricing and labelling. Cashmere adulteration can mislead consumers, damage brand reputation and disadvantage legitimate producers.

However, the study remains a laboratory-based proof of concept where researchers used prepared fibre samples rather than finished commercial garments with dyes, finishes, moisture variation or complex multi-fibre blends. Further work would be needed before the method could be widely used in routine industrial testing.

Further Reading: Jinni Chen et al., “Multi-Component Quantitative Analysis of Cashmere and Wool Fiber Mixtures Based on NIR Spectroscopy and IVY-DHKELM”, *Journal of Natural Fibers*, 2026.

Michell Legacy: Towards 100 years of Leadership in Alpaca and Natural Fibres



With 95 years of expertise and innovation in the processing of Alpaca fibre, Michell & Co. stands as a pioneer and world-leading producer and exporter of Alpaca tops and yarns.

Headquartered in Arequipa, Peru, Michell is a vertically integrated company whose operations encompass the entire production chain - from animal breeding, fibre sorting, scouring, carding and combing to worsted spinning and the dyeing of both classic and fancy yarns. With a monthly production capacity of 250 tons of yarn, ranging from 0.4Nm to 120Nm, Michell proudly presented its A/W 27–28 Collection during Pitti Filati 99, held in Florence last June.

At the core of Michell’s vision is the commitment to building a balanced and sustainable ecosystem where economic growth is aligned with strong anti-corruption principles, environmental stewardship, biodiversity preservation, and the conscientious use of natural resources. Equally important is the company’s social commitment, reflected in its close collaboration with local communities and the implementation of responsible employment practices throughout its workforce.

As the company approaches its 100th anniversary in 2031, Michell has launched “Michell 100”, a long-term strategic programme designed to align the company’s operations and policies with the United Nations Sustainable Development Goals. The initiative prioritises key pillars such as gender equality, responsible water and energy management, carbon footprint reduction, and improved access to education through Michell’s social development programs.

The inspiration behind the Michell A/W 27–28 Yarn Collection is deeply rooted in the company’s Andean heritage. Through this collection, Michell seeks to share the richness of its history, culture, textile traditions, and the exceptional qualities of noble natural fibres, led by the luxurious Alpaca.

Across all product lines, Michell offers an extensive range of classic and fancy yarns in contemporary colour palettes, featuring solid shades, heathers, melanges, colour injections, and hand-painted effects inspired by the vibrant tones of Peru’s cultural heritage.

The passion for working with Alpaca, combined with state-of-the-art technology and the creativity of Michell’s R&D team, enables the development of highly specialised and bespoke yarns. The new Michell Yarn Collection showcases luxurious natural fibre yarns designed to meet a wide variety of applications, including machine knitting, hand knitting, weaving, hosiery, upholstery, sock manufacturing, and circular knitting. Innovation continues to be one of Michell’s main drivers.

As part of this commitment, the company has developed “EasyWash Alpaca,” an innovative washable Alpaca yarn created through an environmentally friendly enzyme-based process.

In parallel, Michell’s traceability system across the entire alpaca value chain enables complete transparency - from the breeding of the animals to the finished product. These initiatives have supported compliance with some of the industry’s most demanding international certifications, including Global Organic Textile Standard (GOTS), OEKO-TEX, Responsible Animal Fiber Certification (RAF), Fair Trade Peru, Interwoollabs, and Business Alliance for Secure Commerce (BASC).

Aligned with these achievements, Michell’s Sorani Farm stands out as the only farm in the world to offer certified organic Alpaca fibre.

We invite you to discover the many exciting initiatives and innovations Michell has prepared as it advances toward a century of leadership in the Alpaca and natural fibres industries.

For more information, visit the official Michell & Co. website www.michell.com.pe or find them on LinkedIn as Michell y Cia S.A and Instagram as @michell_alpaca

Bestseller backs regenerative wool project in South Africa

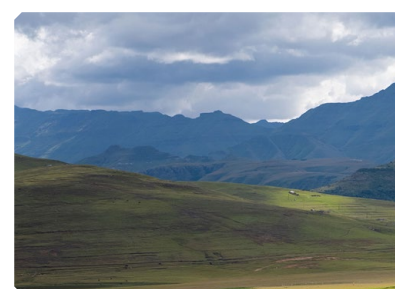
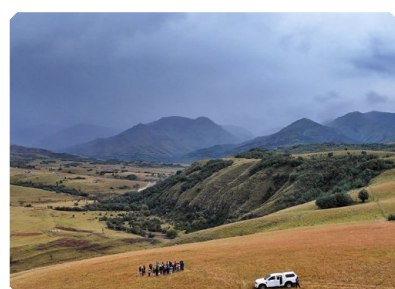
Bestseller is investing US\$3m in a South African regenerative wool project aimed at improving Eastern Cape grasslands, animal welfare, soil resilience and farmer livelihoods. By MARK LANE

COPENHAGEN - Bestseller is contributing US\$3m to a regenerative agriculture fund supporting sheep farmers and shepherds in South Africa's Eastern Cape.

The Danish fashion group said the funding, equivalent to DKK 19m, will go to the Regenerative Fund for Nature, an initiative established by Conservation International and Kering in 2021. Inditex joined the fund in 2023 and Bestseller has now become a partner.

The money will support work already under way in the Eastern Cape, where Conservation International and local partners are working with farming communities to improve grasslands, animal welfare and soil resilience. The project focuses on regenerative grazing practices, including rotational grazing, which can help restore grasslands, reduce erosion and improve soil carbon storage.

The Eastern Cape is one of South Africa's most important wool-producing regions and has a long history of sheep farming, including communal and



smallholder production systems. South Africa's wool sector is built largely around Merino sheep and has developed a reputation for high-quality fibre, with Cape Wools SA highlighting the country's strengths in clip preparation, uniformity, softness and first-stage processing.

Wool farming in the province is closely linked to rangeland management. In many rural areas, sheep are grazed on communal grasslands that also support biodiversity, water catchments and local livelihoods. Poorly managed grazing can expose topsoil, increase erosion and send sediment into rivers. Well-planned rest periods and rotational grazing are therefore central to efforts to improve both wool production and landscape health.

The Regenerative Fund for Nature says its South African wool project builds on an initial phase from 2021 to 2023 in the upper and middle Umzimvubu Catchment. The project aims to help farmers from six grazing associations in communal rangelands participate more profitably in the wool value chain, while implementing regenerative agricultural practices and the Responsible Wool Standard across at least 12,000 hectares.

Conservation International said earlier support from Kering and Inditex has helped nearly 1,000 farmers across 17,000 hectares in the Eastern Cape adopt regenerative grazing practices and improve animal welfare. Bestseller's contribution is intended to expand this work into a larger landscape-level initiative.

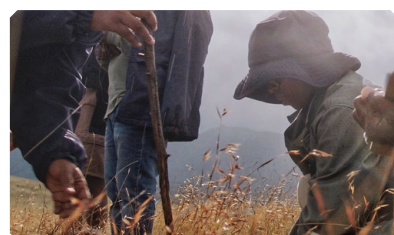
Dorte Rye Olsen, head of sustainability at Bestseller, said the investment reflects the company's aim to support raw material landscapes that matter to nature, local communities and the fashion industry.

"Through the Regenerative Fund for Nature, we participate in a long-term collaboration, where initiatives are developed over time and in close interaction with local actors," she said.

Virginia Keesee, who leads Conservation International's global fashion and nature initiatives, said the work in the Eastern Cape had shown measurable benefits for shepherds and their land over the past five years.

"Bestseller's support will help us spread the impact across the region," she said.

The Regenerative Fund for Nature says its wider portfolio now covers 14 projects in 10 countries, with 1.1m hectares of farms and grazing lands enrolled and 105,000 beneficiaries directly or indirectly impacted.



ICAC launches cotton carbon credits scheme

WASHINGTON - The International Cotton Advisory Committee (ICAC) has launched a carbon credits initiative designed to create new income streams for cotton farmers through regenerative agriculture, biochar and verified carbon sequestration.

The programme could allow participating cotton producers to generate up to US\$200 per hectare in additional revenue by linking more sustainable land management practices to carbon credit markets, according to ICAC.

What makes this initiative notable for natural fibres is the dual role it carves out for cotton, not just as a renewable crop, but as a potential avenue for climate finance. It could give farmers a real financial reason to invest in soil health, while introducing a new class of verified environmental value into cotton supply chains.

ICAC says the programme will draw on regenerative agriculture techniques and biochar application, backed by monitoring and verification systems, to produce certified carbon credits. Farmers would then earn income by trading those credits on carbon markets, essentially getting paid for measurable climate benefits.

A pilot phase is currently underway in Uzbekistan, where ICAC said early results indicate the model could be replicated across other cotton-producing countries. The organisation has partnered with Merago Inc, which will oversee MRV processes, certification and trading of credits generated under ICAC-led regenerative agriculture and carbon sequestration programmes.

The approach reflects growing interest in whether natural fibre production can be better linked to payments for ecosystem services. For cotton, this centres on practices that increase soil organic matter, reduce degradation, improve water retention and store carbon in soils or biomass.

Biochar, a key part of the model, is produced by heating organic material, such as cotton stalks or crop residues, under low-oxygen conditions. When applied to soils, biochar can remain stable for long periods, potentially improving soil structure while storing carbon.

ICAC has previously highlighted biochar as part of its wider agricultural development work. In a 2025 presentation, the organisation said biochar could support payments for ecosystem services and noted pilots in Cameroon and India. ICAC's regenerative agriculture work in Zambia had included more than 350 model farm demonstrations connected to 50,000 smallholder cotton farmers, with yield increases of 50 to 200 per cent in the project area compared with control fields.



The new carbon credits initiative builds on earlier discussions between ICAC and the Common Fund for Commodities on carbon finance for smallholders. In November 2025, the two organisations discussed regenerative agriculture, soil health practices, biochar application and carbon credit payment systems for farmers. ICAC said at the time it was preparing frameworks for carbon credit payments to cotton farmers.

For the cotton sector, the commercial test is whether carbon finance actually reach growers at scale, especially smallholders. Carbon projects are rarely simple, with verification costly, and farmers typically needing technical support, dependable data collection and a clear route to market before any credits translate into real income.

Carbon schemes have also come under sustained pressure over questions of additionality and permanence (ie whether the emissions reductions being claimed would have happened regardless).

The programme also arrives at a time when cotton is fighting to sharpen its sustainability credentials against synthetics and other preferred materials. Verified carbon credits could add a new revenue stream for farmers and give brands and retailers something concrete to point to when sourcing cotton.

However, any claims at brand level, whether around regenerative cotton, carbon credits or climate-positive sourcing, will need to be precise, well-evidenced and carefully scoped. Regulators are watching green marketing closely, and overclaiming in this space now carries real reputational risk.

