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Draft sector guidance

Apparel, accessories and footwear

June 2024
Open for consultation and feedback

SICS® industry:
Apparel, Accessories & Footwear (CG-AA)

Taskforce on Nature-related Financial Disclosures

Contents

Draft for consultation

This sector guidance is a draft for consultation with market participants and other interested stakeholders. The Taskforce welcomes feedback provided via the TNFD website by 27 September 2024.

Feedback will be reviewed by the Taskforce and final sector guidance issued by the TNFD by 30 December 2024.

1. Introduction

1.1. The purpose of this guidance

In September 2023, the TNFD published its recommendations for disclosure of nature-related issues and supporting implementation guidance. This document provides sector-specific additional guidance for the apparel, accessories and footwear sector, covering:

- The assessment of nature-related issues using the TNFD's LEAP approach (Section 2); and
- The disclosure of sector-specific metrics in line with the TNFD's recommended approach to metrics (Section 3).

The TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach is designed as an iterative process – across business locations and business lines – in line with established risk management processes and corporate reporting cycles. Organisations may choose to start with a narrow scope for a LEAP assessment, and gradually expand the scope of the assessment as they gain experience and insight.

The TNFD recognises that there can be significant differences across sectors for corporates applying the LEAP approach. It has published this additional guidance with significant input from a range of knowledge partners and market participants, to help apparel, accessories and footwear sector participants apply the LEAP approach to their context. The overall structure of the LEAP approach is set out in Figure 1. This guidance follows that structure and sets out the elements of LEAP for which this document provides additional guidance.

The Taskforce also recognises that investors and other stakeholders require quantitative information to compare performance and nature-related issues within sectors. To facilitate that sector-level analysis, this guidance also includes:

- Guidance on the application of the core global disclosure indicators and metrics to the apparel, accessories and footwear sector (Section 3.1); and
- Core and additional sector disclosure indicators and metrics (Sections 3.2 and 3.3).

Figure 2 provides an overview of the TNFD disclosure measurement architecture and where indicators and metrics are listed in the TNFD recommendations and relevant sector guidance.

Figure 1: The TNFD approach for identification and assessment of nature-related issues – LEAP

