FASHION IMPACT *TOOLKIT*

An impact inventory across the textile value chain

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Visit www.deloitte.com/FashionImpactToolkit for the interactive version of the Fashion Impact Toolkit

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The organisation has been leading the movement since 2009 and convenes the renowned international forum on sustainability in fashion, Global Fashion Summit, the Innovation Forum, thought leadership publications including the Fashion CEO Agenda, GFA Monitor and Upstream Circularity Playbook, and impact programmes including the Circular Fashion Partnership and the Renewable Energy Initiative.

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This report is interactive

EXECUTIVE *SUMMARY*

The challenge: A complex and fragmented value chain

The sector's value chain involves a wide range of actors, geographies, and production systems. This complexity can make tracing operations and identifying the related positive and negative sustainability impacts a significant challenge for stakeholders involved.[1] Addressing these challenges can require greater access to reliable value chain information to support brand traceability and the development of tools that empower actors across the value chain (including organizations, brands, manufacturers, consumers, traders, investors, etc.) to promote a more agile textile sector that is equipped to deal with evolving changes.

The imperative: The Fashion Impact Toolkit helps uncover the sustainability impacts of the textile sector

A sector-wide understanding of sustainability impacts is important for enabling consistent and collaborative action. To answer this imperative, a sector-wide Fashion Impact Toolkit has been developed, helping to establish a common language for companies in the textile and fashion sector. By mapping potential impacts across each stage of the value chain, this approach offers actors a common reference point to coordinate priorities and enhance cooperation.

By mapping impacts across every stage of the value chain, this approach offers companies a common reference point to align priorities and **enhance cooperation.** Such cooperation can help form the foundation for collective engagement, which could be central to scaling the positive impact needed to help transform the sector.

The Fashion Impact Toolkit is structured according to the European Sustainability Reporting Standards (ESRS) and provides a practical, sector-specific starting point for textile industry companies and stakeholders to identify their impacts across the value chain. Designed for actors from raw material producers and retailers to recyclers and remanufacturers, the toolkit offers a structured inventory of positive and negative impacts, filterable by material and geography. It helps enable those companies to build an adapted company-specific impact inventory that helps lay the foundation for strategic sustainability planning.

While it does not constitute a full double materiality assessment (defined in the **Sector-wide sustainability impacts landscape** section) or quantify impacts, the toolkit helps to equip companies with the insights to translate sector-wide data into company-specific context. The step-by-step approach outlined in the **Creating an Impact Inventory** section supports companies in leveraging the inventory, shaping sustainability strategies, and potentially collaborating with other value chain actors to drive systemic change. Such cooperation can help form the foundation for collective engagement, which could be central to scaling the positive impact needed to help transform the sector.

The end goal: Addressing sustainability impacts to help enable industry-wide transformation

Identifying sustainability impacts across a company's operations is important for reducing environmental and social impacts, and also to help drive long-term, industry-wide transformation. By leveraging tools such as the sector-specific Fashion Impact Toolkit, industry stakeholders can establish a shared understanding of key sustainability implications. This collective agreement helps enable the industry to address root causes, unlock shared value, and foster collaboration across the value chain, paving the way to take actions that should enhance the resilience of the sector.

CHAPTER 1

Setting The Context: Why Identify Sustainability Impacts

Today's textile value chains are complex, global and highly fragmented, making it difficult to access accurate information and develop a broad understanding of impacts, particularly beyond Tier 1 and Tier 2 suppliers. While many companies have some visibility into garment assembly, understanding the sustainability impacts of upstream processes, such as yarn production, fiber production or raw material sourcing, remains a significant challenge. As the industry focuses its efforts on shifting away from the linear business models, the need for visibility into circular activities, such as reuse, resale, repair, remake/remanufacture and recycling, has become increasingly important, yet remains largely unmet.

As the industry focuses its efforts on shifting away from the linear business models, the **need for visibility** into circular activities, such as reuse, resale, repair, remake/remanufacture and recycling, has become increasingly important, yet remains largely unmet.

Gaining insights into sustainability impacts is important to…

… understand a company's footprint and target impactful areas

Given that companies in the textile sector face a wide array of impacts spanning the entire value chain, it is helpful to identify impacts at each stage to build a robust understanding of a company's sustainability footprint. With this foundation companies can begin to quantify their most important concerns and focus mitigation efforts where they can have the greatest effect. This requires targeting the value chain activities and stages with the highest sustainability footprints, helping to ensure that resources are directed most effectively towards the areas that matter the most. By concentrating on these high-impact areas, companies can achieve more transformative outcomes.

… uncover operational insights for more informed decisions

In addition to improving footprint understanding, sustainability impact identification can help enhance operational insights. This heightened awareness can directly support competitiveness by streamlining operations and supporting more informed decisions.

… build stakeholder trust and long-term resilience

Addressing these topics is important for complying with current regulatory requirements, such as the Corporate Sustainability Due Diligence Directive (CSDDD) and the Corporate Sustainability Reporting Directive (CSRD), and for positioning companies competitively in a landscape where sustainability performance is becoming an important factor for investors, regulators, and consumers alike. Identifying sustainability impacts may also be a strategic driver that helps strengthen long-term resilience, builds stakeholder trust and creates value.

… drive proactive and targeted sustainability strategies

Adopting a proactive approach to sustainability impact management is one element to creating long-term value and driving positive outcomes, while reactive strategies, though sometimes necessary in certain situations, can tend to limit growth and resilience over time. By anticipating concerns before they escalate and embedding sustainability into the core of business strategy, companies can be better positioned to adapt to shifting regulatory landscapes and respond to sustainability pressures.

… enable industry-wide transformation

Beyond individual gains, identifying sustainability impacts also helps lay the groundwork for industry-wide transformation. By leveraging the toolkit resources, industry stakeholders across the value chain can collaborate with a shared understanding of implementing practices to create positive impacts. Using this toolkit amongst value chain actors may act as a foundation for discussing impacts at different stages of the value chain, fostering stronger relationships with upstream suppliers, and enabling collaborative efforts that help enhance the resilience of the value chain.

CHAPTER 2

Creating An Impact Inventory

Creating an impact inventory can help textile industry stakeholders in identifying applicable sustainability matters across the value chain. The clarity provided by increasing visibility into a company's own operations can support smarter decision-making, and lays the groundwork for long-term resilience and industry-wide progress. A key outcome of this analysis is the creation of a sector-wide Fashion Impact Toolkit: an interactive resource designed to help understand the impact landscape.

The Fashion Impact Toolkit

What is the Fashion Impact Toolkit and what does it cover?

The Fashion Impact Toolkit offers a structured overview of positive and negative sustainability impacts according to the ESRS to help companies in the textile sector identify their key areas of influence. Acting as a practical starting point for impact identification along the textile value chain, the toolkit helps companies map their areas of influence based on parameters such as materials, processes, and geographies. It is intended to help accelerate sustainability efforts in the sector by equipping companies with an initial, sector-wide understanding of their impact landscape, and by laying the foundation for further, company-specific analysis.

What is the Fashion Impact Toolkit not intended to be?

The Fashion Impact Toolkit does not constitute a full double materiality assessment as it does not cover risks and opportunities along the value chain. Additionally, it is not intended to provide a quantitative evaluation of the identified impact. The toolkit is not intended for consumer communication but is rather built to strengthen business-to-business collaboration. The Fashion Impact Toolkit offers only a sectorial level of granularity and therefore cannot fully capture the unique features of every company. Consequently, it is important that each brand or value chain actor independently assesses the relevance and materiality of the impacts and transforms them, as appropriate, into company-specific ones. This means reviewing and adapting the listed impacts based on their own characteristics, such as specific processes, geographic footprint, and material choices, to help ensure relevance and applicability.

Who is the Fashion Impact Toolkit designed for?

The Fashion Impact Toolkit is intended for actors across the textile value chain, from raw material producers to end-of-life waste managers and encompasses the intermediate stages including manufacturing, logistics, retail, and brand operations. It is designed to be applicable across major sub-sectors, including high-street fashion, luxury, footwear, sportswear, and textile manufacturing.

How does the Fashion Impact Toolkit function in practice?

The Fashion Impact Toolkit is an interactive resource which compiles an inventory of sustainability impacts, systematically organized by activity and sub-activity of the value chain. Users can filter impacts by materials and geographies, providing a foundation for companies to then tailor and complete the information to their specific operational context.
To help navigate the Fashion Impact Toolkit and the identification of potentially relevant information, an illustrative, seven-step framework, based on Deloitte's experience, has been developed.

Quick wins: Using the Fashion Impact Toolkit for impact assessment:

1. **Identify the position in the value chain:**
Determine the company's specific role and activities within the textile value chain, whether in raw material production, manufacturing, distribution, reuse, or end-of-life management. This step helps ensure focus on the impacts that are most relevant to the company's area and responsibilities within the broader value chain.

2. **Generate material- and geography-specific insights:**
Leverage the Fashion Impact Toolkit as part of the company's efforts to analyze impacts based on the materials utilized and the geographic regions in which the company and its stakeholders operate. This step provides a more refined understanding of how impacts can vary according to material types and location-specific conditions, helping to ensure that prioritization is grounded in the company's actual operational context. To leverage material and geographic-specific insights, companies should enhance traceability and deepen their understanding of the value chain. Knowing which materials are used, and where they are sourced and manufactured enables companies to navigate the toolkit with greater precision, focusing on the areas that are most relevant to their operations.

3. **Translate sector-wide impacts into company-specific ones:**
Review the identified impacts through the lens of the company's unique characteristics, such as production processes, supply chain structure, and regional presence, to adapt the information to the specific context.

4. **Quantify the identified impacts:**
To effectively prioritize and address sustainability concerns, companies should assess the severity, and likelihood of each impact. Quantifying impacts, where possible using available data, may enable better comparison, prioritization, and cooperation with the materiality assessments, helping to ensure compliance with the reporting framework.

Forward-looking: Leveraging the Fashion Impact Toolkit as part of the approach for strategy building:

5 **Understand operational implications:**
Once the impacts are mapped and quantified, they should be interpreted through the lens of the company's strategic and business perspective. This means identifying areas where negative operational impacts might occur and areas where there is opportunity to maximize positive impact. This step is an important input for conducting a broad double materiality assessment and should encompass a review from the company's legal team.