ICAC is calling on governments, private sector businesses, certification bodies and industry experts to help scale the initiative across global cotton production.

Traceability, trust and the future of South African Mohair

Long before a customer pauses to read the composition label on mohair knitwear in a distant city, the fibre begins somewhere far quieter: in the vast openness of the Karoo.

Here, Angora goats move across ancient veld beneath enormous skies, their soft, lustrous fleece shaped by climate, landscape and generations of farming knowledge. To stand among a flock in the Karoo is to experience mohair as something deeply connected to place: tactile, agricultural and real, where fibre is inseparable from land and life.

Yet increasingly, consumers are asking questions that stretch beyond softness, style or composition labels. Where did this fibre come from? Who produced it? Can its story be trusted? In a rapidly evolving textile landscape, traceability has become one of the defining conversations shaping the future of natural fibres.

For the South African mohair industry, this shift presents both challenge and opportunity.

Over the past year, Mohair South Africa and SPIN360 have collaborated on an extensive programme of work focused on environmental assessment, supply chain transparency and future industry preparedness. At the centre of the project was a desire to better understand how mohair's impacts can be measured consistently, and how the industry can position itself within a global market increasingly shaped by accountability, evidence and traceability.

The work brought together farms, brokers, processors and technical stakeholders across the value chain, consolidating data and aligning the sector around internationally recognised assessment methodologies. It also in-

cluded anticipation research exploring how brands, retailers and textile stakeholders expect traceability systems to evolve in the years ahead.

What emerged was a clear picture: traceability is no longer a peripheral sustainability consideration. It is becoming central to how trust is built between farmer, brand and consumer.

At the same time, the meaning of traceability is shifting. Historically, it often existed as paperwork and chain-of-custody documentation. Today, expectations are more demanding. Global brands increasingly seek real-time visibility, integrated data systems and stronger assurance regarding origin, certification and environmental performance. Emerging international legislation, including future Digital Product Passport requirements in the European Union, signals a future in which environmental and provenance claims must be substantiated with increasing precision.

For natural fibres, this moment is particularly significant.

Unlike many highly industrialised supply chains, mohair still retains a visible and

"What emerged was a clear picture: traceability is no longer a peripheral sustainability consideration. It is becoming central to how trust is built between farmer, brand and consumer"



MOHAIR BUILDS DATA-LED SUSTAINABILITY PLATFORM

South African mohair has taken a significant step towards strengthening its position in a market increasingly shaped by evidence-based sustainability claims.

A year-long collaboration between Mohair South Africa and SPIN360 has resulted in a new scientific and strategic foundation for the sector. The project was designed to give the South African mohair industry a clearer evidence base, a stronger market narrative and a roadmap for future improvement.

The work included the development of a unified scientific framework, a legislative and market intelligence system, a representative primary data asset and a strategic plan for continuous progress. Together, these elements are intended to support the sector as brands and retailers face growing pressure to substantiate environmental and social claims.

For natural fibres, this shift is becoming increasingly important as regulators move away from broad sustainability language and towards specific, verifiable information. The mohair sector's work with SPIN360 is an effort to respond directly to that change by building data and transparency into the industry's long-term positioning.

SPIN360 said the project showed what can be achieved, "when an industry chooses to lead with science," adding that South African mohair now has the data, narrative and strategic clarity needed to remain trusted through the next decade of sustainability transformation.

Mohair South Africa said the initiative marked the beginning of a new chapter in which mohair can work more closely with the market, understand customer needs and become a model for transparency, traceability and responsible production.

identifiable origin. It can be traced not only to a country but also to a landscape, a farming culture, and a way of life. That connection between fibre and place is becoming increasingly valuable in a world where consumers often feel disconnected from the products they purchase.

The South African mohair industry already operates within an established trace-

ability framework through the Responsible Mohair Standard (RMS), with Transaction Certificates and broker-managed records. However, the research conducted through the SPIN360 collaboration identified opportunities to strengthen integration, accessibility and future readiness across the supply chain.

The long-term vision extends beyond compliance. It is about building a more unified and resilient system that protects the integrity of origin as fibre moves from farm to fashion.

This may eventually include more advanced digital infrastructure capable of integrating certification data, chain-of-custody records and verification systems into a single, secure platform aligned with future market requirements. While the technologies are complex, the intention is simple: to ensure that the connection between mohair and its source is not lost as products move through global supply chains. There is something striking about the intersection now taking shape between one of the world's oldest natural fibre industries and some of fashion's most advanced technologies. Blockchain, forensic verification and digital product passports may feel far removed from the quiet rhythm of Angora goats grazing Karoo veld, yet they are increasingly part of the same conversation.

At its heart, traceability is about preserving trust, not simply tracking fibre. It is about ensuring that when a consumer pauses in a store and becomes curious about the origin of a garment containing mohair, there is a real story to follow - grounded in landscape, stewardship and authenticity.

This is where traceability finds its deeper meaning. Trust does not emerge from a barcode or a system alone; it is built through the preservation of provenance and the ability to follow a fibre back to something real.

For Mohair South Africa, this work reflects an industry that is thoughtfully preparing for the future while remaining grounded in the environmental and agricultural systems that have always defined it.

In an increasingly digitised world, there is still something quietly powerful about being able to trace a natural fibre back to a real landscape, a real farm and a real flock of goats beneath the Karoo sky.

Cotton risk rises as brands step up traceability efforts

Cotton supply chains are facing renewed scrutiny after new research found a sharp rise in finished garments showing results consistent with prohibited cotton. MARK LANE reports

New findings contained in the 2026 Oritain Supply Chain Intelligence Report show three years of progress on prohibited-cotton risk were reversed in 2025.

Oritain's Market Insights Programme anonymously purchases and tests around 1,000 finished garments a year across major retail markets, including the US, Europe, Canada, Australia and New Zealand. The programme covers around 40 brands and different garment types.

In 2025, the proportion of brands with at least one result consistent with prohibited cotton rose to 90 per cent. This compares with 64 per cent in 2024, 73 per cent in 2023, 95 per cent in 2022 and 96 per cent in 2021.

The findings come despite rapid adoption of traceability systems by brands and retailers. According to the report, 87 per cent of companies in the US and 94 per cent in the UK now report tracing all or most of their cotton supply.

However, Oritain argues says many systems still rely heavily on supplier declarations, certificates and documentation. These may show where cotton is meant to have come from, but they do not necessarily prove what is in the finished product.

"The question is no longer whether companies know their Tier 1," the report states. "The question is whether they can verify what happens throughout Tier 2, Tier 3, and Tier 4, where

substitution, blending, and mislabeling most often occur."

The report highlights sharp increases in cotton risk across several major sourcing regions. China recorded the highest risk prevalence, rising to 40 per cent in 2025. Bangladesh's risk nearly quadrupled to 15 per cent. The Americas, described by Oritain as a relatively "safe" manufacturing region, rose to 13 per cent.

Oritain links this to wider sourcing disruption. Tariffs, capacity pressure and shifting trade rules are pushing brands to move production into new hubs. But the report says this does not remove cotton risk. Instead, prohibited cotton may move through new routes and enter supply chains via yarn, fabric, subcontractors or open-market sourcing.

"The purpose of our study was to obtain an independent and objective snapshot of the prevalence of prohibited cotton in key western apparel markets," said Anjali Gupta, head of data science at Oritain. "What the data shows us, year on year, is that risk does not completely disappear when brands change their manufacturing location."

The report also points to China's continuing role in global cotton supply. Citing USDA data, it says Xinjiang now accounts for 92 per cent of China's cotton production. Oritain says many alternative garment-making countries still import large volumes of Chinese yarn and fabric, creating potential exposure even where final assembly has moved elsewhere.



Traceability

Rebecca Brocato, chief government affairs officer at Oritain, said traceability is now a basic requirement. "Whether it's forced labour, evasion of anti-dumping duties, or illegal transshipments to hide the true origin of a raw material or a finished product, the expectation of transparency and traceability in the supply chain has to be acknowledged as a must, a requirement," she said. "It's not a choice anymore."

Gemma Lynch, chief customer officer at Oritain, also said consumers increasingly expect brands to do the verification work before products reach stores.

"Consumers want products to come with proof they can trust, but they do not want to do heavy investigative work at the shelf," she said.

Jason Thompson, vice president of brand development at Supima, added that cotton substitution remains a known risk. "A brand that purchased U.S. cotton is not necessarily getting it in the finished garment," he said. "The main issue is that substitution is happening, and we have known this for a long time. The difference now is that there are significant consequences for these substitutions."

Natural fibres still a pollution risk when burned: studys

Cotton may have a lower climate impact than polyester when openly burned, but natural fibres can still generate harmful local air pollution when they enter unmanaged waste streams, according to new research. By BRETT MATHEWS

A study published in *Environmental Science and Pollution Research* estimates that around 15m tonnes of textile waste is openly burned each year across 137 countries. Of this, around 2.8m tonnes is cotton, compared with 8.3m tonnes of polyester.

Interestingly, the paper compared the open burning of polyester and cotton textile waste, highlighting the different pollution profiles of fossil-based synthetic fibres and plant-based natural fibres. Polyester burning was found to be the bigger climate concern because it releases fossil carbon dioxide. Depending on the emissions factors used, polyester burning could generate between 8.3m and 24.6m tonnes of fossil CO₂ a year. However, the study warns against assuming that natural fibres are impact-free at end of life. Cotton is largely cellulose and its carbon is considered biogenic, meaning it forms part of the natural carbon cycle. For this reason, cotton's direct CO₂ emissions from burning are treated differently from fossil-based polyester in most life cycle assessments.

But the researchers found that cotton burning can still produce pollutants that affect human health and local air quality. These include carbon monoxide, nitrogen oxides, sulphur dioxide and particulate matter. Under some combustion conditions, cotton's carbon monoxide emissions were not that much lower than polyester's.

The paper argues that end-of-life management needs to be given more weight, suggesting a natural fibre garment can still become a pollution source if it is dumped and burned in an open environment.

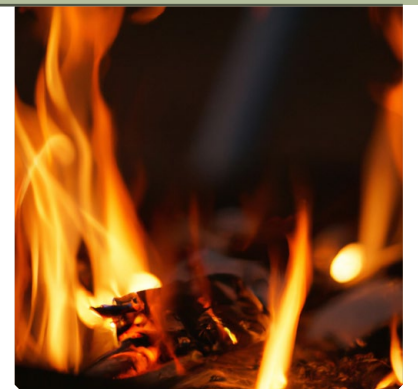
The research estimates that around 25m tonnes of textile waste is openly dumped globally each year. Using low, medium and high burning assumptions, it calculates that between 10m and 20m tonnes of textile waste is burned annually in uncontrolled conditions, with 15m tonnes used as the central estimate.