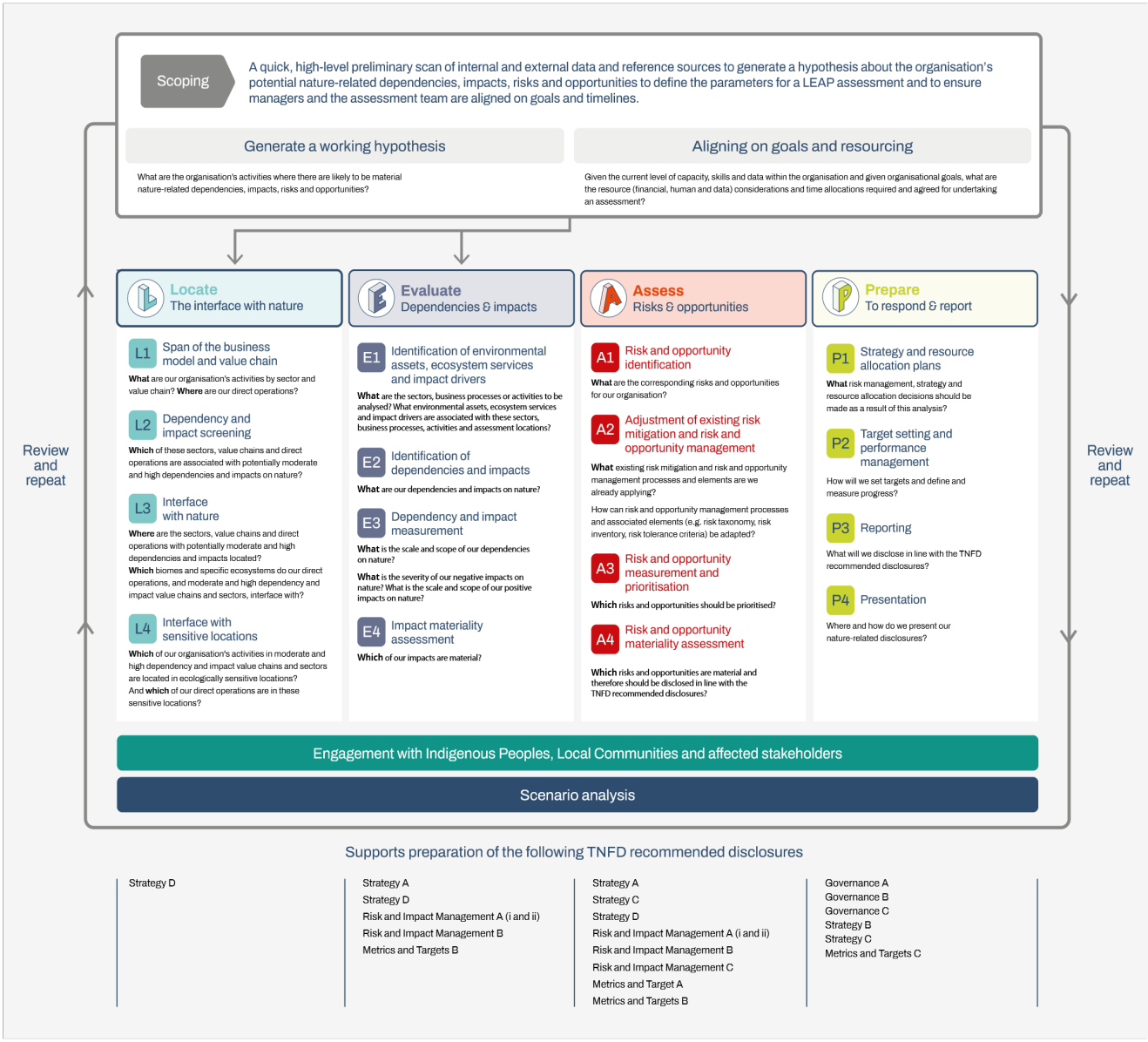
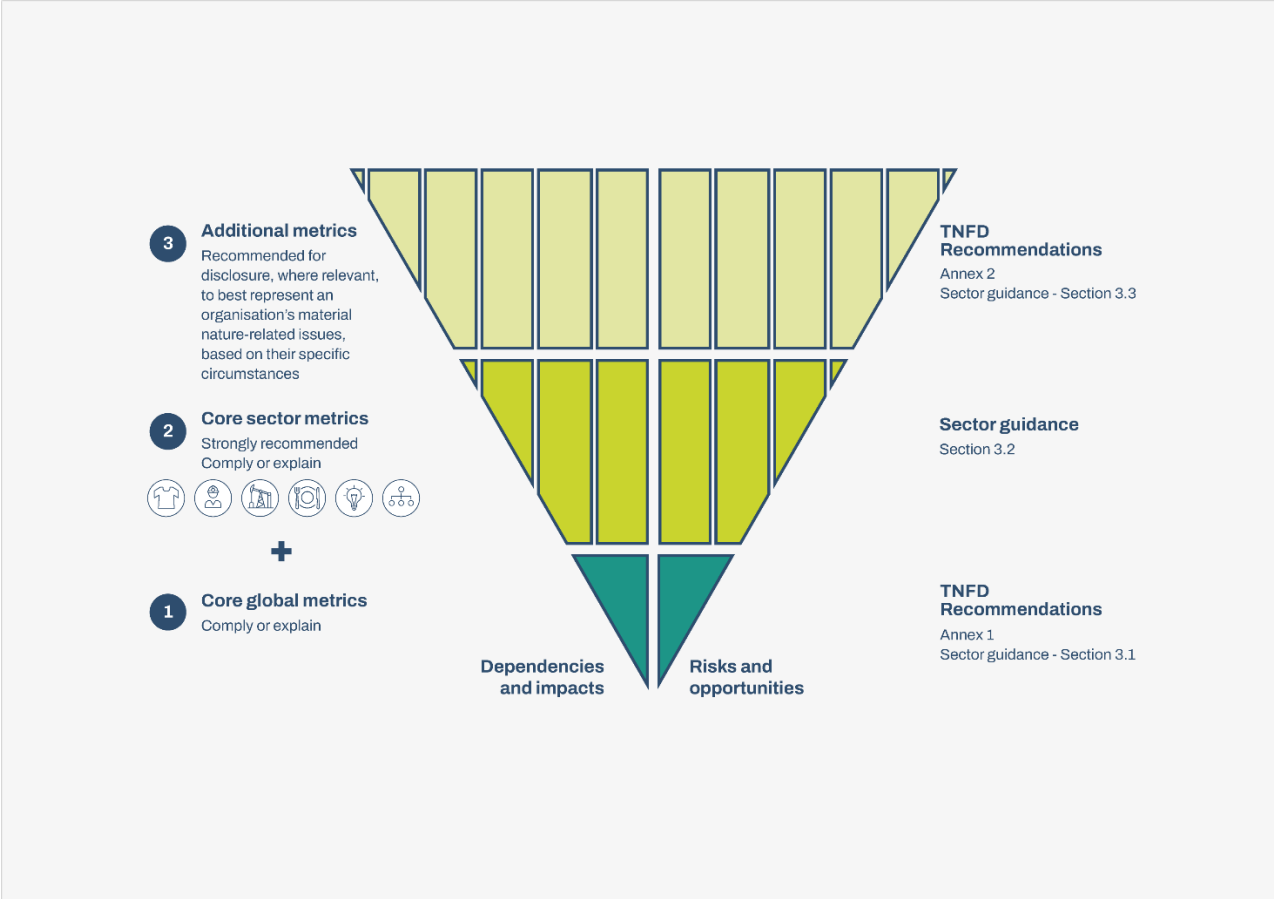