6 **Shape the ambition and strategy:**
Building on the outcomes of their double materiality assessment, companies can articulate a clear sustainability vision and shape a focused, insight-driven sustainability strategy.

7 **Collaborate for systemic change:**
Collaboration is important for a transparent and sustainable value chain. Companies can accelerate progress by collaborating across the different stages of the value chain, such as raw material producers, yarn and fiber manufacturers, brands and recyclers, to help drive shared goals and unlock mutual value. Strategic relationships across value chain activities can help enable coordinated, systemic action and more effective decision-making at scale.

This illustrative framework may help inform how companies develop targeted sustainability strategies to elevate performance. This may also enable a shift from insights to action, helping to empower companies to move beyond identifying impacts to actively implementing solutions, setting priorities, and driving measurable change across the value chains.

CHAPTER 3

Mapping The Textile Value Chain

A holistic sectorial value chain forms the foundation for the impact inventory. Based on Deloitte Global's experience and validations against relevant sources[2,3,4,5,6,7], the mapping of activities serves as the basis for identifying impacts across the main stages of the textile lifecycle.[8]

The textile value chain remains predominantly linear, largely following the traditional production-consumption-disposal model. However, a shift toward circular models has created an additional opportunity for companies to enhance value creation of their production cycles[9,10]. As a result, new and emerging activities have been integrated into the value chain framework in the form of a circular flow. Given that these circular processes are expected to gain industry relevance, driven by upcoming regulation and initiatives[11,12] aimed at managing waste and promoting eco-design, among other strategies, it is important to also explore the sustainability impacts associated with them. This relevance is further underscored by the projected growth of the global second-hand apparel market, which is expected to reach $367 billion by 2029[13], highlighting the strong economic potential of circular business models. This enables stakeholders to understand how the transition to a circular value chain introduces new impacts and opportunities throughout the system.

The value chain mapped in Figure 1 reflects the apparel product lifecycle. The linear section of the value chain includes material production, garment manufacturing, commercialization, consumer use, waste collection and sorting, and the end-of-life processes such as incineration and landfilling. The circular section of the value chain incorporates both existing and emerging processes related to high-value recovery activities, alongside open- and closed-loop recycling. These activities also include upstream strategies such as product design and eco-design, which help an important role in enabling circularity from the outset.

Given the complexity that generally characterizes textile value chains and the large variety of products in the different industry segments that are considered in this exercise, it was necessary to identify the most representative value chain activities to limit the scope of the analysis and prioritize areas with significant impacts.

Mapping the textile sector's value chain revealed 20 main activities and 101 sub-activities. A scoping exercise narrowed it down to the 88 most relevant sub-activities, based on two primary criteria. First, **material relevance:** the selection focused on the most widely produced materials, such as cotton, polyester, viscose and polyamide, as well as those specific to certain subsectors, including leather, wool, and cashmere for luxury, and non-textile synthetics for footwear. Sub-activities related to other, less relevant materials were excluded. Second, **recycling maturity:** sub-activities were selected based on the technological readiness of recycling processes and the prevalence of materials compatible with each mature recycling technology. Recycling-related sub-activities that had not yet reached a certain Technology Readiness Level (TRL) were excluded[14]. In addition to these criteria, a **geographical scoping** was applied to the 88 sub-activities to assess where each primarily takes place. This helped capture regional variations in impacts, recognizing that such impacts may differ significantly by location.

Mapping the textile sector's value chain revealed **20** main activities and **101** sub-activities. A scoping exercise narrowed it down to the **88** most relevant sub-activities.

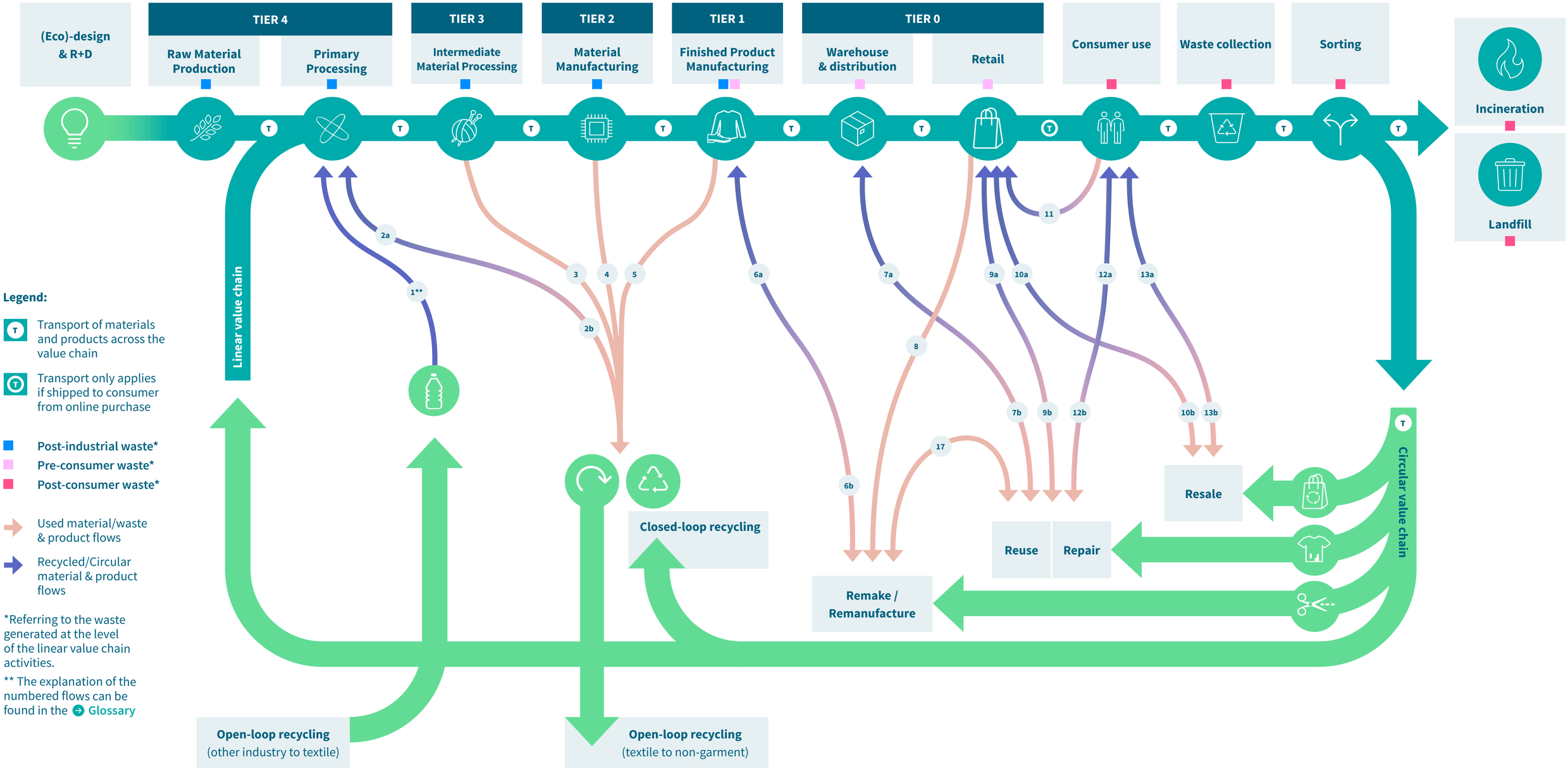
VALUE CHAIN SCOPING: THE CASE OF COTTON

To identify the most representative activities, variables such as global material production, recycled materials and geographies were analyzed. For example, cotton accounts for 20% of global fiber production[15]. Being a predominant fiber, it was included in the scope of the analysis.

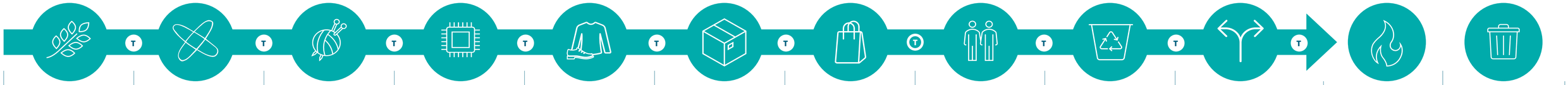
Additionally, a scoping exercise was conducted on recycling activities. Recycled cotton was included in the study as it is one of the most revalorized materials, through mechanical, chemical, or thermomechanical recycling technologies.[16,17]

For the geography scoping variable, countries accounting for over 70% of global cotton raw material production were included in the scope.

The details of the criteria and variables considered for the scoping exercise can be found in annex **Scope and hypothesis of the impact analysis.**



Sources: Textile Exchange, Supply Chain Taxonomy for the textile, apparel and fashion industry, 2024. - UNEP, Sustainability and Circularity in the Textile Value Chain, A Global Roadmap, 2023. - World Resources Institute & Apparel Impact Institute, Roadmap to Net Zero Delivering Science-Based Targets in the Apparel Sector, 2021.
The explanation of the waste, material and product flows identified by the numbers can be found in annex "Glossary".