South Asia accounts for the largest share, with an estimated 5.8m tonnes of textile waste burned a year under the central scenario. East Asia and the Pacific follows at 3.2m tonnes. India, China and Indonesia were identified as the largest countries by volume of dumped textile waste.

The study estimates that cotton accounts for around 19 per cent of burned textile waste, based on global fibre production shares adjusted for recycled cotton. This gives a central estimate of 2.8m tonnes of cotton waste burned each year.

While this is much lower than polyester's share, cotton's combustion still raises health concerns. The researchers used paper combustion as a proxy for cotton because both are predominantly cellulose-based. Their modelling suggests cotton open burning can release significant carbon monoxide and particulate emissions, especially where burning is inefficient or oxygen is limited.

The study also shows why stronger fibre-specific data is needed. Current waste inventories rarely separate textiles from other municipal waste, and they do not usually



distinguish between fibre types. This makes it difficult to understand the real end-of-life impacts of cotton, polyester and blended textiles.

The paper also points to second-hand clothing flows as a factor in textile waste accumulation. Countries importing large volumes of used clothing can face waste burdens when garments are unsellable or unsuitable for reuse. Where waste systems are weak, these textiles may be dumped or burned.

This is important for natural fibre producers, certification schemes and brands using cotton, wool and other bio-based materials. Environmental performance is increasingly being judged across the full life cycle, not only at farm or fibre production stage.

The study concludes that improved textile waste data, better emissions factors and more field research are needed to quantify the problem more accurately. It also calls for waste management strategies that reduce the environmental and health burdens of open burning.

Further reading:

Environmental impact of open burning of polyester and cotton textile waste: a comparative analysis, Environmental Science and Pollution Research, 2026.

Cracking the formula: why true circularity demands industrial infrastructure



True textile circularity now depends less on lab-scale recycling breakthroughs and more on industrial infrastructure capable of processing high volumes of complex post-consumer waste into usable fibre streams.

In the global effort to build a circular fashion economy, the technical milestone is often confused with the ultimate destination. For years, the textile industry's primary focus has been academic: solving the chemical and mechanical puzzles of fibre separation. But as the European Commission's landmark ban on the destruction of unsold clothing and footwear takes full effect, the luxury of theoretical pacing has officially vanished. The sector is no longer facing a lab-scale problem; it is facing an immediate, high-volume regulatory mandate to redirect surplus textiles into continuous, value-preserving re-use streams.

This critical friction point was a central theme at the recent Global Fashion Summit in Copenhagen, where the conversation shifted decisively from laboratory innovation to factory floor execution. As RE&UP General Manager Andreas Dorner notes, managing the technical challenge of "cracking the recycling formula" is only the first step; the true hurdle for the industry is building the heavy, physical infrastructure required to make that formula functional on a commercial scale.

The industry has spent years discussing the theoretical necessity of circular supply chains. The real test now is whether global brands are prepared to move past temporary pilots and actively integrate scalable, industrial baselines into their everyday, high-volume manufacturing operations.

The 10 per cent illusion vs. the 90 per cent reality

The reason why "cracking the formula" in a laboratory is no longer sufficient under upcoming EU regulations lies in the sheer nature of global textile waste. Historically, most commercially available recycled fibres have relied on highly predictable, pre-consumer waste streams like factory cutting scraps.

From an operational standpoint, however, cutting waste represents less than 10 per cent of the broader textile waste challenge, and its availability is structurally limited to active manufacturing hubs. The true challenge sits directly within developed consumer markets like Europe and America, where complex, worn garments are discarded by the millions. This 90 per cent is precisely the pool of post-consumer

waste and unsold inventory that imminent legislative bans and Extended Producer Responsibility (EPR) schemes are forcing brands to capture and regenerate.

Post-consumer waste is notoriously heterogeneous, deeply aged, and locked in complex polycotton blends. Solving this at a scale compliant with EU law requires a recycling system that is completely feedstock-agnostic. To move beyond simple "down-cycling," an industrial system must possess the mechanical and thermo-chemical capacity to deconstruct these complex worn garments, extract dyes entirely through advanced decolorization, and separate mixed fibers into pure, high-purity cotton and polyester streams.

Commercial proof of the ecosystem

Proving that this industrial baseline is up, running, and ready to absorb commercial volumes today, RE&UP recently brought this exact operational scale to a joint collaboration with premium American denim brand Madewell and fabric manufacturer ISKO.

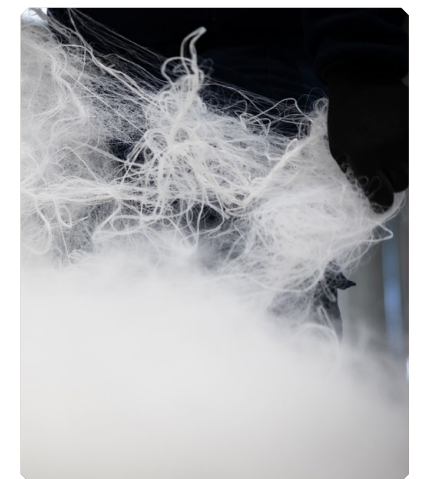
The collaboration successfully took approximately 20,000 pairs of post-consumer jeans collected through Madewell's circular trade-in initiatives and fed them directly into RE&UP's industrial system. RE&UP successfully unmade and re-engineered this complex post-consumer denim waste into premium, traceable Next-Gen Cotton fibres and Next-Gen Polyester chips. These materials were then engineered by ISKO into Global Recycled Standard (GRS) certified fabrics that retain the exact stretch, strength, and comfort demanded by modern, premium denim consumers.

Demonstrating that this infrastructure can support high-volume apparel production cycles across diverse market segments, RE&UP has established active, large-scale programs with other global retail giants. These include high-visibility circular integration initiatives with PUMA via their specialized RE:FIBRE program, large-scale commercial rollouts with BESTSELLER, and premium denim developments with NYDJ.

These partnerships demonstrate that major global brands can confidently utilize their own post-consumer take-back streams to fuel high-volume, mainstream apparel production cycles right now – providing a concrete execution strategy for upcoming compliance demands.

The new scaling paradigm

The gap between current recycling capabilities and projected market demand highlights a structural bottleneck that cannot be solved by individual brands acting in isolation. By 2030, global demand for recycled fibres is estimated to exceed 44 million tonnes annually. Yet, the vast majority of recycled material currently entering the market remains reliant on down-cycled plastic bottles or highly predictable pre-consumer factory scraps, leaving the massive influx of post-consumer garment waste largely unaddressed. Solving a crisis of this magnitude requires a



"The real test now is whether global brands are prepared to move past temporary pilots and actively integrate scalable, industrial baselines into their everyday, high-volume manufacturing operations"

systemic, industry-wide shift in how textile waste is valued, collected, and processed. For a circular economy to become commercially viable at an industry level, the infrastructure must evolve into an integrated ecosystem.

With an active processing capacity of 80,000 tonnes and a structural roadmap to scale beyond 1 million tons globally by 2030, RE&UP was designed to serve as this centralized supply chain utility. By integrating automated sorting, feedstock-agnostic mechanical and thermo-chemical separation, and direct decolorization into a unified stream, the facility demonstrates that a comprehensive, one-stop solution is no longer a theoretical concept but a functional reality. However, true systemic impact ultimately depends on collective industry adoption. The physical baseline exists; the next phase requires the wider textile sector to step out of temporary pilots and integrate these centralised infrastructures into everyday, high-volume production.

Traceability mainstreams in natural fibres



Traceability in natural fibres supply chains is moving beyond marketing and becoming a major compliance concern. By MARK LANE

LONDON - For years, traceability in natural fibres was very much a marketing exercise. Brands used words like organic, regenerative, responsible, certified and preferred to describe cotton, wool, cashmere and linen, and for the most part, nobody looked too hard at what those words actually meant (and, more to the point, how they could be proven).

That is slowly changing. The question being asked now by regulators, retailers and even consumers is: can the brand actually prove where the fibre came from, how it moved through the supply chain, and whether the claim on the label has any real evidence behind it?

Several things are driving this at once, the strongest one being regula-

tion. EU rules are tightening around green claims, product information and forced labour. The US continues to enforce the Uyghur Forced Labor Prevention Act, with cotton origin a central concern. Certification bodies are digitising their records, while brands are preparing for digital product passports, albeit with varying degrees of success.

In addition, a growing number of solution providers are linking physical verification with digital chain-of-custody systems. We are also moving beyond traceability pilots and case studies.

For natural fibres specifically, these are important developments because the value proposition almost always rests on origin. Organic cotton, regenerative wool, sustainable cashmere and so on are claims that all begin at farm level. If that origin can't be verified, the commercial risk is increasingly starting to fall on the brand.

The policy backdrop

The EU is the most important near-term driver. The Digital Product Passport sits at the heart of the 2024 Ecodesign for Sustainable Products Regulation (ESPR). The Commission describes it as a way to, "store and share relevant data," about a product's sustainability, durability and environmental profile, which is accessible to consumers, businesses and public authorities alike. For textiles, that points towards a future where material composition, provenance and circularity data can

no longer be buried in supplier spreadsheets. Increasingly, they will need to be structured, retrievable and defensible.

The ESPR is already having an impact. In February 2026, the Commission adopted measures to prevent the destruction of unsold apparel, clothing accessories and footwear. Large companies face a ban from 19 July 2026, with medium-sized companies expected to follow in 2030. Companies will also have to disclose information on unsold consumer products discarded as waste. Environment Commissioner Jessika Roswall said the textile sector was "leading the way" but still faced major challenges.

Traceability is also getting pulled into the green claims debate. The EU's Empowering Consumers for the Green Transition Directive targets vague and misleading environmental claims (the kind that have been standard practice in fashion marketing for years, and which continue to be so in some cases). A Commission FAQ from November 2025 makes clear that broad claims like "eco," "sustainable cotton" or "regenerative wool" will be increasingly exposed unless backed by solid evidence.

On forced labour, the EU Forced Labour Regulation will prohibit products made with forced labour from being placed on the EU market from 14 December 2027. Authorities will take a risk-based approach, focusing on high-risk sectors, products and regions. For cotton supply chains, this reinforces the shift from supplier assurance to verifiable origin data.

Meanwhile, the Corporate Sustainability Due Diligence Directive entered into force in July 2024, requiring affected companies to identify and address adverse human rights and environmental impacts across their value chains. Even if the final scope narrows under the Omnibus process, the direction is clear: large buyers will need more reliable information from upstream suppliers, and that means greater transparency.