Figure 2: TNFD disclosure metrics architecture signposted to metrics lists



The guidance in Section 3 on the application of the TNFD core global metrics for this sector, as well as the core and additional sector metrics outlined, expand on the disclosure indicators and metrics outlined in Annexes 1 and 2 of the TNFD recommendations. The TNFD has incorporated and sought to build on existing industry standards and disclosure metrics wherever possible to build on current data collection and reporting practices and minimise additional assessment and reporting costs.

1.2. Audience for this guidance

This guidance covers those organisations with business models or value chains in the Sustainable Industry Classification System (SICS) Apparel, Accessories & Footwear industry, part of the Consumer Goods sector (Box 1).[1]

Box 1: SICS® industries in the scope of this guidance document

Apparel, Accessories & Footwear (CG-AA):

This industry includes entities involved in the design, manufacturing, wholesaling and retailing of various products, including adult and children's clothing, handbags, jewellery, watches and footwear. Products are manufactured primarily by vendors in emerging markets, thereby allowing entities in the industry to focus on design, wholesaling, marketing, supply chain management and retail activities.[2]

[1] SASB Standards (2023) Sustainable Industry Classification System (SICS).
[2] SASB Standards (2023) Apparel, Accessories & Footwear.

This guidance does not currently address the dependencies, impacts, risks and opportunities for nature linked with the jewellery and accessories industries in detail. Organisations may find it useful to refer to the TNFD metals and mining guidance to identify these issues for the upstream segments of the jewellery and accessories industries. The TNFD aims to integrate further guidance for the jewellery and accessories industries into the next version of this guidance. We welcome inputs and suggestions as to which issues should be considered and on how best to integrate them into this guidance. Please provide any feedback via the official feedback page on the TNFD website.

This guidance is a supplement to the TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach and should be read in conjunction with that guidance.

The examples provided in this guidance are intended to be illustrative. They are not exhaustive, universally applicable or recommended by the TNFD as examples of measures for all entities within the industry. Each company's context, location and nature-related interactions are unique. The TNFD encourages all companies to consult additional relevant sources, including scientific references and relevant industry standards or best practice guides, and conduct thorough assessments to identify and assess nature-related dependencies, impacts, risks and opportunities specific to their operations and value chains. This guidance aims to support, not replace, a tailored assessment, which will be necessary for each entity.

Table 1: Areas of LEAP with additional guidance for the apparel, accessories and footwear sector in this guidance document

Scoping	✓						
L1	✓	E1	✓	A1	✓	P1	✓
L2	✓	E2	✓	A2		P2	✓
L3	✓	E3	✓	A3	✓	P3	
L4	✓	E4		A4		P4	

2. Sector-specific LEAP assessment guidance

2.1. Scoping a LEAP assessment

Working hypothesis generation:

What are the organisation's activities where there are likely to be material nature-related dependencies, impacts, risks and opportunities?