TIER 4

Raw Material Production

- Farming
- Harvesting
- Forestry
- Extracting from the earth (e.g. oil, gas)
- Shearing

Primary Processing

- Ginning
- Pulp making
- Pretreatment
- Extrusion
- Slaughtering
- Cleaning
- Scouring

TIER 3

Intermediate Material Processing

- Spinning
- Tanning

TIER 2

Material Manufacturing

- Knitting
- Weaving
- Dyeing
- Printing
- Embellishing
- Finishing
- Retanning
- Molding
- Vulcanization
- Coating

TIER 1

Finished Product Manufacturing

- Washing
- Laundering
- Printing
- Dyeing
- Patterns / Tailoring / Cutting
- Assembly of pieces
- Embellishing
- Cleaning
- Tertiary packaging
- Polishing

TIER 0

Warehouse & distribution

- Customs management
- Secondary and tertiary packaging
- Transport
- Wholesale

Retail

- E-commerce (including last mile delivery)
- Physical store retailing
- Returns management
- Primary packaging
- Post-sale service
- Customer experience
- Marketing
- Headquarters activities (human resources, financial, audit, legal,…)

Consumer use

- Use
- Washing
- Drying
- Ironing

Waste collection

- Drop-off of post-consumer waste (ONG, physical store, ecommerce, textile specific bins, etc.)
- Municipality bins
- Post-industrial waste collection
- Pre-consumer waste collection

Sorting

- Preliminary inspection
- Manual sorting (by condition, composition, use, quality, color)

Incineration

- Pre-treatment
- Incineration with energy-Recovering
- Incineration without energy recovery

Landfill

- Controlled landfill (pre-treatment, environmental management)
- Uncontrolled landfill

Legend:

- (T) Transport of materials and products across the value chain
- (T) Transport only applies if shipped to consumer from online purchase

Primary Raw material (virgin, organic, regenerative):

- Cotton
- Polyester, polyamide
- Leather
- Viscose
- Wool, Cashmere
- Non-textile synthetic polymers

Sources: Textile Exchange, Supply Chain Taxonomy for the textile, apparel and fashion industry, 2024. - UNEP, Sustainability and Circularity in the Textile Value Chain, A Global Roadmap, 2023. - World Resources Institute & Apparel Impact Institute, Roadmap to Net Zero Delivering Science-Based Targets in the Apparel Sector, 2021.

(Eco) design & R+D

- Design for durability
- Design for repairability
- Design for recyclability
- Design to reduce resource use
- Analyse trends (emotional durability)
- New fibers. Fabrics testing
- Material selection

Reuse

- Reverse logistics
- Donation exports
- Rental

Repair

- Reverse logistics
- Workshop repair for product defects
- Guarantee maintenance service

Resale

- Reverse logistics
- Recondition for resale
- Second-hand/Outlets E-commerce (B2C, C2C)
- Second-hand/Outlets physical stores (B2C, C2C)

Remake / Remanufacture

- Reverse logistics
- Disassembling
- Replacing
- Reprocessing
- Reassembling

Closed-loop recycling

Mechanical recycling

- Pre-treatment
- Shredding
- Carding (Fiber separation)

Chemical recycling

- Washing
- Shredding
- Dissolution
- Dry wet spinning
- Melting
- Depolymerization (etilenglicol processing)
- Polymerization (antinmonium oxide)
- Extrusion

Thermomechanical recycling

- Pre-treatment
- Melt processing (shredding and grinding at high T°C)
- Extrusion/Injection

Open-loop recycling (other industry to textile)

Thermomechanical recycling

- Pre-treatment
- Melt processing (shredding and grinding at high T°C)
- Extruding & texturizing

Open-loop recycling (textile to non-garment)

Mechanical recycling

- Pre-treatment
- Shredding
- Carding (Fiber separation)

Thermomechanical recycling

- Pre-treatment
- Melt processing (shredding and grinding at high T°C)

Chemical recycling

- Washing
- Shredding
- Dissolution
- Dry wet spinning
- Melting
- Depolymerization (etilenglicol processing)
- Polymerization (antinmonium oxide)
- Extrusion

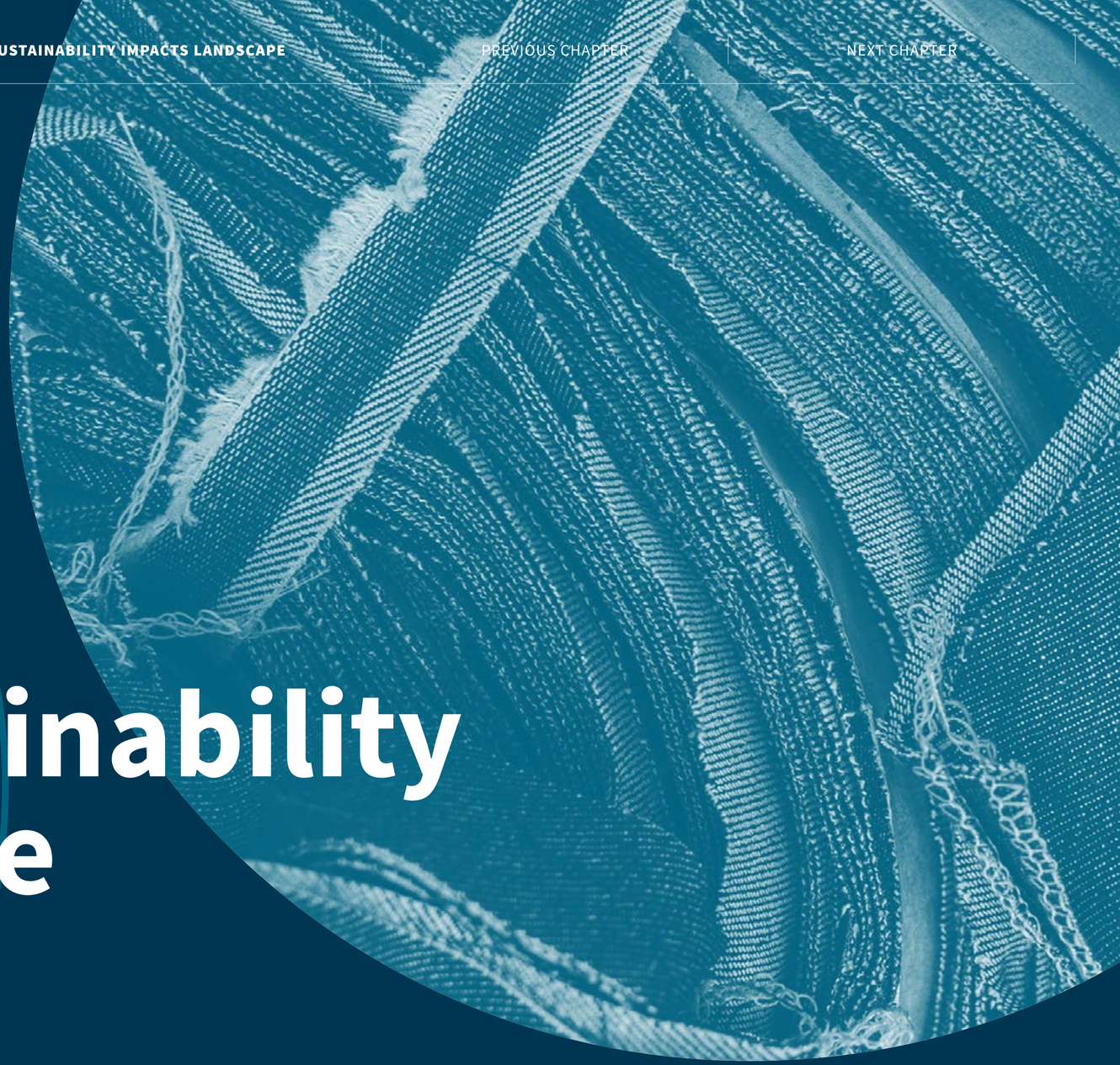
Recycled Material:

- Cotton
- Polyester, polyamide
- Wool
- Non-textile synthetic polymers

Non-textile industry Material:

- Non-garment Textile
- Chemical / Industrial use
- Insulation
- Carbon-based
- Construction
- Plastic granules
- Sports & recreation infrastructure

Sources: Textile Exchange, Supply Chain Taxonomy for the textile, apparel and fashion industry, 2024. - UNEP, Sustainability and Circularity in the Textile Value Chain, A Global Roadmap, 2023. - World Resources Institute & Apparel Impact Institute, Roadmap to Net Zero Delivering Science-Based Targets in the Apparel Sector, 2021.



CHAPTER 4

Sector-Wide Sustainability Impacts Landscape

With the aim of revealing where some of the most important sustainability challenges of the textile sector lie, a structured impact inventory has been developed. By outlining nearly **3,000** impacts across value chain stages, the research conducted to construct the Fashion Impact Toolkit, highlights key hotspots and pressure points. This inventory mapping is associated with the ESRS prior to any simplification efforts[18], helping to ensure consistency with the in-force ESRS thematic standards[19], and offers a foundation for future reporting and strategy development.

Each value chain stage can present distinct sustainability challenges and varying impact. From upstream raw material sourcing to consumer use, end-of-life, and circular activities, the nature of impact can differ significantly, requiring tailored interventions.

To help support a meaningful and actionable understanding of these impacts, the textile value chain has been grouped into six distinct stages. This categorization reflects clusters of activities that tend to share similar types of impacts and intervention needs, helping companies to more effectively target their efforts.

By outlining nearly **3,000** impacts across value chain stages, the research conducted to construct the Fashion Impact Toolkit, highlights key hotspots and pressure points.

The following six stages of the value chain are each associated with their corresponding activities:

- **Production of materials:** Tier 4 – Raw material production and Primary processing, Tier 3 – Intermediate material processing
- **Garments manufacturing:** Tier 2 – Material manufacturing, Tier 1 – Finished product manufacturing
- **Product distribution and use:** Tier 0 – Warehouse & distribution and Retail, Consumer use
- **End-of-life management:** Waste collection, Sorting, Incineration, Landfill
- **Material recycling:** Closed-loop recycling, Open-loop recycling (other industry to textile), Open-loop recycling (textile to non-garment)
- **High-value recovery activities:** (Eco) design & R+D, Reuse, Repair, Resale, Remake/Remanufacture

What Is EFRAG & The ESRS Framework?

The European Financial Reporting Advisory Group, known by its acronym, EFRAG, is a private association whose aim is to support the European Commission regarding topics related to corporate reporting.

In its sustainability reporting activities, EFRAG provides technical advice to the European Commission in the form of the European Sustainability Reporting Standards (ESRS). The ESRS covers 10 topics related to sustainability concerns and serves as the framework for European reporting regulations such as the Corporate Sustainability Reporting Directive (CSRD).

The CSRD and ESRS pose the basis for the double materiality assessment, a sustainability analysis that evaluates both the financial relevance of sustainability concerns to a company and the company's own impacts on people and the environment. The double materiality assessment could be considered as the next step to the impact inventory at hand, given that from the identified impacts, risks and opportunities can be drawn.