The revised Waste Framework Directive, which came into force in October 2025, is also significant. It requires EU member states to establish mandatory EPR schemes for textiles and footwear, with producers paying fees that finance collection, reuse, recycling and disposal. The more detailed the end-of-life system becomes, the more brands will need to know exactly what's in a product and where it started.

How traceability works

The methods being used to trace natural fibres are evolving fast, and the market is converging on four main approaches.

The first is digital chain of custody, which is recording the movement of certified or claimed material through each stage of the supply chain using transaction certificates, tokens or blockchain-style records. It can follow volume from farm through gin, spinner, fabric mill, garment maker and brand. The weakness is that it's only

"A Commission FAQ from November 2025 makes clear that broad claims like "eco," "sustainable cotton" or "regenerative wool" will be increasingly exposed unless backed by solid evidence."

as strong as the data going in, and the controls around substitution, blending and fraud.

The second is physical marking. This might be DNA markers or luminescent pigments added to fibre so it can be tested later. This is useful where brands need proof that a claimed fibre is still present after spinning, weaving, dyeing or finishing.

The third is forensic origin testing whereby isotope analysis and related techniques examine the natural chemical signature of a material to assess whether its claimed origin is plausible. This is particularly relevant for cotton given forced labour enforcement and the sensitivity around certain origins.

Finally, there is satellite and geospatial data, which is helping to verify growing areas, land use, water stress and farm-level conditions. This doesn't replace chain of custody, but it strengthens the evidence base around the farm itself.

In practice, the market is moving towards hybrid systems that combine several of these. Digital records show the intended chain of custody, while physical and forensic tools test whether the product in hand actually supports the paperwork.

What's happening in the market

One of the most significant recent moves came in January 2026, when Oeko-Tex announced a full collaboration with TextileGenesis to digitally trace and authenticate organic cotton. This system digitises transaction certificates, bringing physical material movements and certification data into one platform. Oeko-Tex reported 381





per cent year-on-year growth in its Organic Cotton certification by 31 December 2025.

TextileGenesis CEO Amit Gautam said the collaboration would create a digital chain of custody for Oeko-Tex certified organic cotton and eliminate paper-based transaction certificates. Oekotex CEO Dr Alfred J. Beerli described it as taking certification into the "digital future" through secure, transparent and data-driven processes. The pilot covered selected organic cotton supply chains across India and Bangladesh, in-

"Samantha Helmold, sustainability and ethical sourcing manager at Rodd & Gunn, said the technology allows the company to verify fibre origins "with a level of assurance it had not previously achieved"

volving ginning, spinning mills, fabric mills and certification bodies.

Better Cotton is also moving from mass balance towards physical traceability. In November 2025, BCI reported that more than 50 per cent of BCI Cotton entering global fashion and textile supply chains was traceable, with 17 retailer and brand members having received products containing Physical BCI Cotton since the launch of BCI Traceability in 2023. Physical BCI Cotton can be traced from country of origin using segregation and controlled blending models.

Over 27,000 metric tonnes of Physical BCI Cotton were traced from cotton gins to retailer and brand members during 2025, with traceability now live in Australia and Brazil, meaning Physical BCI Cotton can be sourced from 15 countries. A first-mile traceability app for smallholder farmers is also in development.

The commercial logic is straightforward. Shane Stephens of Staplcoth said BCI Certification could help satisfy "modern marketplace demands," while Andrew Whale of Australian retailer Big W said customers should be able to leave a store confident the business was working towards better outcomes across its supply chain.

Physical verification is also gaining ground. In November 2025, Haelixa announced a partnership with New Focus Textiles to verify recycled cotton content using DNA technology, applying a marker directly to post-industrial and post-consumer cotton waste before shredding. The marker survives mechanical recycling, spinning, weaving, dyeing and finishing. Patrick Strumpf, Haelixa CEO, said recycled claims need "solid evidence," while Jennie Peterson of New Focus Textiles said buyers no longer needed to rely on claims alone.

Although this involves recycled rather than virgin cotton, the principle applies across the board. Whether the claim is organic, recycled or regenerative, the problem is the same in that the fibre needs to be identifiable later in the supply chain. Haelixa has also said its DNA-based system can be aligned with digital records on platforms like TextileGenesis, illustrating the industry's shift towards combined physical and digital verification.

Haelixa said its DNA and forensic traceability certificates were integrated into Tex-

tileGenesis' fibre-to-retail module, linking physical proof with digital chain-of-custody and certification data.

New models are also emerging at farm level. CottonConscience, listed by the European Space Agency in April 2026, combines satellite data, DNA tagging and water systems insights to trace cotton from farm to gin, giving brands verifiable data to support water-related claims. This suggests traceability is no longer just a custody record and is now being linked to agronomy, water, soil and land-use data.

FibreTrace takes a similar approach, embedding traceable IDs into raw fibres and verifying movements through the supply chain. Samantha Helmold, sustainability and ethical sourcing manager at Rodd & Gunn, said the technology allows the company to verify fibre origins "with a level of assurance it had not previously achieved."

Reformation has used FibreTrace with Good Earth Cotton in denim, allowing customers to follow the product journey from a farm in Moree, New South Wales, through ginning and production, making traceability consumer-facing rather than back-office compliance.

In December 2025, Fenix Outdoor Group, owner of Fjällräven, Hanwag and Royal Robbins, partnered with TextileGenesis to implement fibre-to-retail traceability across product lines covering cotton, animal fibres, synthetics and man-made cellulose. Sustainability director Saskia Bloch said it would allow the group to communicate product journeys more transparently and build consumer trust.

Wool and animal fibres are part of the same trend. NATIVA is promoting regenerative wool as fully traceable from certified farms using blockchain to record the supply chain. Stella McCartney cites farm-level traceability for its NATIVA wool, including specific farms in Western Australia. In luxury and outdoor markets, where wool, cashmere, alpaca and mohair carry high value and strong animal welfare expectations, traceability is increasingly tied to proof of land management and fibre authenticity.

Standards are also shifting, with implications for traceable natural fibres. Textile Exchange published the final criteria for its Materials Matter Standard in December 2025, effective 31 December 2026 and mandatory from 31 December 2027. Its first version covers materials under Textile Exchange's Responsible Animal Fiber framework (wool, alpaca and mohair) as well as recycled materials under GRS and RCS. While this clearly won't make every natural fibre automatically traceable, it signals a wider harmonisation of what material claims are expected to mean.

Global pressure

Our take is that the strongest legal pressure globally around traceable fibres remains around cotton and forced labour. US Customs and Border Protection says DNA traceability and isotopic testing can serve as evidence that original cotton fibre was not sourced from the Xinjiang Uyghur Autonomous Region. This has helped push forensic verification from niche science into mainstream sourcing conversations.

In February 2026, GenuTrace and Kinset announced a collaboration to help brands prove cotton origin claims, citing Germany's tightening anti-greenwashing rules and ongoing UFLPA enforcement. The model combines fibre-level authentication with digital traceability designed to be ready for product passport requirements. It is becoming increasingly apparent that traceability is becoming a strategic commercial asset, not just a compliance exercise.

Limitations

Full farm-to-product traceability is far easier in short, segregated, premium supply chains than in high-volume commodity flows. Blended yarns, sub-contracting,

trims and multi-country processing all add complexity. Physical markers aren't suitable for every process or price point, while isotope testing depends on reference databases and sampling strategy. Digital platforms improve records but don't automatically prevent fraud.

There's also a commercial tension that perhaps doesn't get talked about enough. Brands want deeper visibility, but suppliers are being asked to absorb new costs, audits and data requirements. Smaller mills and farms often lack the systems to participate. If traceability becomes a buyer mandate without shared investment, it surely risks becoming another cost pushed upstream to those least able to bear it (especially as natural fibres supply chains are already being squeezed on so many other cost fronts)

Must-have or nice-to-have?

For high-risk cotton, organic cotton, regenerative fibres, premium animal fibres and any product carrying a strong sustainability or origin claim, traceability is increasingly a must-have. The combination of EU consumer law, DPP preparation, forced labour enforcement and retailer due diligence means brands need evidence that can survive proper scrutiny.

For lower-risk commodity fibres sold without specific environmental or origin claims, it may still look optional in the short term. But that window seems to be narrowing. Once product passports, EPR data systems and anti-greenwashing enforcement mature, even basic product information will need to be far more reliable than it is today.

The practical takeaway for brands isn't that every garment needs to be immediately traced to farm level. It's that brands need a material risk map, a claims map and a traceability roadmap, and the highest-risk claims should be tackled first. Organic cotton, regenerative cotton, cashmere and wool are the obvious starting points.

Traceability won't solve all of the industry's problems with natural fibres, and it certainly doesn't guarantee better farming, fairer prices or lower impacts. But without it, an increasing number of the claims brands make about their materials are going to become much harder to defend.

"The combination of EU consumer law, DPP preparation, forced labour enforcement and retailer due diligence means brands need evidence that can survive proper scrutiny"

Nordic wool waste points to circular opportunity



A new Nordic wool study has identified almost 3,000 tonnes of wool that could be brought into a regional circular value chain, despite large volumes of wool still being imported into the region.
By MARK LANE

A new Nordic wool study has identified almost 3,000 tonnes of wool that could be brought into a regional circular value chain, despite large volumes of wool still being imported into the region.

The report, *A Feasibility Study for a Nordic Circular Wool Value Chain*, was commissioned by Nordic Innovation and carried out under the Nordic Wool Initiative. The project was led by Axfoundation and Norion Consult, with partners including Dansk Mode

& Textil, Holma Helsingland, Icelandic Textile Center, Insutex, Ístex, NF&TA, Saimaa Wool, SirkULL and Swedish Textile Manufacturing.

The report argues that the Nordic countries face a structural mismatch, with large volumes of locally produced wool discarded or downgraded, while companies continue to import wool and wool yarn from outside the region. It argues that a more integrated Nordic value chain could help turn this overlooked fibre into yarn, felted products, insula-

tion, interior textiles, carpets, fertiliser and other applications.

According to the study, Norway, Sweden, Finland and Denmark produce an estimated 5,128 tonnes of raw wool a year. Of this, 2,767 tonnes are currently utilised and 2,361 tonnes are discarded. The report estimates that 2,929 tonnes could be available for a Nordic wool value chain.

The largest potential volume is in Norway, where 1,340 tonnes are identified as available for a Nordic system. Sweden follows with 1,136 tonnes, Denmark with 248 tonnes and Finland with 205 tonnes.

The report suggests Iceland has a more organised wool system, with Ístex processing almost all of the country's wool. Although some Icelandic wool is exported to the UK and mainland Europe, the report does not consider this fibre readily available for a new Nordic value chain because it is already being used.