Goals and resource alignment:

Given the current level of capacity, skills and data within the organisation and given the organisational goals, what are the resource (financial, human and data) considerations and time allocations required and agreed for undertaking an assessment?

For the apparel, accessories and footwear sector, important nature-related dependencies, impacts, risks and opportunities are likely to occur across the entire value chain:

- Upstream, at the raw material production, requiring significant agricultural, forest, wildlife or petrochemical raw materials;
- At processing and manufacturing levels, where the use of chemical agents and dyes is necessary;
- At the consumer level, where the use of products can cause microfibre release; and
- At the end-of-life stage of products, often turning into high quantities of waste that are typically poorly recycled.

Organisations may find it useful to refer to the TNFD food and agriculture, forestry pulp and paper, and oil and gas sector guidance documents to identify these issues at the production phase.

The variety of business models and supply-chain relations means that textile value chains can be relatively complex and opaque. Over time, apparel, accessories and footwear sector organisations will need to build the processes and capabilities to collect more nature-related data from their value chain partners, both upstream and downstream. For example, organisations may find it useful to review and update standard supply contract terms to include nature-related requirements. There may also be opportunities to partner with other organisations in the sector (including supply chain partners) to collaboratively assess nature-related issues across the value chain. In the interim, apparel, accessories and footwear organisations may find it useful to apply a phased approach to assessing and disclosing nature-related issues within the value chain, increasing their value chain coverage and the breadth and depth of the data captured, assessed and reported as the organisation's nature-related assessment capabilities develop.

Organisations should prioritise the areas of the value chain where material dependencies, impacts, risks and opportunities have arisen, or are assessed as most likely to arise (see guidance for the Locate phase). Further guidance is available in the TNFD guidance on value chains.

Tools that are likely to be helpful for initial scoping and component L2 of the Locate phase include:

- Textile Exchange's Material Impact Explorer, a sector-specific tool that provides risk ratings framed around potential impacts and dependencies on nature.;
- ENCORE;
- SBTN's High Impact Commodities List (HICL) and Materiality Screening Tool;
- WWF Biodiversity Risk Filter; and
- IBAT.

2.2. Locate the organisation's interface with nature

This section provides additional considerations to help apparel, accessories and footwear industry organisations with the Locate phase of the LEAP approach.

L1: Span of the business model and value chain

Guiding questions:

What are our organisation's activities by sector, value chain and geography? Where are our direct operations?

Organisations need an understanding of their exposure to nature-related dependencies, impacts, risks and opportunities along their value chain, which can be considered during the Scoping phase of LEAP. TNFD defines the components of value chain as upstream, direct operations and downstream.

Table 2: Illustration of the apparel, accessories and footwear value chain

Upstream (Productions)				Direct (Sales)	Downstream (Consumption)	
Raw material extraction: Cultivation and extraction of raw materials from the earth, plants or animals.	Raw material processing: Processing of raw materials into yarn, leather and other intermediate products.	Material production: Production and finishing of materials (e.g. fabric, trims) that go directly into finished product.	Finished production assembly: Assembly and manufacturing of final products.	Office, retail and distribution centres: Corporate real estate not involved in production process.	Consumer care: washing, drying, dry cleaning, etc.	Reuse, recycle, landfill.
< Logistics: Shipping materials and products across value chain[3] >						