The impact inventory also identified transversal impacts, which are impacts that can occur across activities and affect actors and geographies within the value chain. These include impacts related to S1 (own workers), S2 (workers in the value chain), and G1 (business conduct). Workers across the textile value chain may encounter challenges related to limited access to collective bargaining and opportunities for social dialogue. In terms of business conduct, where inadequate whistleblower protections and gaps in anti-corruption measures exist this may pose challenges to ensuring transparency and accountability, while strong ethical practices and clear reporting mechanisms help foster integrity, fairness, and trust throughout the value chain.

Hereafter, each of the six stages of the textile value chain is presented with an overview of the sustainability impacts identified in the impact inventory. The summaries are representative of each stage but do not capture the full scope of impacts analyzed. They aim to provide textile companies with a high-level overview of the Fashion Impact Toolkit.

PRODUCTION *OF MATERIALS**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

Environmental Impact Summary:

The raw material production of natural fibers, such as cotton, wool, and viscose, can have significant impact on biodiversity loss primarily driven by practices like the over-extraction and pollution of water, the use of chemical fertilizers and herbicides, monoculture, extermination of predators, livestock trampling, overgrazing, logging and deforestation. These activities may degrade natural habitats, disrupt ecosystems, and reduce the survival of native species. However, when natural fibers are sourced through regenerative agricultural practices, they can generate positive impacts on biodiversity by promoting carbon sequestration, improving soil health, and enhancing overall ecosystem resilience. In contrast, synthetic fibers like polyester and polyamide, can involve energy-intensive extraction and processing methods that could contribute heavily to pollution of air, water and soil and microplastic release. During the fiber production phase, where negative impacts are noted these may be linked with air pollution, which may be due to uncontrolled emissions of particulate matter and airborne fibers released during spinning operations.

Social Impact Summary:

Material production activities, particularly in cotton, wool, and cashmere farming, can be associated with significant social impacts. As stated by the International Labor Organization (ILO)[20] natural fiber sourcing has been linked to reports of state-imposed forced labor, debt bondage, child labor, low wages, and job insecurity in the case of seasonal employment or the absence of formal contracts.[21] In primary processing, such as ginning, the informal and seasonal nature of work relations has contributed to low wages, often below living wage benchmarks.[22]
Beyond labor concerns, surrounding communities across both natural and synthetic fiber production may face displacement, food insecurity, and deteriorating living conditions due to land degradation in farming areas. Reportedly, indigenous groups are particularly vulnerable in both contexts, experiencing the loss of traditional livelihoods, the damage to sacred sites, and the erosion of cultural heritage.

Governance Impact Summary:

Significant animal welfare concerns can arise in the production of textile materials from sheep, goats, and cattle. Practices such as mulesing, overcrowding, lack of medical treatment, and poor handling during shearing or slaughter can cause suffering and health risks for animals. In many regions, weak regulation and limited oversight may allow these practices to continue unchecked, raising ethical concerns about the treatment of animals within textile supply chains.

GARMENTS
*MANUFACTURING**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

Environmental Impact Summary:

Throughout garment production, the impacts can vary significantly between wet and dry processing methods. Wet processes[23] can have impacts on water resources, primarily due to high freshwater consumption, which can intensify water stress in local communities, especially in water-scarce garment manufacturing regions, as highlighted in the WWF Water Risk Filter.[24] In addition, the discharge of untreated or insufficiently treated wastewater, often containing heavy metals, hydro-carbons, organic compounds, and other hazardous substances, can contaminate local waterways, disrupt ecosystems, and could deplete limited water supplies. In contrast, dry processes[25] are typically associated with high electricity demand, which may overload local power grids and impact energy stability[26]. Additionally, this can contribute to pollution through the release of fine particulate matter, volatile organic compounds, and chemical emissions from adhesives, coatings, and thermobonding agents, raising concerns about air quality and worker exposure.

Social Impact Summary:

Negative impacts on workers throughout the textile value chain, including within production facilities, can remain a pressing challenge for the industry, requiring systemic intervention. Workers can be exposed to hazardous chemicals, dyes, and textile dust, while high noise levels and excessive heat from machinery can contribute to respiratory illnesses, hearing loss, skin conditions, and other long-term health matters. The manual and repetitive nature of many production tasks can also contribute to skill stagnation, limiting workers' opportunities for career advancement. In addition to these physical risks, economic vulnerabilities can be widespread. Global pressure to keep production costs low can drive down wages, at times below living wage standards. Forms of forced labor, linked to imposed recruitment and employment fees, and cases of child labor in garment manufacturing have been identified[27].

Governance Impact Summary:

Ensuring the integrity of practices within the textile sector's supply chain, such as sustainability performance reviews, can be complex. This complexity can be due to potential integrity incidents in the sector[28,29].

PRODUCT DISTRIBUTION *AND USE**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

According to the Ellen MacArthur Foundation, while global clothing sales

doubled,

from 50 billion units in 2000 to over 100 billion in 2015, the average number of times a garment is worn declined by:

40%[30]

Environmental Impact Summary:

In use stages, the environmental footprint becomes particularly visible through garment washing and care. Frequent laundering of synthetic garments can contribute to microplastic pollution, as fibers shed into wastewater and can bypass treatment systems, polluting rivers and oceans. The impact of natural fibers has not yet been determined and requires further in-depth studies to better understand the concerns related to microfibers. The use of hot water and electric dryers can elevate household energy demand, straining local power grids, especially in humid or cold climates. Laundry detergents and softeners can introduce chemicals into water systems, harming aquatic life and disrupting ecosystems, while improper greywater disposal can lead to soil contamination. Warehousing and retail also play a role through packaging waste, logistics, and energy-intensive operations, which can contribute to environmental degradation, including air pollution, resource depletion, and biodiversity loss.

Social Impact Summary:

In distribution and use, social impacts focus on consumer well-being, privacy, and workers' rights. Digital retail platforms can improve access, especially in underserved areas, and can foster social inclusion. However, privacy concerns can emerge from the extensive collection of personal data, especially in regions with lower data protection laws and insufficient safeguards to help ensure user confidentiality. Ambiguous product descriptions, unclear reviews, and greenwashing practices can undermine consumers' ability to make informed decisions. On the other hand, transparent labelling and independent certifi-cations, as highlighted in the OECD publication[31], can help foster trust and enable conscious consumption. Store workers can face low wages and poor working conditions, exacerbated by the recent push in automatization (for instance, self-checkout) and digitalization (for instance, e-commerce) and there-fore impacting employment in this activity.

Governance Impact Summary:

In distribution and use, governance impacts related to supplier relationships and lobbying activities may play a significant role, as raised for example in the latest Index Report from Better Buying.[32] Low management of supplier relation-ships, including delayed payments and failure to enforce labor standards, can lead to strained relationships.[33,34] However, companies committed to transparency, anti-corruption measures, and ethical labor policies can foster more sustainable and fair working conditions, promoting stronger supplier relationships and enhancing the business environment. On one hand, activities that weaken environmental regulations or undermine welfare standards can contribute to greenwashing and perpetuate poor conditions in manufacturing and distribution. On the other hand, efforts that support fair labor practices can lead to stronger policies, improved labor standards, and enhanced worker protection in the industry. This includes advocating for fair wages, safe working conditions, ultimately benefiting workers and driving systemic change across the value chain.

END-OF-LIFE *MANAGEMENT**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

Figure 4: Countries with existing active Extended producer responsibility[35] schemes for textile:[36]

Mandatory Extended Producer Responsibility
- USA
- Netherlands
- France
- Spain
- Croatia
- Hungary
- Latvia

Voluntary Extended Producer Responsibility
- Belgium
- Colombia
- Germany
- China
- Australia

In 2024,

61%

of textile waste was sent to landfill and incineration, as observed by Circle Economy.[37]

Environmental Impact Summary:

As raised in a recent study commissioned by the European Parliament[38], the end-of-life stage is one of the parts of the textile value chain with lowest visibility resulting in limited and outdated data on its environmental impact. Although textile exports are often intended for reuse, studies show they follow a complex journey that can end in incineration or landfill.[39,40] One of the reasons garments end up in landfills is that the supply of second-hand clothing exceeds the demand, and these countries can sometimes lack the infrastructure to effectively process waste and help ensure high recovery rates. Incinerating synthetic and natural fibers releases green-house gases, amplified when there is no energy recovery, while the decomposition of natural fibers like cotton and wool in landfills produces methane. Impacts from incineration and landfilling arise from pollution: air pollution from landfill gases and dioxins from incineration, water pollution from microplastics and leachates, soil pollution from contaminated ash and soil sealing due to landfill expansion. Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) used in stain-resistant textiles may also be a concern, being forever chemicals and persistent pollutants. These impacts can also affect biodiversity, causing wildlife mortality from ingestion of landfill waste and habitat destruction from expanding landfills.

Social Impact Summary:

The social enterprises and cooperatives running textile collection and sorting operations can offer job opportunities for those with barriers to traditional employment such as migrants, the long-term unemployed, and formerly incarcerated persons. These positions can support social reintegration by offering meaningful jobs, skill development, confidence-building, and increased economic participation for workers. In contrast, informal waste-pickers at uncontrolled landfills may endure unsafe working conditions and unregulated low wages, heightening their economic vulnerability and, in some cases, child labor[41,42].

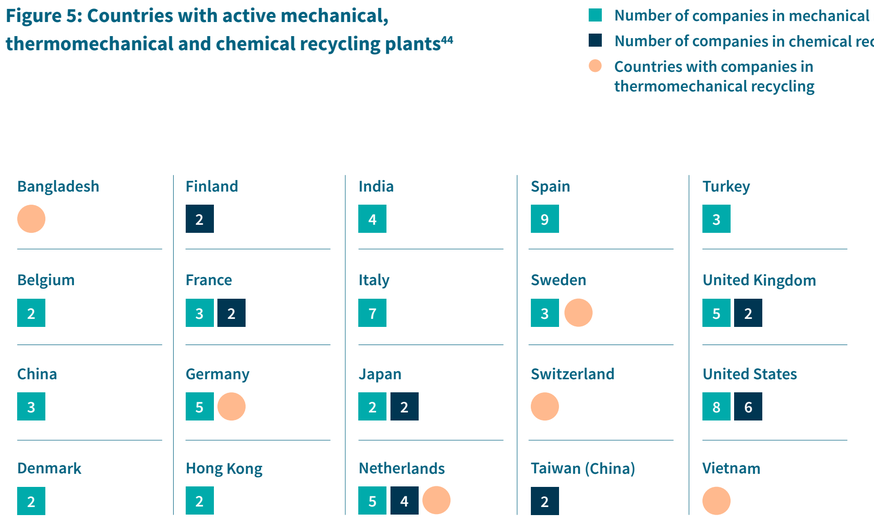
Governance Impact Summary:

Practices such as the unethical resale or misappropriation of donated textiles, can stem from weak oversight in donation-based collection systems. Some of these textiles are exported to the Global South, where they can flood local markets and end up in unmanaged landfills[43]. On the other hand, legislation, such as Extended Producer Responsibility (EPR) schemes for textiles, can play a positive role in driving the transition to less wasteful value chains, by making producers accountable for the lifecycle of their products and channeling financial resources toward investments in high-value material recovery and recycling infrastructure.