The study says the issue is not simply a shortage of wool, rather, it is a shortage of coordination, classification, processing capacity and market demand.

Fragmented value chain

Nordic wool production is fragmented across many small farms, often spread over large areas. In several countries, wool remains a by-product of meat production rather than a primary source of income. Farmers therefore have limited incentive to invest in better shearing, sorting and storage unless there is a clear route to market.

The report also challenges a common assumption that Nordic wool is too coarse or too mixed to be useful. It says the term "quality" is often used too narrowly to mean fine, soft wool for next-to-skin apparel. While Nordic wool may not generally compete with Merino for base layers, it can be suitable for other products, including outerwear, socks, furniture fabrics, blankets, carpets, slippers, acoustic panels, insulation and horticultural uses.

Thus the authors argue that various wool types are not necessarily "good" or "bad." They have different characteristics, with coarser fibres, pigmented wool, shorter fibres and felt-prone wool all having value if they are sorted and directed into the right applications.

The report estimates that, of the wool potentially available for a Nordic value chain, 557 tonnes could be suitable for

yarn, 1,455 tonnes for non-woven products and 918 tonnes for non-textile uses. This suggests the biggest opportunity may not be in conventional apparel yarn, but in felted and technical products.

Norway has the most developed wool infrastructure in the region, with collection depots, trained classifiers, national grading standards and a centralised pricing system. Around 90 per cent of Norwegian raw wool is collected. In 2024, Norway collected just over 3,048 tonnes of wool, with total raw wool production estimated at 3,387 tonnes.

Even in Norway, however, significant volumes are not fully used. The report identifies 339 tonnes of uncollected wool and 1,001 tonnes discarded after collection. Much of this could be used in non-woven or non-textile applications, including fertiliser or crop cover.

Sweden lacks infrastructure

Sweden, the report suggests, has strong potential but lacks infrastructure. The report says Sweden produced an estimated 1,136 tonnes of raw wool in 2024, around half of which is currently wasted because of limited sorting, processing and marketing capacity.

A new Swedish wool classification standard was introduced in 2025 and is partly harmonised with the Norwegian system. The report sees this as a key step because common classification would allow smaller batches from different farms and regions to be aggregated into predictable industrial volumes. That is essential if manufacturers are to rely on Nordic wool.

Sweden currently has only one commercial scouring facility, on Gotland, processing around 100 tonnes a year. Much unwashed Swedish wool is sent to Poland, Belgium, the UK, Czech Re-

public or Italy. In some cases it returns to Sweden, in others, it enters the global market.

Finland produced an estimated 289 tonnes of raw wool in 2024. The report says 205 tonnes may be discarded, despite survey evidence suggesting that for most Finnish breeds, at least 80 per cent of sheared raw wool could be considered "good wool". Finland has remaining spinning capacity, but demand is weak and systematic collection is limited.

Denmark produces smaller volumes, estimated at 318 tonnes a year. There is no official wool collection system. Some larger lamb producers gather and sell wool through auctions in Bradford, while hobby farmers use a mix of routes, including small spinners, recycling stations, fertiliser use or informal sales. The report estimates 248 tonnes of Danish wool could be available for a Nordic value chain.

The report says the Nordic countries still import significant quantities of wool and wool yarn. In 2024, imports of wool and wool yarn exceeded the volume that could be supplied by a Nordic value chain. The report says this suggests demand could theoretically exist, provided companies are willing to switch from imported raw materials to Nordic wool.

However, the report also warns that using Nordic wool only makes environmental sense if it is processed and used regionally. If raw wool is shipped to Asia for processing and then re-imported as finished products, transport emissions may erode much of the benefit.

A key recommendation is therefore to retain more stages of processing within the region. At present, the biggest missing link is scouring, the washing process

that removes grease, dirt and vegetable matter from raw wool. The report concludes that the Nordic region does not currently have enough wool or demand to justify one large-scale washing facility. Instead, it points to decentralised washing stations located near collection and classification hubs.

This model could reduce transport distances, lower investment costs and support more resilient supply chains. It could also allow products to be marketed as fully Nordic, which the report says may be important for achieving higher prices.

The study also highlights the role of felting and non-woven production. Much Nordic wool is suited to these routes, yet industrial capacity remains limited. Sweden is currently the only Nordic country with facilities capable of handling medium to large volumes. The report says there is scope for more production in insulation, acoustic panels, agricultural textiles, interior products and other felted goods.

However, economics remain a major barrier. Based on industry estimates, the report calculates that the currently under-utilised wool available in the Nordics could have a potential annual value of €127.6m. Most of this value is linked to wool suitable for yarn, which is assigned a much higher value than non-woven or non-textile grades.

Realising that value would require investment in pre-sorting, collection, classification, scouring, spinning, weaving and felting. The report says political support may be needed, at least in the short term. It points to Norway's wool subsidy system, in place since 1952, as one reason Norwegian wool handling and sorting are more developed than in other Nordic markets.

The environmental assessment says greater use of Nordic wool would improve resource efficiency because wool is already produced as part of sheep farming. If it is discarded, the potential material value is lost. If it replaces imported wool, polyester, mineral insulation or other materials, it may reduce transport impacts, fossil fibre use and waste.

Further reading: *A Feasibility Study for a Nordic Circular Wool Value Chain*, Nordic Wool Initiative, commissioned by Nordic Innovation.



LCA suggests US cotton can show **negative carbon footprint**

A new life cycle assessment of US cotton has found the fibre can show a negative cradle-to-gate greenhouse gas footprint when biogenic carbon storage in fibre and soil is included. By **BRETT MATHEWS**



NORTH CAROLINA - A new report, commissioned by Cotton Incorporated and conducted by WSP USA, assesses the environmental impacts of producing one kilogram of US cotton fibre packaged in bales at the ginning gate.

The ISO-conformant study - *Life Cycle Assessment of United States Cotton Fiber Production* - says producing one kilogram of US cotton fibre generates 1.45kg of fossil CO₂ equivalent emissions. However, when biogenic carbon dioxide stored in the fibre and soil is included, cotton production removes 1.71kg CO₂e per kilogram of fibre.

This gives a net cradle-to-gate greenhouse gas footprint of -0.264kg CO₂e per kilogram of fibre, according to the report.

This claim is significant because cotton LCAs have historically tended to present the fibre as an agricultural material with substantial impacts from fertiliser,

field emissions and irrigation. Here, the potential carbon storage benefits of cotton agriculture are illustrated/.

Earlier Cotton Incorporated LCAs in 2010 and 2017 examined cotton within broader global and cradle-to-grave contexts. This new study is narrower, focusing specifically on US cotton fibre to the ginning gate, but it also goes further in quantifying biogenic carbon flows. That makes the negative greenhouse gas result striking, although not directly comparable with all previous cotton LCAs because system boundaries, datasets, allocation methods and assumptions differ between studies.

The report itself says its hotspot findings align closely with the 2017 global cotton LCA, but its treatment of biogenic carbon gives the sector a potentially stronger climate argument than many older assessments allowed.

The finding could prove significant for cotton, which has often been marked

down in environmental assessment tools because of concerns over water use, fertiliser, pesticides and land impacts.

However, the report also urges caution. It says biogenic carbon storage may not be permanent because carbon stored in cotton fibre can be released later in the product life cycle, depending on use, re-use, recycling and end-of-life pathways.

Wool parallels

The findings also echo recent work in the wool sector, where researchers have argued that standard LCA approaches can understate the environmental performance of natural fibres by failing to fully account for biogenic carbon flows. Recent wool research applying ISO 14067:2018 found that including biogenic carbon significantly reduced reported wool emissions across six Australian case studies. The International Wool Textile Organisation said the work challenged “emissions-only” assessment approaches

and showed the need to distinguish between fossil carbon and carbon cycling through plants, animals and soil.

The new cotton LCA report authors say: “Although biogenic carbon storage may not be permanent, a portion of this carbon can remain sequestered long-term, and opportunities exist to enhance cotton circularity and thus improve the permanence of this storage.”

They add that this ability to store biogenic carbon, “distinguishes cotton from petroleum-derived fibres,” and offers, “a meaningful reduction in climate impacts.”

The study covers cradle-to-gate production, meaning it includes raw material extraction and refinement, field operations, fertiliser production, irrigation, harvesting, transport to gin, ginning and packaging.

It does not cover spinning, fabric formation, garment manufacturing, consumer use or end of life. As such, the findings should not be read as a full cradle-to-grave assessment of cotton products.

The study used primary data collected through Cotton Incorporated’s Natural Resource Survey. This covered 753 cotton growers across 17 US cotton-growing states and accounted for 9.2 per cent of U.S. cotton acres grown.

Data was collected for the 2021/22 cotton crop year and grouped into four regions: Far West, Southwest, Midsouth and Southeast.

The report says this makes the assessment, “the first comprehensive and rigorously conducted assessment solely focused on US cotton fibre production.”

Key impact categories

The report identifies field emissions and fertiliser production as the main contributors across multiple environmental impact categories. Field emissions accounted for 40 per cent of global warming potential when biogenic carbon dioxide was excluded, while fertiliser production accounted for 38 per cent.

For primary energy demand, fertiliser production was the dominant factor, accounting for 64 per cent of impacts. For blue water use, irrigation accounted for 84 per cent, with fertiliser production accounting for 12 per cent. Blue water consumption was almost entirely due to irrigation.

The report says these hotspots are broadly in line with earlier cotton LCA

“The report says this makes the assessment, “the first comprehensive and rigorously conducted assessment solely focused on US cotton fibre production.”

work, including global cotton LCA results published in 2017.

This continuity suggests that while newer data may alter the scale of some impacts, the main areas for improvement remain well understood.

The report also points to several practical interventions which include more precise nutrient application, better irrigation management, regular soil testing, reduced or no-till farming, cover cropping and more efficient irrigation pumping systems.

It also recommends a longer-term transition towards renewable energy for irrigation pumps and greater use of lower-impact fertilisers, including green and blue fertilisers.

For brands and fibre buyers, the study could strengthen arguments that cotton is being disadvantaged by outdated or incomplete data in sustainability tools.

Cotton has frequently been criticised for high water use and agricultural inputs. In some fibre comparison tools, cotton has also scored poorly against synthetics, despite the latter being derived from fossil resources and contributing to microplastic pollution.

While this report does not necessarily settle those debates, it does add new evidence that cotton’s environmental profile depends heavily on methodology, geography, farming practices and how biogenic carbon is treated.

The report is explicit on this point, stating that methodological choices can substantially affect LCA results (similar to the recent Textile Exchange LCA on cotton).