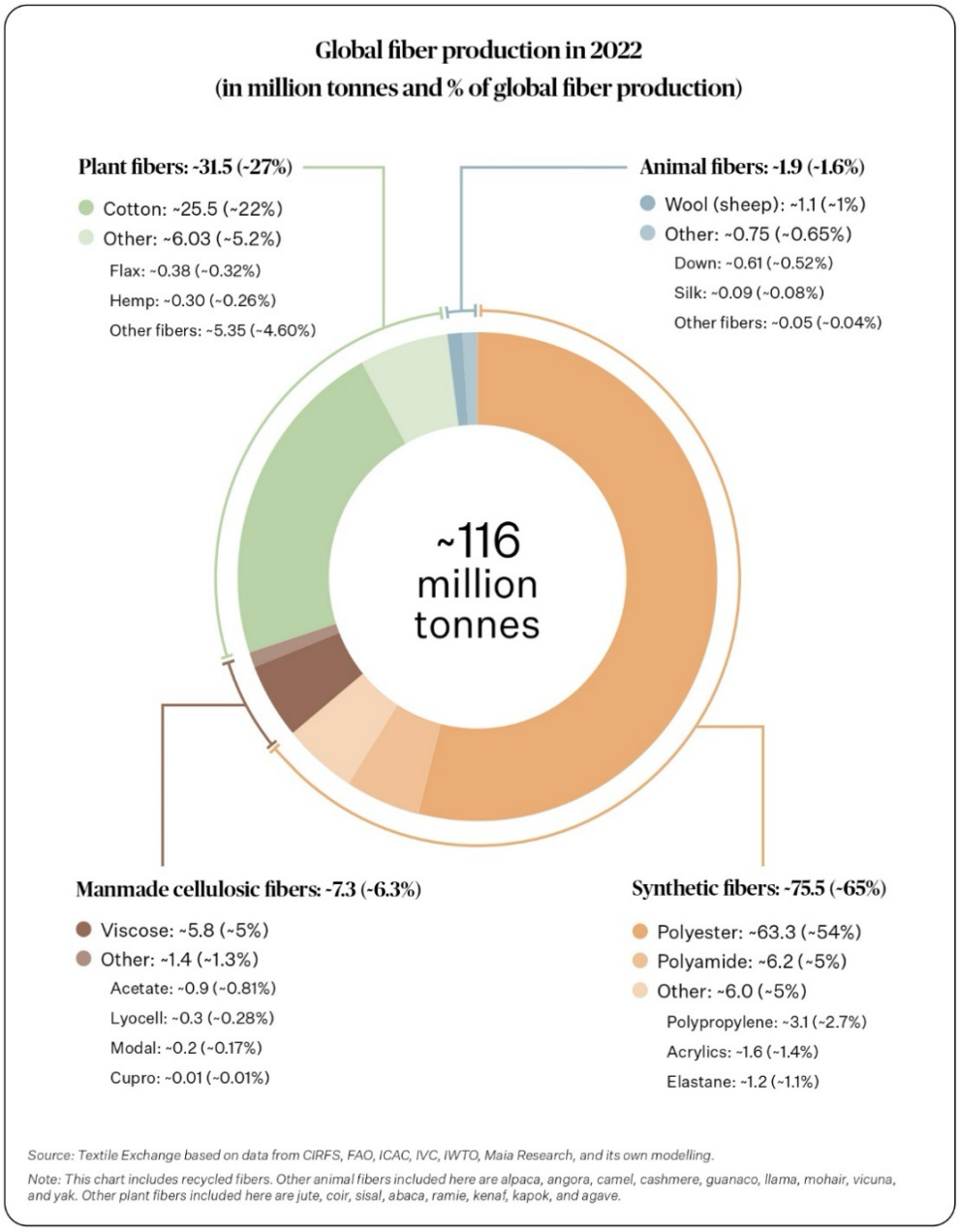
Source: WRI (2019) Apparel and Footwear Sector Science-Based Targets Guidance – adapted to TNFD value chain definitions

The sector's main impacts on nature are mostly linked to raw materials production activities, and potentially at the use and end-of-life phase, due to microfibre leaks and waste generation. During the Scoping phase of LEAP,

[3] Includes packaging.

organisations can leverage existing supply chain data on sourcing locations and procurement data on volumes and raw materials to assess the relative importance of raw material inputs (e.g. by size of operations in the location, volume of production in units or kilogrammes of material sourced, revenue or spend) and to identify business critical locations. For textiles, depending on quantity and geographic location, existing environmental LCA and footprints can already highlight sources for the following fibres: cotton, leather, wool and precious wool such as cashmere, silk and man-made cellulosic fibres. Figure 3 shows the global fibre production in 2022 by type of fibre.

Figure 3: Overview of most common fibre sources



L2: Dependency and impact screening

Guiding question:

Which of the sectors, value chains and direct operations are associated with potentially moderate and high dependencies and impacts on nature?