MATERIAL *RECYCLING**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

Figure 5: Countries with active mechanical, thermomechanical and chemical recycling plants[44]



According to Circle Economy, only

0.3%

of the global textile industry is circular. Only 0.27% of the 3.25 billion tonnes of materials used by the textile industry each year **come from secondary materials,** highlighting significant potential for **circular improvement.**[45]

Environmental Impact Summary:

The environmental impacts of textile recycling vary significantly depending on the method used: mechanical, chemical, or thermomechanical recycling. While each method plays a positive impact in diverting textile waste from landfills and reducing reliance on virgin fibers, they can also present environmental challenges. Mechanical recycling, for example, can result in microfiber pollution and air quality degradation, leading to respiratory risks during shredding. Chemical recycling, on the other hand, may cause contamination of water bodies through the release of solvents and dyes in water. Thermomechanical recycling may contribute to high energy demand used for heating and melting thermoplastic materials. Depending on the type of fiber, there are preferred recycling techniques, based on technical adequacy and fiber quality to be obtained. To name a few, cotton fibers can be recycled both mechanically and chemically, but they tend to break down, losing strength and limiting their reuse in high-quality applications. Synthetic fibers can be processed using the three methods, but they typically generate microplastic pollution. Wool fibers degrade during mechanical recycling, while non-textile synthetics lose elasticity and tensile strength during thermomechanical processing.

Social Impact Summary:

Recycling factories can lead to negative health and safety impacts for workers, including respiratory concerns from fiber dust, injuries from heavy machinery, and chemical exposure. In developing regions, child labor remains a concern, driven by economic vulnerability and weak labor enforcement. At the same time, chemical recycling[46] for materials like cotton or polyamide, can offer opportunities for career growth by requiring specialized skills and training, giving workers access to higher-paying technical roles. Nearby communities can face water pollution from untreated wastewater and pressure on municipal water systems, particularly from pre-treatment and chemical recycling processes. On the other hand, consumers are increasingly empowered to make informed, sustainable choices through transparent information and standardized labelling (e.g., Global Recycled Standard (GRS), Recycled Claim Standard (RCS), ISO14021 - Environmental labels and declarations, Cradle to Cradle).

Governance Impact Summary:

The impact inventory highlights the positive impact of recycling activities on responsible business conduct. Ethical transparency audits in recycling facilities have improved public trust in the textile industry by ensuring compliance with international labor and environmental standards. Additionally, constructive advocacy is leading to higher industry standards and supportive public policies incentivizing the scaling of recycling technologies.

HIGH-VALUE RECOVERY *ACTIVITIES**

* The conclusions in this section are extracted from Deloitte's impact inventory analysis, which is based on more than 130 sources and summarized in the Fashion Impact Toolkit, from which the below key insights were derived. The conclusions were selected for their representativeness within each value chain block, though they do not capture all dimensions of the impacts analyzed.

According to Environmental Coalition on Standards (ECOS), up to

80%

of product environmental impacts are determined at the **design** stage.[47]

Environmental Impact Summary:

The circular activities help extend the life of garments, reduce the need for virgin materials, and minimize textile waste. Repair and remanufacturing prolong garment usability, delaying end-of-life disposal. Reuse and resale effectively divert clothing from landfills and incineration, while also enabling scalable business models that help integrate circularity into the textile value chain and strengthen the overall business case for circularity. However, circular activities can have negative impacts related to the rebound effect: offering reused or resold items at a discount can unintentionally drive overconsumption[48], and the environmental benefits risk being offset[49] unless reuse is accompanied by communication that promotes mindful consumption and long-term use. Additionally, while reverse logistics are important to circular models, they carry hidden environmental costs, including emissions from fuel use and waste from additional packaging. Eco-design supports circularity by extending product lifespan and improving recyclability. Durable materials, modularity, and emotional durability help garments last longer and be reused or repaired more easily. Using mono-materials and detachable parts also helps enable more efficient recycling and reduces waste.

Social Impact Summary:

Transparent and authentic communication about product sustainability help strengthen consumer awareness of circular practices. It can support informed decision-making, helping guide more people toward sustainable choices. Moreover, responsible marketing is essential, as greenwashing and misleading claims remain a concern. Circular business models like rental and reuse can also improve access to high-quality clothing for a wider range of consumers.

Governance Impact Summary:

Circular activities promote ethical and sustainable corporate values, drive innovation, and encourage long-term thinking across departments, while also empowering companies to help play a constructive role in shaping public policy and advancing more sustainable industry standards.

CHAPTER 5

From Insights To Action

The global reach and complex structure of the value chain of the textile sector, combined with the wide range of impacts across various activities underscore the sector's potential to drive positive sustainable development on a global scale.

To minimize the vast array of identified negative impacts, several key actions stand out as particularly effective across the value chain[50].

Eco-design strategies emerge as a fundamental approach to help mitigate negative environmental effects by integrating sustainability into product design from the outset. This can include the use of recycled or sustainably sourced materials, designing for longevity, and helping to ensure products are easier to recycle at the end of their lifecycle. In sourcing natural fibers, companies can also embrace regenerative agriculture practices such as crop rotation and agroforestry, which help improve soil health, promote carbon capture, and lessen the negative environmental effects of conventional farming. Additionally, water and wastewater management play an important role in reducing water consumption and preventing pollution, with closed-loop water systems and the use of non-toxic dyes offering solutions to help mitigate the impact of water-intensive garment production processes.

To contribute to respectful and secure work environments, practices such as responsible purchasing, formalized work arrangements, safer working environments, and wage transparency can contribute to promoting decent work practices. By providing employees enhanced training, upskilling and development opportunities, companies may help enhance worker livelihoods and promote job security, also in new business models[51].

Governance frameworks promoting due diligence across companies' and supply chain operations are important for fostering transparency and accountability. Additionally, industry collaboration and compliance with international standards help ensure uniform adherence to labor and environmental regulations, promoting responsible practices across the sector.

By identifying potential sustainability impacts, industry stakeholders can unlock collective action, tackle root challenges, and drive meaningful transformation across the value chain.

Key questions for turning impacts into actionable strategies:

1

How can addressing sustainability impacts affect companies' current business operations and strategies?

2

How can impact data be integrated into core business decisions, such as product design, sourcing strategies, logistics decisions and end-of-life processes?

3

How can companies value and long-term sustainability goals be achieved with positive impacts?

4

What synergies can be created by addressing sustainability impacts together, rather than in isolation?

5

How can collaboration with suppliers, other third parties and peers bring more visibility and transparency in the value chain and how can the industry address shared sustainability challenges, unlocking collective gains?

6

Where are the opportunities to innovate, whether in material, business models, or stakeholder engagement, to both help reduce impacts and generate collective benefit in the sector?

APPENDIX

SCOPE AND HYPOTHESIS OF THE IMPACT ANALYSIS:

This analysis' scoping exercise was structured around three key dimensions: sub-sector, specific activities and sub-activities, and geographical scope.

Sub-sector project scope:

Inclusion: high-street, sportswear, footwear, luxury and manufacturing. Activities and sub-activities in the value chain have been defined with the objective of covering the most relevant processes in each of these sub-sectors. From the products' side, clothing and apparel, footwear, bags and leather goods and home textiles were considered for this study.

Exclusion: Other products such as cosmetics or jewellery were excluded, based on the EU Textiles, Clothing, Leather and Footwear industries (TCLF) definition.

Activities and sub-activities scope:

Criteria to include sub-activities on the value chain for tier 4 to 2:

- Threshold for global material production was set to 87.3% - with in-scope materials being polyester (57%), cotton (20%), polyamide (5.3%) and viscose (5%).
- To ensure representability of applicable sub-sectors, additional materials were incorporated in the scope, specifically leather, wool and cashmere for the luxury sector, and non-textile synthetic materials Styrene-Butadiene Rubber (SBR), Thermoplastic polyurethane (TPU), Thermoplastic Rubber (TR), etc.) for footwear soles.

Additional assumptions

- When scoping for leather, only leather from bovine origin was considered given that it makes up for the majority (70%) of total leather for the textile industry[52].
- Metal components were excluded from the analysis, as they represent a minor proportion of the total product weight (e.g. zippers, buckles, eyelets) as per the definition of the EU TCLF industries.

Geographical scope:

The Fashion Impact Toolkit presents data that is either global or geography-specific. The main geographical regions where the previously selected sub-activities are carried out were identified, and regional differences were highlighted to determine the granularity of the analysis (local/market/region).

Criteria for inclusion:

1. **Relevance:** Establishes if geography is a material variable to be studied for a particular activity in the value chain; in other words, it answers the question of whether a certain activity will undergo a geographical scoping or not.

   E.g.: ***Raw material production*** *(e.g. agriculture): Geography is relevant because the availability and quality of raw materials depend on regional characteristics like soil quality and climate.*

   Transport**:** *Geography is not relevant because the impact of transportation (e.g., emissions) remains relatively similar regardless of location.*

2. **Concentration:** Determines the geographic scale of an activity, whether it is highly concentrated in specific areas or widely dispersed.

   E.g.: ***Raw material production of polyester***: *Highly concentrated in certain countries, meaning that the majority of polyester production happens in a few key locations.*

3. **Heterogeneity:** Assesses whether the impact is uniform within the region or varies depending on the area.