Economic allocation was used as the baseline method and this allocates 83 per cent of impacts to cotton fibre and 17 per cent to cottonseed, based on the

economic value of the co-products.

However, sensitivity analysis found that mass allocation reduced impacts by 53 per cent, biophysical allocation by 58 per cent and cereal unit allocation by 24 per cent compared with the economic allocation baseline. The report says this means the headline results represent the most conservative scenario in terms of allocation method.

The choice of background datasets also changed the results. Greenhouse gas emissions increased by 34 per cent when switching from LCA for Experts to ecoinvent datasets, largely because of differences in electricity and fertiliser emission factors.

The authors say this shows the importance of transparent methodology and warns against inappropriate comparisons between studies.

This is likely to be a central issue for cotton advocates. Many brands rely on product footprinting tools to make fibre choices and sustainability claims, but if these tools use old data, generic assumptions or inconsistent allocation methods, natural fibres may be misrepresented.

The report itself says it is not suitable for direct comparisons with other LCA studies because system boundaries, assumptions, background datasets and impact assessment methods may differ.

There are also important limitations. The study focuses only on environmental impacts and does not evaluate social or economic dimensions. It also does not assess plastic leakage or pollution, as methods for evaluating these impacts in LCA are still under development.

The authors also highlight potential inaccuracies from grower-reported data and the use of secondary modelling for irrigation energy and farm fuel consumption. They say more detailed primary data is needed, particularly around nitrous oxide emissions from fertiliser application, specific fertiliser types and on-farm fuel use.

Despite these caveats, the report is likely to be welcomed by cotton interests at a time when natural fibres are seeking stronger recognition in environmental policy and product foot-printing systems.

The findings suggest U.S. cotton may have a stronger climate story than is often assumed, particularly where soil carbon and fibre carbon are recognised.

Interview with Jesse Daystar

To find out more about Cotton Incorporated's new Life Cycle Assessment of U.S. cotton fibre production, we caught up with one of the report's contributors, Jesse Daystar, VP and chief sustainability officer at Cotton Incorporated

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Natural Fibres Insight (NFI): How do these findings compare with earlier LCAs on cotton, including the 2017 global cotton LCA? Your report says the main hotspots align closely with the 2017 findings. What has changed most since then?

Jesse Daystar: The consistency between this study and earlier work, including the 2017 global cotton LCA, is itself a meaningful finding. When independent assessments using different data and methods identify the same hotspots, the underlying science is being confirmed. Field emissions, fertilizer production, and irrigation remain the dominant contributors. That stability reflects the biology and agronomy of cotton production.

What has changed most since 2017 is the precision and origin of the data. This is the most comprehensive cradle-to-gate LCA of U.S. cotton fibre production to date, built on primary data from 753 cotton growers across 17 states through Cotton Incorporated's Cotton Growers Natural Resource Survey for the 2021/22 crop year. The study was conducted in conformance with ISO 14040 and 14044 and was critically reviewed by an independent expert panel. Earlier global assessments blended U.S. production with cotton from China, India, Australia, and other regions, which masks real regional differences in irrigation, soil, energy mix, and grower practices.

The study also brings a more rigorous



treatment of biogenic carbon, accounting for both temporary storage in harvested fibre and changes in soil organic carbon from conservation practices like reduced tillage and cover cropping. That dimension was not fully quantified in earlier work.

NFI: Cotton has often performed poorly in environmental scoring tools and developed a reputation as a high-impact fibre. Do you think this study helps challenge some of those assumptions? In particular, how should brands interpret the finding that U.S. cotton has a net cradle-to-gate footprint of $-0.264 \text{ kg CO}_2\text{e/kg}$ when biogenic carbon storage is included?

Jesse Daystar: Yes, this study up-

dates the conversation. Many of the tools and scoring systems that have shaped cotton's reputation rely on older data, global averages, or assumptions that do not reflect how U.S. cotton is grown today, and most do not yet include biogenic carbon storage in fibre and soil. This LCA gives brands a current, U.S.-specific, independently reviewed foundation. As current data is incorporated into tools and databases, brands will have a more accurate foundation for evaluating U.S. cotton.

The carbon result is meaningful, but it has to be interpreted in its proper scope. From cradle to gate, producing one kilogram of U.S. cotton fibre generates approximately 1.45 kg of fossil CO_2e emissions. The study also accounts for approximately 1.71 kg of

CO_2e temporarily stored in cotton fibre and in soil from conservation practices. When that temporary biogenic carbon storage is included, the net cradle-to-gate result is $-0.264 \text{ kg CO}_2\text{e}$ per kilogram of U.S. cotton fibre. Fossil and biogenic carbon are reported separately, in line with GHG Protocol guidance.

Three points matter for how brands interpret that number. First, this is a cradle-to-gate result for fibre production, not a cradle-to-grave result for a finished product. Second, the biogenic carbon is temporary, because most of it can be released at end of life depending on how the product is used, reused, recycled, or disposed of. Third, this finding does not mean every cotton product is "carbon negative." It means that within the boundary of fibre production, and when temporary biogenic storage is included, the net result is negative.

NFI: How should brands use this report without overclaiming? What would be a fair and responsible way to communicate these findings?

Jesse Daystar: The principle is straightforward: claims have to match the scope of the data. This is a cradle-to-gate study of U.S. cotton fibre production. Brands using it should keep that boundary, and the role of temporary biogenic carbon storage, attached to any claim they make.

The strongest, most defensible communication does three things. It states the scope: cradle-to-gate, U.S. cotton fibre production, primary data from 753 growers across 17 states. It states the result with its qualifier: a net cradle-to-gate footprint of $-0.264 \text{ kg CO}_2\text{e}$ per kilogram of U.S. cotton fibre when temporary biogenic carbon storage in fibre and soil is included. And it does not extend the claim to the full product life cycle.

A fair example would be:

"The new U.S. cotton LCA found a net cradle-to-gate result of $-0.264 \text{ kg CO}_2\text{e}$ per kilogram of U.S. cotton fibre when temporary biogenic carbon storage in cotton fibre and soil is included"

"The new U.S. cotton LCA found a net cradle-to-gate result of $-0.264 \text{ kg CO}_2\text{e}$ per kilogram of U.S. cotton fibre when temporary biogenic carbon storage in cotton fibre and soil is included."

NFI: Where are the biggest practical opportunities to reduce the footprint of U.S. cotton further?

Jesse Daystar: The study's contribution analysis points directly to where the leverage lies. Field emissions and fertilizer production together account for roughly 78 per cent of the fossil greenhouse gas footprint of U.S. cotton fibre. That makes nitrogen management the single most important practical lever.

The opportunity is on both sides of the fertilizer ledger: how it is used and how it is produced. Precision practices such as soil testing, optimized rate and timing, and split applications can reduce the amount of nitrogen applied without sacrificing yield. That cuts both the emissions embedded in fertilizer production and the direct and indirect nitrous oxide emissions that occur in the field. Nitrous oxide has a global warming potential roughly 265 times that of carbon dioxide over a 100-year horizon, so improving nitrogen use efficiency is one of the highest-impact moves available.

Irrigation is the dominant driver of water-related impacts, and U.S. growers have been making real progress. Adoption of flow meters, irrigation scheduling tools, and soil moisture monitoring has increased significantly over the past decade. Continued investment in pumping efficiency, and where practical, transitioning to lower-carbon energy for pumping, will reduce both water consumption impacts and the associated emissions.

Soil health practices are the third major area. Reduced tillage, cover cropping where it fits the system, residue management, and other conservation

practices support soil health, reduce erosion, build resilience, and increase soil organic carbon. More carbon held in stable soil organic matter strengthens cotton's biogenic carbon profile in a more durable way.

Pest management has also evolved significantly through the adoption of biotech traits and integrated pest management, and the study reflects current practice from grower-level survey data. Continued investment in IPM and biological controls remains an important area of improvement.

Finally, circularity, through initiatives like Blue Jeans Go Green™ denim recycling program and broader fibre recycling investment, extends the useful life of the carbon stored in cotton fibre. That can extend the time biogenic carbon remains stored, though product-level climate value still depends on cradle-to-grave accounting.

One thing worth being clear about: the practices that get adopted at scale are the ones that work economically for growers. Sustainability and profitability have to move together.

NFI: How will Cotton Incorporated take this work forward?

Jesse Daystar: One of the main goals of this work is to improve how U.S. cotton is represented in the systems where fibre decisions are being made - sustainability tools, scoring frameworks, brand sourcing, and policy - using current, credible, independently reviewed data.

The updated life cycle inventory data from this study has been submitted for inclusion in several major sustainability databases, tools, and platforms, with additional submissions planned as more opportunities are identified. Many of the cotton datasets currently embedded in those tools draw on older or globally averaged data. That has real consequences when material assessments and sourcing decisions are only as good as the data behind them. Replacing those with current, U.S.-specific, grower-level data is one of the most useful things this work can do.

There is a need to update assumptions about cotton, but the goal is not to replace one oversimplified story with another. The goal is to ground the conversation in better data.

Brazil strengthens cotton export lead

Brazil has reinforced its position as the world's leading cotton exporter after shipping record volumes in a difficult year for global cotton trade. By MARK LANE

According to the *Cotton Brazil Annual Report 2025*, Brazilian cotton exports reached 2.83m tonnes in the 2024/25 market year, up 6 per cent on the previous period. The increase came despite a 7.4 per cent fall in global cotton exports and a 5.3 per cent decline in imports.

The figures highlight Brazil's growing significance in the global cotton sector. In 2024/25, the country accounted for 31 per cent of all cotton traded globally, up from 27 per cent a year earlier. The US remained close behind with a 30 per cent share, while Australia's share fell to 12 per cent.

Brazil is now the world's third largest cotton producer, behind China and India. Its 2024/25 crop reached 3.7m tonnes, equal to 15 per cent of global output. This placed it ahead of the United States, which produced 3.1m tonnes. Brazil's production increased by 17 per

cent year on year, helping drive the wider recovery in global cotton output.

Brazil's performance came in a market marked by weaker trade, lower prices and shifts in demand from major importing countries. Global production rose by 5.8 per cent to 25.3m tonnes, but international trade contracted. China, historically a major driver of cotton demand, cut imports by 65 per cent, falling to fourth place among importing countries.

Bangladesh became the world's largest cotton importer in 2024/25, buying 1.82m tonnes, up 17 per cent. Vietnam ranked second with 1.65m tonnes, while Pakistan rose sharply to 1.33m tonnes, up 91 per cent.

Cotton Brazil said the diversification of export destinations was central to Brazil's performance. Brazilian cotton reached 30 countries in the 2024/25 market year, an 11 per cent increase.