Tables 3a, 3b, 4a and 4b provide the ENCORE materiality ratings for impact drivers and ecosystem services associated with apparel, accessories and footwear activities, based on the 2018-23 version of the ENCORE knowledge base. The ENCORE dependency and impact materiality ratings provide a useful screening tool for apparel, accessories and footwear sector organisations to inform whether a specific commodity or production process may warrant a more detailed dependency and impact assessment. ENCORE outputs should be considered as guidance only, and further analysis may be needed, using the tools outlined below.

Table 3a: Materiality ratings of ecosystem services in the apparel, accessories and footwear sector typically depends on (based on 2018-2023 version of ENCORE)

Dependencies	Dependency materiality ratings for apparel, accessories and footwear
Ground water for natural and synthetic fibre production	Very high
Surface water for natural and synthetic fibre production	Very high
Fibres and other materials for jewellery and natural and synthetic fibre production	Moderate
Flood and storm protection for footwear, jewellery, natural and synthetic fibre production	Moderate
Ground water for jewellery production	Moderate
Ground water for jewellery production	Moderate
Water flow maintenance for footwear, jewellery, natural and synthetic fibre production	Moderate
Bio-remediation for footwear, jewellery, natural and synthetic fibre production	Low
Dillution by atmosphere and ecosystems for footwear, jewellery, natural and synthetic fibre production	Low
Filtration for footwear, jewellery, natural and synthetic fibre production	Low
Mass stabilisation and erosion control for footwear, jewellery, and natural fibre production	Low
Water quality for footwear, jewellery, natural and synthetic fibre production	Low
Mass stabilisation and erosion control for synthetic fibre production	Low

Source: 2018-2023 version of the ENCORE knowledge base.

Note: The ecosystem service classification used by ENCORE, the source of this table, differs from the classification used by TNFD guidance, based on the UN SEEA. A crosswalk is available from UN SEEA.

Table 3b: Materiality ratings of ecosystem services the apparel, accessories and footwear sector typically depends on (based on 2018-2023 version of ENCORE)

	ISIC class/group	Raising of sheep and goats	Raising of cattle and buffaloes	Growing of fibre crops	Other land transport	Manufacture of other textiles	Manufacture of man-made fibres	Extraction of crude petroleum	Manufacture of refined petroleum products	Manufacture of other chemical products	Manufacture of basic chemicals
Provisioning services	**Water supply**	High	High	High	Very low	Medium	Medium	Medium	Low	Medium	Medium
	Genetic material	Medium	Medium	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other provisioning services	N/A	N/A	Medium	Medium	N/A	N/A	N/A	N/A	N/A	N/A
	Biomass provisioning	High	Very high	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regulating and maintenance services	**Solid waste remediation**	Low	Medium	Medium	ND	Low	Low	Low	Low	Medium	Low
	Soil and sediment retention	Very high	Very high	Very high	Low	Low	Low	Low	Medium	Medium	Medium
	Water purification	High	High	Very high	ND	Medium	Medium	Very low	High	Medium	Medium
	Soil quality regulation	High	High	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other regulating and maintenance service	Low	Low	Medium	Very low	Low	ND	Medium	Low	Low	Low
	Biological control	Medium	Medium	High	ND	N/A	N/A	N/A	N/A	N/A	N/A
	Air filtration	Medium	Medium	Medium	Very low	Very low	Very low	Very low	Very low	Very low	Very low
	Flood control	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	Medium	Medium
	Global climate regulation	Medium	Medium	Very high	Medium	Very low	Very low	High	Very low	Very low	Very low
	Nursery population and habitat maintenance	Very low	Very low	Very low	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Noise attenuation	Very low	Very low	N/A	Very low	Very low	Very low	Very low	Very low	Very low	Very low
	Other regulating and maintenance service - Mediation of sensory impacts (other than noise)	Very low	Very low	N/A	N/A	Very low	Very low	Low	N/A	Very low	Very low
	Local (micro and meso) climate regulation	Medium	Medium	Very high	Low	Low	Low	Low	Low	Low	Low
	Pollination	N/A	N/A	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Storm mitigation	High	High	Medium	Medium	Medium	Medium	Low	Medium	Medium	Medium
	Water flow regulation	High	High	High	Low	Medium	Medium	Medium	Medium	Medium	Medium
	Rainfall pattern regulation	Very high	Very high	Very high	Medium	Very low	N/A	ND	N/A	N/A	Very low
Cultural services	**Recreation related services**	N/A	ND	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Visual amenity services	N/A	ND	N/A	Very high	N/A	N/A	N/A	N/A	N/A	N/A
	Education, scientific and research services	N/A	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Spiritual, artistic and symbolic services	Very high	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A = Non-applicable ND = No data

Source: ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (Unpublished, Expected 2024). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059.