   E.g.: ***Material manufacturing in specific region***: *Homogeneous impact because similar production methods, labor conditions, and environmental regulations may lead to relatively uniform effects across the region.*

METHODOLOGY:

Phase 1: Design of the value chain

In the first phase, the global value chain was disaggregated into specific activities and sub-activities. This mapping was performed based on sectorial association reports, industry analysis and the analysis of the value chains of certain companies in each of the sub-sectors. Core value chain stages were identified, and each of these stages was further divided into detailed sub-activities, while also specifying the key materials associated with each. This breakdown was then validated in consultation with a number of representative stakeholders who considered whether the resulting value chain structure was appropriate and representative of the industry.

Phase 2: Inventory scope definition

Building on the detailed value chain mapping from phase one, this phase focused on defining the scope of the impact inventory.
From the broad list of sub-activities, a selection process was carried out to retain only those considered most relevant and material for the sector. Criteria were established for each value chain phase to help ensure that the selected sub-activities reflected some of the most important sustainability concerns. The principal materials and geographic regions associated with these sub-activities were also identified, with particular attention to regional differences that could affect the analysis, whether at the local, market, or regional level. The proposed scope was subsequently validated with sectorial associations to help ensure its adequacy and representativeness.

Phase 3: Analysis of the sub-activities within the scope

In this phase, value chain activities and sub-activities were reviewed to analyze the geographical variations in activity locations. Documentation was examined to deepen technical understanding of the sub-activities identified in phase two. This helped enable identification of potential impacts across materials and geographies within the value chain.

Phase 4: Identification of potential impacts

Potential sustainability impacts related to the value chain, geographies, and sustainability topics were mapped and validated. Positive and negative potential impacts were identified for each activity and sub-activity. Through the analysis of the sub-activities in scope and a review of over 130 industry reports, association papers, and other sources, 3,000 impacts were identified. These were mapped to ESRS topics down to the sub-sub-topic level, helping to promote calibration with current standards and regulations. The impact mapping was validated with expert stakeholders via the ESRS framework. A data visualization dashboard was developed to show the distribution of potential impacts along the value chain, highlighting key regions, actors, and important processes through maps and diagrams.

Phase 5.1: Report writing

The insights and key learnings from this impact inventory were consolidated into a concise report which also serves as a user guide for the Fashion Impact Toolkit.

Phase 5.2: Toolkit

The impact inventory was transformed into an interactive interface that presents the 3,000 identified impacts in a user-friendly manner. This toolkit was developed based on a visual representation of the value chain and includes interactive icons to easily access the underlying information.

GLOSSARY:

DEFINITIONS:

Closed-loop recycling (Textile-to-textile recycling)
The process of breaking down a garment or piece of cloth into its constituent fibres and then creating a new textile or garment from those fibres.

Consumer use
The individual or company who makes the final purchase of a product for their own use.
Includes companies using products for commercial use (e.g. hotels purchasing bedding, linen rental company purchasing linens, etc.).

(Eco)-design and research and development (R&D)
Eco-design: The integration of environmental sustainability considerations into the characteristics of a product and the processes taking place throughout the product's value chain.
Research and development (R&D): Development of new technologies, products, services, and improvement of existing processes, focusing on incremental and breakthrough innovations.

Incineration
A method of waste disposal that involves the combustion of waste. It may refer to incineration on land or at sea. Incineration with energy recovery refers to incineration processes where the energy created in the combustion process is harnessed for re-use, for example for power generation. Incineration without energy recovery means the heat generated by combustion is dissipated in the environment.

Landfill
The deposit of the waste onto or into land. It includes specially engineered landfill sites and temporary storage of over one year on permanent sites. The definition covers both landfills in internal sites, i.e. where a generator of waste is carrying out its own waste disposal at the place of generation, and in external sites.

Open-loop recycling (other industry to textile)
The conversion of material from one or more products into a new product, involving a change in the inherent properties of the material itself (often a degradation in quality).

Post-consumer waste
Textiles that have been disposed of after consumption and used by the citizen or end-users of commercial or industrial institutions, processed by a specialized textile sorter.

Post-industrial waste
Any waste that is generated as a by-product of industrial processes such as milling, spinning, printing and garmenting. This waste is a subset of the pre-consumer waste.

Pre-consumer waste
Pre-consumer waste includes all post-industrial waste as well as any leftover/unsold materials or products such as fabric ends, unsold garments, etc.

Remake/Remanufacture
Industrial process by which an item is returned to its original condition from both a quality and performance perspective. The item can be previously sold, leased, used, worn, remanufactured, or non-functional product or part. Remanufactured condition can be described as like-new, same-as-when-new, or better-than-when-new.

Reuse and repair
Reuse: Operation by which a product or component is used repeatedly and for long periods of time, for its original purpose without being significantly modified, remade, or recycled. Products might need to be 'prepared for reuse', which often involves cleaning, repairs, or small modifications so that they can continue to be used over and extended period and by multiple users.
Repair: Operation by which a faulty or broken product or component is returned back to a usable state.

Resale
Business model that includes peer-to-peer sale of second-hand items (online and offline), third-party marketplaces (online and offline), and own-brand re-commerce and take-back (online and offline).

Sorting
Manual sorting of collected post-consumer textiles and footwear, into different grades for their subsequent treatment (reuse, recycling, disposal, etc.).

Supply chain
The progression of companies entities involved in the supply and purchase of materials, goods, or services from raw materials to the final product.

Tier 0 – Retail
Marketing and distribution of final products without production process.
Output: Finished products (e.g., apparel, home textiles, footwear, etc.).

Tier 0 - Warehouse and distribution
A site which takes physical possession of claimed material, but which is not a processor and does not transform products, including any (re) packaging which can affect labelling or identification of materials (e.g. bagging of bulk down, or applying a logo to finished products, etc.).
NOTE: Distributors may include sites that provide warehousing for products that may or may not be owned by the distributor.

Tier 1 - Finished product manufacturing
Assembly and manufacturing of final products.
Output: Finished products (e.g., apparel, home textiles, footwear, etc.).

Tier 2 - Material manufacturing
Production and finishing of materials (e.g., fabrics, trims, etc.) that go directly into finished product.
Output: Finished materials (e.g., fabrics, finished leather, composite material, etc.).

Tier 3 - Intermediate material processing
Processing of raw materials into yarn and equivalent state.
Output: Intermediate material (e.g., yarn, etc.).

Tier 4 - Primary processing
Primary processing of (primary/secondary) raw materials into commodity state.
Output: Processed raw material (e.g., staple fibre and filament, hides, etc.).

Tier 4 - Raw material production
Extraction and farming of primary raw materials and collection of secondary raw materials.
Output: Raw material (e.g. seed cotton, greasy wool, reclaimed materials, latex, petrochemicals, wood, and raw hides, etc.).

Transversal impacts
Impacts that occur across all activities and affect all actors and geographies within the value chain.

Waste collection
‘Collection’ means the gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility;
‘separate collection’ means the collection where a waste stream is kept separately by type and nature to facilitate a specific treatment.

Value chain
The textile value chain comprises the activities and stakeholders that provide or receive value from designing, developing, making, distributing, retailing, and consuming a textile product (or providing the service that a textile product renders), including the extraction and supply of raw materials, as well as activities involving the textile after its useful service life has ended.

FLOWS:

In this context, 'flows' refer to the arrows depicted in the textile sector value chain in figure 1, illustrating the movement of used materials or waste, products, and recycled or circular materials between different activities.

1. Reincorporation of recycled fibres derived from waste materials of other industries into the primary processing of textile materials. Integration of recycled polyester fibres made from post-consumer Polyethylene Terephthalate (PET) bottle.

2.a. Reincorporation of recycled fibres derived from waste materials of the textile industry into the primary processing of textile materials. Integration of recycled fibres sourced from post-industrial, pre-consumer, and post-consumer textile waste.

2.b. Post-industrial textile waste generated during the primary processing of materials, used for closed-loop recycling. Excess polymer residues, fibre scraps and defective filaments from polyester fibre extrusion and pre-treatment.

3. Post-industrial textile waste generated during the intermediate processing of materials, used for closed-loop recycling. Fibre waste, yarn defects, and irregular fibres generated during the spinning of polyester.

4. Post-industrial textile waste generated during the manufacturing of materials, used for closed-loop recycling. Fabric offcuts, defective textiles, and irregularly woven or knitted materials produced during knitting, weaving, or other material manufacturing processes.

5. Post-industrial textile waste generated during the manufacturing of finished products, used for closed-loop recycling. Fabric offcuts, trimmings, defective garments and other waste generated during finished product manufacturing.

6.a. Incorporation of disassembled garment parts from the remanufacturing activity to be used in the manufacturing or assembly of new textile products.

6.b. Gathering of post-industrial and pre-consumer textile waste (e.g. scraps, cuttings, leftover fabric, etc.), to be used for the remanufacturing of new textile products.

7.a. Garments returned to the warehouse after their defects had been repaired in the workshop.

7.b. Defective garments identified in the warehouse are sent to the workshop for repair.

8. Defective unsold garments are sent for remanufacturing.

9.a. Garments are returned to the store after their defects have been repaired in the workshop.

9.b. Defective garments identified in the store are sent to the workshop for repair.

10.a. Reincorporation of garments to the linear value chain after being reconditioned for resale.

10.b. Unsold garments (excess stock) collected to be resold in the second-hand market.

11. Returns of garments that have never been worn, from the customer to the store.

12.a. Garments that are sent to the consumer either after being repaired through guaranteed maintenance services, or as part of rental programs.

12.b. Garments in need of repair are sent to the workshop by the customer, or after the finalization of a rental agreement in the case where some defects have been identified in the rented garment.

13.a. Purchase of second-hand garments in resale market by the customer.

13.b. Donation or sale of post-consumer use garments by the customer to be resold in the second-hand market.

14. If a product sent for repair is deemed too damaged for full restoration, it is redirected to manufacturing, where its parts are used separately.