On a calendar-year basis, exports reached 3.026m tonnes in 2025, up 9 per cent on 2024. Revenue, however, fell as prices weakened, with market-year export earnings down 6 per cent to US\$4.85bn.

The report also highlights Brazil's strategic focus on Asia. Cotton Brazil's priority markets include Bangladesh, China, South Korea, Egypt, India, Indonesia, Pakistan, Thailand, Türkiye and Vietnam. Together, these markets account for more than 90 per cent of global cotton imports.

Brazilian cotton now has a market share above 30 per cent in eight of its main priority destinations, with South Korea having the highest share of Brazilian cotton, at 62 per cent.

Cotton Brazil, established in 2019 by Abrapa, is run with the National Cotton Shippers Association and Apex-Brasil. Its role is to promote Brazilian cotton internationally, with a focus on quality, sustainability, traceability and reliability.

In 2025, the programme carried out work in 14 countries, staged six international missions and took part in 21 international events. Activities included missions to India, Pakistan, China and South Korea, a buyers' mission in Brazil, participation at Textile Exchange in Lisbon and a presence at ITMA Asia + CITME.

One of the most notable developments came in October, when Cotton Brazil launched a new traceability consultation system and the Cotton Brazil Knowledge Hub, an online platform providing technical information.

Piccoli, president of Abrapa, said Brazilian cotton had gained ground in strategic destinations because the global industry was seeking "security," adding that this was now linked to "consistency, quality, and volume."

Dawid Wajs, president of Anea, said the challenge for 2026 would be to communicate value beyond volume, particularly around sustainability, traceability, quality and social and environmental responsibility.

The report suggests Brazil is now seeking to position itself as a long-term strategic source for brands and mills looking for reliable, traceable natural fibres at a time when cotton is competing directly with man-made fibres.



BCI pilot claims 54 per cent cut in US cotton emissions

ZURICH - US cotton growers licensed to the Better Cotton Initiative (BCI) standard cut greenhouse gas emissions by 54 per cent in a single season. BCI claims the reduction came through a pilot project focused on regenerative farming practices.

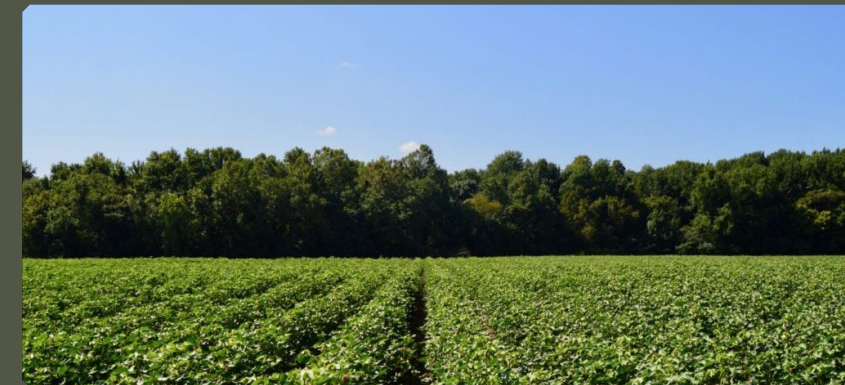
The claimed impact rose to 77 per cent when carbon removals were included.

The 2024-25 pilot involved cotton growers in Arkansas, Mississippi and Missouri. It was led by Better Cotton, formerly the Better Cotton Initiative, and agricultural technology provider Indigo Ag.

Growers adopted a range of regenerative practices including crop rotation, cover cropping, nitrogen management and no-till farming.

Better Cotton said the project delivered more than 17,500 metric tonnes of greenhouse gas reductions and carbon removals across 19,000 acres. The results were calculated and verified using Indigo Ag technology.

The pilot is significant because it at-



tempts to put a verified number on the climate impact of farm-level practice change. For apparel brands, this is increasingly important as attention shifts from broad sustainability claims to measurable reductions in supply chain emissions.

Scope 3 emissions, which include indirect emissions across a company's value chain, typically account for the largest share of a fashion brand's carbon footprint. Cotton farming sits upstream in that footprint, meaning changes in field-level practices can potentially help brands address emissions linked to raw material sourcing. Better Cotton said the pilot also creates a potential route for growers to

earn additional income from verified carbon reductions. The organisation said monetisation could be particularly important given the difficult economic conditions facing many US cotton growers.

Lars van Doremalen, director of impact at Better Cotton, said the project showed the value of regenerative agriculture and field-level data.

"This project captures the power of regenerative agriculture and the value of field-level data," he said. "The growers we work with have driven change for years. But by quantifying that impact, we can unlock tangible incentives for both farming communities and fashion businesses to drive change together."

Brands warned of forced labour cotton concerns

WASHINGTON - Campaigners are warning that cotton produced with state-imposed forced labour in Turkmenistan may be entering global fashion supply chains. The risk is linked to textile manufacturers in Türkiye, Pakistan and parts of Europe.

The warning follows a new report from Cotton Campaign members Turkmen. News and the Turkmen Initiative for Human Rights, which says forced labour remained widespread and systematic during Turkmenistan's 2025 cotton harvest.

The report, *Turkmenistan Cotton: State-Imposed Forced Labor in the Annual Cotton Harvest, High Risk in Global Supply Chains*, says the Turk-

men government reversed modest steps taken in the previous harvest to reduce forced mobilisation.

Public sector workers, including teachers, doctors and utility staff, were again forced to pick cotton or pay for replacement pickers.

The findings raise fresh concerns for brands and retailers sourcing cotton textiles from complex supply chains in Türkiye and Pakistan, two major garment and textile manufacturing hubs.



The report also says Turkmen cotton, yarn or fabric is used by suppliers in Europe, including Portugal and Italy. Campaigners argue the risk cannot be managed at farm level because the forced labour system is imposed by the state.

"In Turkmenistan, forced labour is imposed and enforced by the state at all levels of government, making it impossible for brands to prevent or remediate forced labour on specific farms," said Raluca Dumitrescu, senior coordinator of the Cotton Campaign Coalition at Global Labor Justice.

She said government agencies in jurisdictions with forced labour import bans should recognise Turkmen cotton as a commodity made with state-imposed forced labour and ban all products made wholly or partly with it.

All cotton and cotton products originating in Turkmenistan have been barred from the US since 2018 under a Withhold Release Order.

Natural fibres face mixed outlook for 2026

World natural fibre production is expected to remain broadly unchanged in 2026, but the headline figure masks sharply different trends across the major apparel fibres. MARK LANE reports



WASHINGTON - According to the *World Natural Fibre Update May 2026*, published by the Discover Natural Fibres Initiative, global natural fibre production is forecast at 33.1m tonnes this year, the same as in 2025.

However, the fibre balance within that total is shifting.

Cotton production is forecast to fall, wool output is expected to decline to historically low levels and silk is continuing a modest recovery from the steep fall seen after 2015. Meanwhile, flax and hemp remain important growth areas for apparel and textile applications, despite continuing price volatility and uneven market development.

The report says cotton production in 2025 was estimated by USDA at 26.3m

tonnes, the highest in eight seasons. But for 2026, USDA is forecasting cotton output at 25.3m tonnes, a decline of 1.1m tonnes from the previous year.

DNFI says lower cotton prices since the Covid-era peak are discouraging cotton production and encouraging growers to shift into rotation crops such as maize, soybeans and wheat.

The report states: "Declines in cotton prices since peaking during the Covid era are discouraging cotton production and encouraging shifts to rotation crops such as maize, soybeans and wheat."

Cotton Outlook, a private-sector market information provider, has a similar forecast, putting 2026/27 world cotton production at 25.4m tonnes. It expects lower production in the US

and Turkey, while Brazil is forecast to fall by around 500,000 tonnes as farmers shift to maize in rotations with soybeans. China is also expected to be about 400,000 tonnes lower, assuming yields fall back from the record level seen in 2025.

For apparel brands, the cotton picture is therefore mixed. Supply remains high by historical standards, but the easing in production comes at a time when cotton's environmental profile is also being reassessed, with the publication of several new LCAs.

DNFI also highlights a new International Cotton Advisory Committee report, the Cotton Databook 2025, which it describes as, "the most comprehensive collection of data on sustainability in cotton farming."

The report analysed cultivation practices in 38 countries, covering 99 per cent of global cotton production. DNFI says the findings challenge claims about cotton's environmental impact.

According to the DNFI summary, cotton occupies 2.21 per cent of agricultural land in use. Cotton production accounts for 1.9 per cent of world water use, 3.8 per cent of fertiliser use and 3.7 per cent of global pesticide consumption.

DNFI also cites data showing greenhouse gas emissions from cotton cultivation at 1.7 tonnes per hectare, while the cotton plant sequesters 13.63 tonnes of CO₂ per hectare in soil through photosynthesis.

For the cotton sector, this is potentially significant given that cotton has often been scored poorly in environmental comparisons with synthetic fibres, particularly on water and chemical use. The ICAC data suggests the sector now has a stronger evidence base to challenge older assumptions and simplistic comparisons.

The report also points to the inaugural Australian Natural Fibres Forum, jointly hosted by Cotton Australia and Australian Wool Innovation in April. The forum brought together brands, growers, researchers, supply-chain partners and industry leaders to promote cotton and wool as complementary natural fibres.

There, Cotton Australia chief executive Adam Kay said: "Cotton and wool are not competitors but can work together to highlight the huge advantages of

natural fibres for consumers.

"The world is becoming increasingly aware of the limitations, problems and potential health impacts of oil-based synthetic fibres. Natural fibres are the answer to many of these issues."

Wool Outlook

DNFI says world wool production in 2025 is estimated at less than 1m tonnes, the lowest level since the 1940s. A further decline is expected in 2026 as farmers respond to relatively weak wool prices compared with meat by reducing wool breeds in favour of meat breeds.

The Australian Wool Production Forecasting Committee has forecast shorn wool production in 2026/27 at a record low of 243,900 tonnes greasy. That would be 4.5 per cent below the 2025/26 forecast and nearly 13 per cent lower than 2024/25.

The committee expects 59.3m sheep to be shorn in 2025/26, down 5.9 per cent from the previous season. DNFI notes that the record low was 56.8m sheep shorn in 1905.

The committee attributed the historically low level to lower numbers of breeding ewes and continued high sheep meat and skin prices.

There are signs of improved pricing, however.

DNFI says British Wool prices rose to the highest level in a decade during April. The British Fleece Price Indicator, converted to US dollars, climbed from US\$1.23 in December 2022 to US\$3.37 in April 2026, a rise of 137 per cent over three years.

Over the most recent 10 months, prices for strong wools (fibres with micron values greater than 24) doubled. DNFI says this has brought renewed optimism to producers after an extended period of falling prices, synthetic fibre competition and a shrinking supply chain.