Table 4a: Materiality ratings for impact drivers typically relevant for the apparel, accessories and footwear sector

Impact drivers	Impact materiality ratings for apparel, accessories and footwear
Water use for natural fibre production	Very high
Non-GHG air pollutants for footwear, jewellery, natural and synthetic fibre production	High
Solid waste for synthetic fibre production	High
Terrestrial ecosystem use for natural fibre production	High
Water use for footwear and synthetic fibre production	High
Soil pollutants for footwear, jewellery, natural and synthetic fibre production	Moderate
Solid waste for footwear, jewellery, and natural fibre production	Moderate
Water pollutants for footwear, jewellery, natural and synthetic fibre production	High

Source: 2018-2023 version of the ENCORE knowledge base.

Table 4b: Materiality ratings for impact drivers typically relevant for the apparel, accessories and footwear sector (based on 2024 version of ENCORE)

	ISIC class/group	Raising of sheep and goats	Raising of cattle and buffaloes	Growing of fibre crops	Other land transport	Extraction of crude petroleum	Manufacture of refined petroleum products	Manufacture of other chemical products	Manufacture of other textiles	Manufacture of man-made fibres	Manufacture of basic chemicals
Land, freshwater and ocean-use change	**Area of land use**	High	Very high	High	Medium	Low	Low	Low	Low	Low	Low
	Area of freshwater use	High	High	High	N/A	Very high	N/A	N/A	N/A	N/A	N/A
	Area of seabed use	N/A	N/A	N/A	N/A	Very high	N/A	N/A	N/A	N/A	N/A
Climate change	**Emissions of GHG**	High	High	Medium	Medium	High	Medium	Medium	Low	Medium	Medium
Pollution/pollution removal	**Emissions of non-GHG air pollutants**	High	High	High	Low	Medium	High	Medium	Medium	Medium	Medium
	Disturbances (e.g noise, light)	Medium	Medium	Medium	Medium	Very high	Very high	Very high	Medium	Medium	Very high
	Emissions of toxic soil and water pollutants	High	High	High	Low	Very high	Very high	Very high	Medium	Medium	Very high
	Emissions of nutrient soil and water pollutants	High	High	High	Medium	N/A	N/A	N/A	Medium	N/A	N/A
	Generation and release of solid waste	High	Very high	High	Very low	Low	Medium	Medium	Medium	Medium	Medium
Resource use/replenishment	**Other biotic resource extraction (e.g. fish, timber)**	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other abiotic resource extraction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Volume of water use	High	High	High	Low	Low	Low	Medium	Medium	Medium	Medium
Introduction of invasive alien species		Medium	High	Medium	Low	Low	N/A	N/A	N/A	N/A	N/A

N/A = Non-applicable ; ND = No data
Source: ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (Unpublished, Expected 2024). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. DOI: https://doi.org/10.34892/dz3x-y059.

Organisations can use these tables as initial filters to develop lists of activities with potentially high dependencies and impacts.

In addition, organisations should prioritise:

- Developing lists of key commodities produced or procured;
- Using Textile Exchange's Material Impact Explorer;
- Identifying value chains of any deforestation or conversion-driving commodities, consulting SBTN's High Impact Commodities List (HICL) and/or EU deforestation-free regulation;
- Mapping activities to areas with high water stress using WWF's Water Risk Filter or WRI Aqueduct;
- Mapping activities to areas with high soil degradation;
- Mapping activities upstream in markets with high air pollution concentration and/or high degrees of eutrophication, referring to the UNEP Urban Air Action Platform; and
- Using Fashion Nature Risk Lens, a tool mapping the main biodiversity risks and impacts, at the production level, of the main apparel raw materials (cashmere, cotton, cattle leather, goat leather, sheep leather, man-made cellulosic fibres, silk, synthetics and wool).