CLARIFICATIONS:

- It's important to clarify the **distinction between ESRS S1 and S2** when using the Fashion Impact Toolkit to identify social impacts. Impacts from activities the company performs fall under **ESRS S1** ("Own Workers"), while those from third-party activities in the value chain fall under **ESRS S2** ("Workers in the Value Chain"). This helps ensure social impacts are correctly attributed and reported within the ESRS framework.[53]

- This analysis only recognizes **positive impacts** as those that go beyond the absence of harm by actively creating value for the environment and society. While the Fashion Impact Toolkit does not explicitly account for it, it acknowledges the important role of companies' efforts to help mitigate and reduce their negative impacts throughout the textile value chain.

END NOTES:

1. UNEP, Sustainability and Circularity in the Textile Value Chain, A Global Roadmap, 2023, p. 7.
2. Ellen MacArthur Foundation, A New Textile Economy: Redesigning Fashion's Future, 2017.
3. Global Fashion Agenda, Upstream Circularity Playbook, 2024.
4. Textile Exchange, Supply Chain Taxonomy for the textile, apparel and fashion industry, 2024.
5. UNEP, Sustainability and Circularity in the Textile Value Chain, A Global Roadmap, 2023, p. 18.
6. UNEP, Sustainability and Circularity in the Textile Value Chain, Global Stocktaking, 2021, pp. 11-25.
7. World Resources Institute, Apparel Impact Institute, Roadmap to Net Zero: Delivering Science-Based Targets in the apparel sector, 2021, p. 4.
8. The value chain blocks presented have not been defined based on scientific methodology nor subjected to peer review. They have been grouped solely for the purposes of this report and to support the structured presentation of associated impacts.
9. Ellen MacArthur Foundation, A New Textiles Economy: Redesigning Fashion's Future, 2017.
10. European Commission, Transition Pathway for the Textiles Ecosystem, 2021.
11. European Commission, Ecodesign for Sustainable Products Regulation (ESPR), 2024.
12. OECD. Extended Producer Responsibility. 2024.
13. ThredUp, Resale Report, 2025.
14. Ecologic, Study on the technical, regulatory, economic and environmental effectiveness of textile fibers recycling, 2021
15. Textile Exchange, Materials Market Report, 2024, p. 4.
16. Ecologic, Study on the technical, regulatory, economic and environmental effectiveness of textile fibers recycling. 2021
17. WRAP, Textile sorting and recycling database, 2024
18. The European Commission plans to adopt a delegated act to revise the first set of ESRS – EFRAG, ESRS Revision: work plan and timeline, 2025.
19. ESRS E1: Climate Change, ESRS E2: Pollution, ESRS E3: Water & marine resources, ESRS E4: Biodiversity and ecosystem, ESRS E5: Circular economy, ESRS S1: Own workforce, ESRS S2: Workers in the value chain, ESRS S3: Affected communities. ESRS S4: Consumers & end-users, ESRS G1: Business conduct. – EFRAG, Sector agnostic standards (set 1 ESRS), 2025.
20. International Labour Organization, Child Labour in cotton, 2016.
21. International Labor Organization, Promoting Fair and Effective Labor Migration Policies, 2016.
22. Better Cotton, Decent Work, n.d.
23. Wet processes: Include the following activities for Tier 1: washing, laundering, printing dyeing, cleaning and for Tier 2: dyeing, printing, finishing, retanning and coating.
24. More details on the specific region can be observed in the WWF, Risk Filter Suite – Water Risk Filter.
25. Dry processes: Include the following activities for Tier 1: patterns/tailoring/cutting, assembly of pieces, embellishing, tertiary packaging, polishing and for Tier 2: knitting, weaving, embellishing, molding, and vulcanization
26. International Energy Agency (IEA), IEA Country Profiles, 2025.
27. UNICEF, Children's rights in the garment and footwear supply chain, 2020.
28. OECD, Bribery and corruption due diligence in the apparel supply chain, 2019.
29. Partnership for Sustainable Textiles, Alliance for Integrity, Global Compact Network Germany, Preventing Corruption in the supply chain, 2018, p. 6.
30. Ellen MacArthur Foundation, The trends and trailblazers creating a circular economy for fashion, 2021.
31. OECD, The Role of Sustainability Certifications in Due Diligence in the Garment and Footwear Sector, 2025.
32. Better Buying, Index Report 2024, 2024.
33. Better Buying Institute, Payment and Terms, 2025.
34. Better Buying Institute, Win-Win Sustainable Partnership, 2025.
35. Extended producer responsibility is a policy approach that makes producers responsible for their products along the entire lifecycle, including at the post-consumer stage. By doing so, it helps achieve environmental goals such as recycling targets. At the same time, EPR generates funding from producers that help to pay for the collection, sorting and recycling of waste products, as well as generates detailed information on production, products, waste generation and treatment. - OECD, Extended producer responsibility and economic instruments, 2024.
36. Global Fashion Agenda, Mapping of Extended Product Responsibility (EPR) for Textiles, 2025.
37. Circle Economy, Circularity Gap Report, 2024.
38. European Parliamentary Research Service, Identifying data gaps in the textile industry and assessing current initiatives to address them, 2024.
39. European Environment Agency, EU exports of used textiles in Europe's circular economy, 2023.
40. Circle Economy, The Circularity Gap Report, 2024, p. 24.
41. Systemiq, A Living Income for the Informal Waste Section, 2024
42. World Bank, Unseen Green Jobs, a Study on Informal Waste Workers, 2024
43. European Environment Agency, Management of Used and Waste Textiles in Europe's Circular Economy, 2024.
44. WRAP, Textile sorting and recycling database, 2024
45. Circle Economy, The Circularity Gap Report, 2024, p. 22.
46. WRAP, Textile sorting and recycling database, 2024.
47. Ecos, Durable, repairable and mainstream. How ecodesign can make our textiles circular, 2021.
48. Håvard Berg and Helene Figari, "Reuse of Consumer Products: Climate Account and Rebound Effects," Journal of Cleaner Production, 2024.
49. Thomas Siderius and Kim Poldner, "Reconsidering the Circular Economy Rebound effect: Propositions from a case study of the Dutch Circular Textile Valley", Journal of Cleaner Production 293, 125996 (2021): p. 5.
50. For additional insights on actions contributing to a net positive industry see Global Fashion Agenda, The GFA Monitor, 2024.
51. Global Fashion Agenda, The GFA Monitor, 2024, p. 29.
52. Textile Exchange, Materials Market Report, 2024, p. 62.
53. ESRS S1 – Own workforce: This Standard covers an undertaking's own workforce, which is understood to include both people who are in an employment relationship with the undertaking ("employees") and non-employees who are either people with contracts with the undertaking to supply labour ("self-employed people") or people provided by undertakings primarily engaged in "employment activities" (NACE Code N78). – European Commission, 2023, Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards (Text with EEA relevance). Official Journal of the European Union, L 328, 22.12.2023, p.166.

OTHER SOURCES USED FOR THE DEVELOPMENT OF THE WORK:

- ABC News. Shearing contractors accused of paying in drugs, as workers decry poor conditions. 2019.
- ACT. ACT accountability and monitoring report 2023. 2023.
- Agence de la Transition Ecologique/Ecological Transition Agency. Valorisation du CO2 quels bénéfices ? Sous quelles conditions?/*CO2 recovery what are the benefits? Under what conditions?* 2021.
- Aid Environment. Tracing leather from Brazil to Europe under the EU Deforestation Regulation. 2024.
- +Apparel Impact Institute. Annual impact report. 2024.
- Remanufacture – Reprocessing: Apparel Impact Institute. Low-carbon thermal energy roadmap for the textile industry. 2025.
- Open-loop recycling (textile to non-garment) - Apurva Nidhi. *Repairing clothing:* Transforming the fashion industry's approach to sustainability. 2023.
- BBC. Xinjiang cotton sparks concern over forced labour claims. 2019.
- Better Buying Institute. Better Buying deep dive report. 2020.
- Better Buying Institute. Better Buying index report. 2024.
- Bureau of International Labor Affairs. List of goods produced by child labor or forced labor. 2025.
- Canopy. Hot button report. 2024.
- Carbonfact. [Textiles] ESPR: How the ecodesign for sustainable products regulation will impact apparel and footwear brands. 2024.
- Center for Biological Diversity and Collective Fashion Justice. Shear destruction: wool, fashion and the biodiversity crisis. 2021.
- Center for Biological Diversity and Collective Fashion Justice. The environmental impacts of slaughterhouses: fact sheets. 2021.
- CFDA. Material index: rayon (viscose). 2016.
- Chao Wang, Weiwei Zhang, Xiona Li, Juying Wu. A global meta-analysis of the impacts of tree plantations on biodiversity. 2021.
- Chattermill. Keeping up with what customers want in fashion and retail. 2024.
- Circular and Sustainable Textiles and Clothing. A deep dive into circular textile business models. 2024.
- CNN. Cashmere demand is threatening Mongolia's steppe. Can the industry go sustainable?. 2023.
- Commissariat général au développement durable/General Commission for Sustainable Development. Transport routier et pollution de l'air: Parvient-on à réduire les émissions?/*Road transport and air pollution: Can we reduce emissions?* 2023.
- Common Good Ventures. Exploring the role of iron in the textile and apparel industry - fashion's fascination with iron. 2025.
- Copenhagen Economics. European textiles global value chain report - EuroCommerce. 2025.
- Cotton Connect. Cotton connect impact report. 2023.
- Daniel Murphy. We are living from loan-to-loan: Pastoral vulnerability and the cashmere-debt cycle in Mongolia. 2018.
- ECHA. Per- and polyfluoroalkyl substances (PFAS). 2025.
- Economic Policy Institute. The farmworker wage gap: Farmworkers earned 40% less than comparable nonagricultural workers in 2022. 2022.
- Ellen Macarthur Foundation. A dyeing technology that eliminates wastewater release: dyecoo. 2008.
- Ellen Macarthur Foundation. A new textiles economy: Redesigning fashion's future. 2017.
- Ellen Macarthur Foundation. Circular business models in the fashion industry - new study identifies USD 700 billion opportunity. 2021.
- Ellen Macarthur Foundation. Rethinking business models for a thriving fashion industry. 2021.
- Ellen Macarthur Foundation. Shaping a future-fit fashion industry. 2025.
- EuroCommerce. European e-commerce reports. 2024.
- European Agency for Safety and Health at Work. Improving equipment by involving workers to prevent manual handling risks in a PVC plant. 2022.
- European Agency for Safety and Health at Work. Occupational safety and health in the textiles sector. 2008.
- European Agency for Safety and Health at Work. Smart digital systems: implications for occupational safety and health. 2025.
- European Agency for Safety and Health at Work. Using the "TMS Pro" participatory approach to reduce musculoskeletal disorders for packaging line operators in agribusiness. 2022.
- European Agency for Safety and Health at Work. A review of accidents and injuries to road transport drivers. 2011.
- European Bureau for Research on Industrial Transformation and Emissions. Production of pulp, paper and board. 2025.
- European Chemicals Agency. Aluminium oxide. 2023.
- European Commission. Corporate Sustainability Due Diligence Directive (CSDDD). 2024.
- European Commission - Directorate General for Taxation and Customs Union. Customs control equipment instrument. 2023.
- European Commission Directorate-General for Communication Citizens' Information. The EU customs union: protecting people and facilitating trade. 2019.
- European Environment Agency. Environment and climate pressures from household consumption in Europe. 2024.
- European Environment Agency. Management of used and waste textiles in Europe's circular economy. 2024.
- European Environment Agency. PFAS in textiles in Europe's circular economy. 2025.
- European Environment Agency. Progressing towards waste prevention in Europe – the case of textile waste prevention. 2021.
- European Environment Agency. Textiles and the environment: the role of design in Europe's circular economy. 2022.
- European Environment Agency. Transport and environment report 2022. 2022.
- European Environment Agency. What are the impacts of PFAS polymers on our health and the environment?. 2025.
- European Foundation for the Improvement of Living and Working Conditions. Clothes, textiles and leather (fact sheet). 2009.
- European Foundation for the Improvement of Living and Working Conditions. Representativeness of the European social partner organisations: road transport sector. 2024.
- European Foundation for the Improvement of Living and Working Conditions. Working conditions in the retail sector. 2012.
- FAO. Forest health and protection: forest invasive species. 2025.
- FAO. The EIA in the pulp and paper industry. 1996.
- Fashion For Good. The colourful challenge of textiles. 2022.
- Fibre2Fashion. Fabric embellishments: adding texture and detail to your garments. 2023.
- Fibre2Fashion. Repairing clothing: Transforming the fashion industry's approach to sustainability. 2023.
- FLA. Child labor in cotton supply chains. 2017.
- Forbes. Fashion rental market makes a comeback—as Gen Z and Millennials revive brands like Nuuly, Rent the Runway. 2024.
- GFA. Reverse logistics for circular fashion systems, an exploration of untapped potential. 2024.
- Global Textile Times. 2025 fabric printing: advancements in textile technology. 2025.
- Global Textile Times. Exploring garment washing: techniques and future impact. 2025.
- Globus Publication. Analysis of consumer behavior and consumption patterns in the fashion industry. 2024.
- Golden Gate Molders. Understanding the injection molding cycle: a step-by-step process. 2024.
- Hansen, Monteiro de Aquim, and Gutteres. Environmental assessment of water, chemicals and effluents in leather post-tanning process: a review. 2021.
- Horacio A. Aguirre-Villegas, Caleb Besson, and Rebecca A. Larson. Modeling ammonia emissions from manure in conventional, organic, and grazing dairy systems and practices to mitigate emissions. 2024.
- ILR Global Labor Institute. Higher ground? Fashion's climate breakdown. 2023.
- Instituto Nacional de Seguridad y Salud en el Trabajo de España/ Spanish National Institute of Health and Safety in the Workplace. Riesgos derivados de la exposición a nanomateriales en el sector textil - año 2020/*Risks arising from exposure to nanomaterials in the textile sector - year 2020*. 2020.
- International Journal of Interdisciplinary Research. Comparative study on the drying mechanisms and characteristic changes of fabrics according to heat transfer principles. 2025.
- International Labour Organization. Beyond the bin: decent work deficits in the waste management and recycling industry. 2024.

- International Labour Organization. Purchasing practices and working conditions in global supply chains: Global survey results. 2017.
- International Labour Organization. The recycling industry: addressing child labour and other decent work challenges. 2025.
- International Labour Organization. Women in the transport sector. 2013.
- Jill E. Johnston, Esther Lim, and Hannah Roh. Impact of upstream oil extraction and environmental public health: a review of evidence. 2019.
- Lellis, Zani Fávaro-Polonio, Alencar Pamphile, and Cesar Polonio. Effects of textile dyes on health and the environment and bioremediation potential of living organisms. 2019.
- Li, Zhu, Dong, and Chen. Water footprint assessment of wool products with a low-water footprint baseline. 2022.
- Liqing Peng, Timothy D. Searchinger, Jessica Zionts, and Richard Waite. The carbon costs of global wood harvests. 2023.
- Luca Tasca and Puccini. Leather tanning: life cycle assessment of retanning, fatliquoring and dyeing. 2019.
- M.S. Sousa, A.L.D. Loureiro, and V.L. Miguéis. Predicting demand for new products in fashion retailing using censored data. 2025.
- Maersk. Why the future of fashion must include reverse logistics. 2024.
- Mandeep, Guddu Kumar Gupta, Hao Liu, and Pratyoosh Shukla. Pulp and paper industry–based pollutants, their health hazards and environmental risks. 2019.
- MDPI. Sustainable and innovative packaging solutions in the fashion industry: global report. 2022.
- Monticelli Cashmere. Challenges and innovations in cashmere. 2024.
- Muhammad Moosa Abdul Rehman. Revolution of biotechnology in finishing sector of textile. 2014.
- National Geographic. This is the world's most destructive oil operation - and it's growing. 2019.
- National Oceanic and Atmospheric Administration. Oil spills. 2025.
- Nnachi Alum. Tannins and leather: chemistry, tanning processes, and environmental impacts. 2024.
- NSW Government. Shared responsibilities in shearing. 2025.
- OECD. Due diligence guidance for responsible business conduct responsible supply chains in the garment and footwear sector. 2017.
- OECD. Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector. 2018
- OECD. Emission scenario document on chemicals used in fabric finishing or fabric coating. 2024.
- OECD. Handbook on due diligence for enabling living incomes and living wages in agriculture, garment and footwear supply chains. 2024.
- OECD. Improving recycling markets. 2006.
- OECD. Monitoring trade in plastic waste and scrap (2024). 2024.
- OECD. OECD due diligence guidance for responsible supply chains in the garment and footwear sector. 2018.
- OECD. The role of sustainability certifications in due diligence in the garment and footwear sector. 2025.
- Pammi Sinha, Subramanian Senthilkannan Muthu, and Geetha Dissanayake. Remanufactured fashion. 2016.
- Paul A. Funk and Robert G. Hardin IV. Engineering and ginning: energy utilization and conservation in cotton gins. 2017.
- PETA. Breaking PETA exposé reveals cruelty in your cashmere sweater. 2025.
- PETA. Environmental hazards of leather. 2025.
- Rachael Brown. Remanufacturing: A fitting fashion sustainability solution. 2024.
- Rob Edwards. The fatal dangers of working in the recycling industry. 2014.
- Robert A. Cohen. The ongoing history of harm caused and hidden by the viscose rayon and cellophane industry. 2018.
- RSPCA. What are the animal welfare issues associated with cashmere production? 2019.
- Rudrajeet Pal, Yasaman Samie, and Armaghan Chizaryfard. Demystifying process-level scalability challenges in fashion remanufacturing: An interdependence perspective. 2021.
- S.L. Soh, S.K. Ong, and A.Y.C. Nee. Design for disassembly for remanufacturing: Methodology and technology. 2014.
- Sieja and Mach-Szczypinski. Health effect of chronic exposure to carbon disulfide (CS2) on women employed in viscose industry. 2018.
- Subrata Das. Occupational health and safety issues in textile spinning industry. 2023.
- Supply Compass. Sustainable material guide cotton. 2020.
- Tanweer Islam. Health concerns of textile workers and associated community. 2022.
- Tarikul Islam, Md Monir Hossain, and Sha'Mira Covington. Natural fibers towards fashion sustainability: A review of raw materials, production, application, and perspective. 2025.
- Textile Engineering. Pretreatment process in textile materials. 2023.
- Textile Exchange. Leather learning series: part one the inherent sustainability of leather. 2020.
- Textile Exchange. Making textile-to-textile recycling a reality with SuperCircle. 2023.
- Textile Exchange. Preferred fiber and materials market report 2022. 2022.
- Textile Exchange. Regenerative agriculture landscape analysis. 2022.
- Textile Exchange. The responsible wool standards aims to improve the welfare of sheep and the land they graze on. 2025.
- Textile Focus. Enhancing recycled post-consumer textiles: innovative technologies for promoting sustainable fashion. 2024.
- Textile World. Why clothing durability matters. 2021.
- The International Journal of Life Cycle Assessment. Environmental impacts associated with the production, use, and end-of-life of a woollen garment. 2020.
- The Woolmark Company. Sustainable wool farming practices. 2025.
- Transparentem. From field to fabric: Enhancing due diligence in cotton supply chains. 2025.
- UK GBC. Environmental impacts of timber logging. 2025.
- UN Environment Programme. Sustainability and circularity in the textile value chain. 2023.
- UNICEF. Children's rights in the garment and footwear supply chain. 2020.
- USDA Economic Research Service. Cotton Sector at a Glance. 2025.
- USDA Foreign Agricultural Service. Cotton Production Data. 2024.
- Water Footprint Network. Viscose fibres production: an assessment of sustainability issues. 2017.
- Woolmark. Scouring & carbonising. 2025.
- WRAP. Extending product lifetimes: WRAP's work on clothing durability. 2025.
- WWF. Cleaner, green cotton: Impacts and better management practices. 2013.
- WWF. Ensemble: mobilizing the apparel and textile sector towards sustainability and collective action. 2024.
- WWF. Mobilizing the apparel and textile sector towards sustainability and collective action. 2024.
- ZDHC. Connecting the dots - ZDHC impact report 2023. 2023.
- ZDHC. ZDHC MRSL scope: materials and process. 2021.
- ZDHC. ZDHC wastewater guidelines. 2024.

FASHION IMPACT
TOOLKIT

Deloitte. GFA

An impact inventory across the textile value chain