Merino has also strengthened. Australia's Eastern Market Indicator rose 13 per cent in April to US\$13.58, 73 per



cent higher than a year earlier.

Australian Wool Innovation said the EMI had reached its highest US dollar level since July 2019. This strength in dollar terms highlighted underlying demand, with buyers willing to absorb currency headwinds at elevated price levels.

South African wool prices are also moving higher. DNFI says the All Merino Indicator was up 45 per cent in April 2026 compared with April 2025. Adjusted for inflation, prices are the highest since May 2019.

The wool story, in summary, is one of shrinking production, firmer prices and possible renewed producer confidence. But structural challenges remains - rebuilding flocks and fibre supply will take time.

Silk

DNFI estimates world silk production at 101,000 tonnes in 2025 and 105,000 tonnes in 2026, assuming the recovery that began after 2021 continues.

Silk output rose from around 160,000 tonnes per year between 2010 and 2014 to 202,000 tonnes in 2015. It then fell sharply to 86,000 tonnes by 2021. The preliminary estimate for 2024 is 97,351 tonnes.

Prices for Chinese silk, grade 3A, Denier 20/22D, with 11 per cent regain, were about US\$65/kg at the end of April, according to DNFI.

For luxury apparel, silk's recovery is

important but limited in scale. Even at 105,000 tonnes, silk remains tiny compared with cotton, wool, flax and hemp. Its value lies in premium positioning, heritage and performance, rather than volume.

Textile flax for apparel fibre also covered in the report.

DNFI says textile flax long fibre prices, converted to US dollars, rose 1 per cent to US\$6.75/kg in March 2026, nearly double the level a year earlier. Short fibres rose 6 per cent to US\$2.59/kg.

Flax prices have been highly volatile over the past three years. Drought in 2023 and 2024 in the main producing region led to short supplies and prices close to US\$10/kg. France, Belgium and the Netherlands account for around 90 per cent of world flax production for textile fibre.

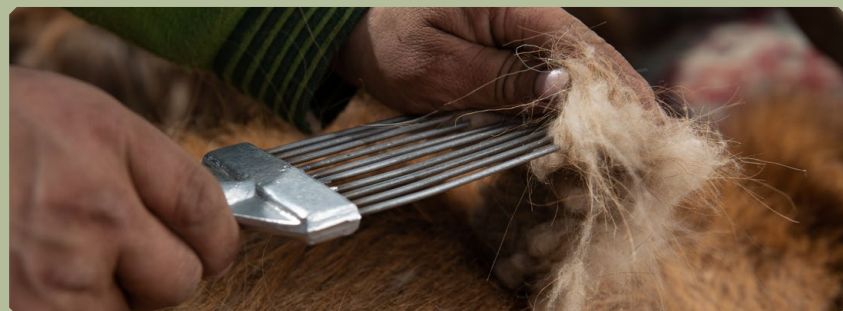
A recovery in production during 2024 and 2025 led to a steep fall in quotes. DNFI estimates textile flax production at 540,000 tonnes in 2025, up from 448,000 tonnes in 2024. Production in 2026 is forecast to moderate to about 500,000 tonnes, assuming average weather and reduced area in response to lower prices since 2024.

Favourable conditions in France, Belgium and the Netherlands enabled the 2025 harvest to achieve yields of 5 to 5.5 tonnes of straw per hectare and about 1 tonne of long fibre per hectare. These were below the excellent 2024 results, but still above average.

DNFI notes that 20 additional scutching lines, along with upgrades to existing lines, have been added to European capacity during the past decade. It concludes that the European industry is, "well positioned to sustainably meet market requirements."

"The world is becoming increasingly aware of the limitations, problems and potential health impacts of oil-based synthetic fibres. Natural fibres are the answer to many of these issues"

Good Cashmere Standard expands animal welfare assessment



HAMBURG - The Aid by Trade Foundation is expanding the use of animal welfare assessments across farms verified under The Good Cashmere Standard. The move comes as the cashmere sector faces growing scrutiny over the evidence behind sustainability and welfare claims. The foundation said its Animal-related Animal Welfare Assessment, known as ARAWA, was carried out for a second consecutive year in 2025 alongside the independent verification process for The Good Cashmere Standard. The assessments are designed to provide a broader picture of herd health and welfare on audited farms in Inner Mongolia, going beyond conventional standard checks.

The ARAWA process looks not only at whether resources such as feed, shelter and suitable grazing conditions are provided, but whether these inputs translate into improved animal welfare outcomes for cashmere goats. The approach is linked to the Five Domains model of animal welfare, which considers nutrition, physical environment, health, behavioural interactions and the animal's mental state. Aid by Trade Foundation said the scope of the project was expanded in 2025. The number of assessed farms rose from 72 in 2024 to 100 in 2025, an increase of 39 per cent. The geographic scope was also widened from three to nine regions in Inner Mongolia, while the number of

cashmere goats assessed rose from 2,024 to 2,298. The foundation said it plans to gradually increase the number of farms surveyed by 2027. Eight parameters are currently used to assess living conditions for cashmere goats, covering nutrition, environment, health and land management. The reviews are conducted independently. Based on the data gathered in 2025, the general health status of the animals was classified as "good", with no signs of underlying health problems identified. Marvin Heuduck, head of The Good Cashmere Standard at the Aid by Trade Foundation, said the decision to integrate ARAWA into the standard's processes took GCS "beyond the usual standard criteria for assessing animal welfare". He added: "We are pleased that the current results confirm the good work on the GCS verified farms. From these results, we can gain new valuable information with which we will further develop animal welfare aspects according to regional and seasonal particularities and in close cooperation with herders and cashmere producers." The Good Cashmere Standard was launched by the Aid by Trade Foundation in 2019 and has since become the largest standard for verified cashmere fibres from Inner Mongolia.

Textile Exchange names Vancouver for 2026 conference

TEXAS - Textile Exchange has announced that its 2026 conference will take place at the Vancouver Convention Center in Vancouver, Canada, from October 12–16, 2026. The event will be held under the theme "The Implementation Era" and will focus on scaling what works across businesses, supply systems and landscapes. According to Textile Exchange, the conference will bring together experts from across the fashion, textile and apparel industry for three days of collective learning around how materials are produced, chosen and reused. The organisation said the 2026 agen-



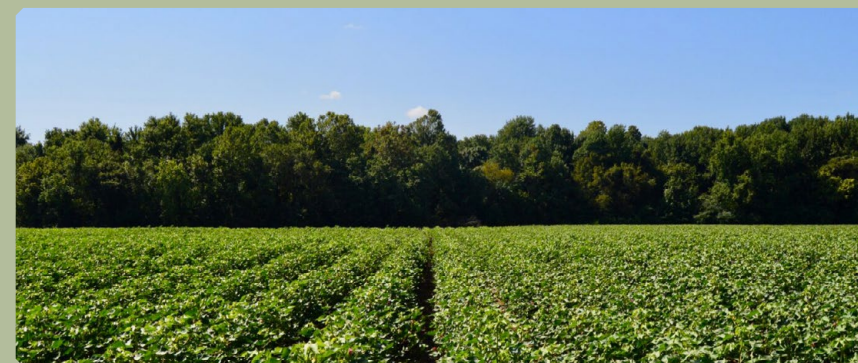
da will be rooted in the realities facing those delivering change, from sustainability executives and practitioners to material producers. The programme will also be linked to Textile Exchange's new action path-

ways, which support the adoption of preferred cropping, recycling and animal material production systems. Textile Exchange said further programme details and announcements will be shared in the coming months.

BCI pilot claims 54 per cent cut in US cotton emissions

ZURICH - US cotton growers licensed to the Better Cotton Initiative (BCI) standard cut greenhouse gas emissions by 54 per cent in a single season. BCI claims the reduction came through a pilot project focused on regenerative farming practices. The claimed impact rose to 77 per cent when carbon removals were included. The 2024-25 pilot involved cotton growers in Arkansas, Mississippi and Missouri. It was led by Better Cotton, formerly the Better Cotton Initiative, and agricultural technology provider Indigo Ag. Growers adopted a range of regenerative practices including crop rotation, cover cropping, nitrogen management

and no-till farming. Better Cotton said the project delivered more than 17,500 metric tonnes of greenhouse gas reductions and carbon removals across 19,000 acres. The results were calculated and verified using Indigo Ag technology. The pilot is significant because it attempts to put a verified number on the climate impact of farm-level practice change. For apparel brands, this is increasingly important as attention shifts from broad sustainability claims to measurable reductions in supply chain emissions. Scope 3 emissions, which include indirect emissions across a company's value chain, typically account for the largest share of a fashion brand's carbon footprint. Cotton farming sits upstream in that footprint, meaning changes in field-level practices can potentially help brands address emissions linked to raw material sourcing.



Better Cotton said the pilot also creates a potential route for growers to earn additional income from verified carbon reductions. The organisation said monetisation could be particularly important given the difficult economic conditions facing many US cotton growers. Lars van Doremalen, director of impact at Better Cotton, said the project showed the value of regenerative agriculture and field-level data. "This project captures the power of regenerative agriculture and the value of field-level data," he said. "The growers we work with have driven change for years. But by quantifying that impact, we can unlock tangible incentives for both farming communities and fashion businesses to drive change together." Leigh Cooper Swisher, director of sustainability solutions at Indigo Ag, said the pilot demonstrated how measurement and verification could be used to show climate impact within cotton supply chains. The findings come as regenerative agriculture is moving higher up the agenda for cotton sourcing. Brands and retailers are increasingly looking for fibre programmes that can offer not only improved farming practices but also data that can be linked to corporate climate targets. However, regenerative agriculture claims are also under growing scrutiny, particularly where brands use the term without clear definitions, baselines or verified outcomes.

Marvin Heuduck takes lead role at Good Cashmere Standard

BERLIN - Marvin Heuduck has joined the Aid by Trade Foundation (AbTF) as the head of The Good Cashmere Standard (GCS) and New Standard Development, filling a newly created role within the AbTF team. The Good Cashmere Standard aims to protect animal welfare and the environment while securing social standards for herders and workers in the first cashmere-processing stage. Through his doctorate from the University of Göttingen as well as his work



for various authorities and in international efforts, Heuduck has developed sound scientific and practical experience in the field of animal welfare and protection; this represents an ideal foundation for succeeding in the newly created position. He said: "My passion is for the goats, who impress me through their unique nature. Ensuring their well-being and finding new ways to protect them in the context of cashmere extraction is a project close to my heart. "Through this position as the head of The Good Cashmere Standard, the Aid by Trade Foundation offers me a unique opportunity to use my years of expertise in animal welfare to make a difference and to decisively help shape the standard for the future."

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