Useful additional tools and sources for the apparel, accessories and footwear sector for the L2 component of the Locate phase include:

- Regulation (EU) 2023/1115 of the European Parliament and of the Council;
- UNEP's Urban Air action Platform;
- Our World in Data database on plastic pollution; and
- OECD Due Diligence Guidance for Responsible Supply Chains in the Garment & Footwear Sector.

L3: Interface with nature

Guiding questions:

Where are the sectors, value chains and direct operations with potentially moderate and high dependencies and impacts located?

Which biomes and specific ecosystems do our direct operations, and moderate and high dependency and impact value chain and sectors, interface with?

There are several challenges for brands and retailers when tracing the origin of the raw material used in their products:

- Supply chains can be long and fragmented, spanning several countries and suppliers, resulting in a lack of transparency on the origin of units of production for downstream/retail organisations;
- Growers/farmers and other raw materials providers can be small scale and difficult to track precisely to their farm or plantation. This means that often the most feasible point of tracking is at the aggregator or primary processor level;
- Often there is no commitment made by brands or other processing tiers (e.g. garment makers) to keep sourcing from the same suppliers, growers or regions, year after year; and
- Certain materials such as leather are difficult to trace, because brands are utilising the co-product of another industry, which reduces the ability of an apparel company to influence that industry's value chain.

This lack of supply security/commitment can result in a volatile or constantly shifting supply base, making it difficult for nature-related dependencies, impacts, risks and opportunities to be assessed in detail and action plans to be implemented. Chain of custody (CoC) can help connect final products back to source, and as digital and electronic tracking becomes more mainstream, this information will be visible between tiers.

Where possible, an approach based on an organisation's actual sourcing footprint is preferred, but in the absence of traceability, companies can use information about sensitive locations for materials. While doing this, they can also implement systems to improve traceability to the fibre/raw material origin (i.e. farm, forest, site), investing in industry-wide initiatives where possible, to understand sourcing at a sub-national or even more granular level. For the apparel, accessories and footwear sector, cotton, leather, wool and precious wool such as cashmere, as well as man-made cellulosic fibres, are all raw material categories that are at risk of being sourced from biodiversity hotspots. Synthetic fibres sourced from the petrochemical industry may also experience a similar risk.

For farming and natural fibre production:

- Organisations buying directly from farms (directly procured commodities) should be able to locate supplier farms precisely.
- Organisations buying indirectly from cooperatives, traders, brokers (indirectly procured commodities) and direct suppliers should map points of procurement and geolocate the sourcing area and progressively increase granularity with the aim of reaching farm-level traceability in a set timeframe.

Organisations in the apparel, accessories and footwear sector can at this stage deepen their use of tools such as the IUCN Species Threat Abatement and Restoration (STAR) metric to conduct site-specific assessments.

Organisations can also identify the biomes and ecosystems with which their identified direct, upstream and downstream locations interface. The apparel, accessories and footwear sector typically interfaces with the following biomes:

Land:

- Tropical-subtropical Forest (T1);
- Savannahs and grasslands (T4);
- Intensive land use systems (T7); and
- Vegetated wetlands (TF1).

Freshwater:

- Rivers and streams (F1);
- Lakes (F2); and
- Artificial wetlands (F3).

Ocean:

- Shoreline systems (MT1);
- Coastal inlets and lagoons (FM1); and
- Brackish tidal systems (MFT1).

This list can be considered as a reference. However, organisations should review all applicable biomes connected to their specific interfaces across their value chains and associated activities where significant dependencies and impacts on those biomes exist.

Organisations may also refer to the TNFD biome guidance for further guidance when analysing their interfaces with these biomes.

L4: Interface with sensitive locations

Guiding questions:

For our organisation's activities in moderate and high dependency and impact value chains and sectors, which of these are in ecologically sensitive locations? And which of our direct operations are in sensitive locations?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

List of datasets and tools

Table 5 provides a list of tools that apparel, accessories and footwear sector organisations may find useful for the Locate phase of LEAP, in addition to those listed in the cross-sector LEAP guidance. Organisations may also find it helpful to reference tools in the TNFD Tools Catalogue.

Table 5: Additional tools for apparel, accessories and footwear sector organisations for the Locate phase of LEAP

Tool name	Description
Global Forest Watch	An online platform that provides data and tools for monitoring forests.
Canopy Forest Mapper	An interactive tool that visually represents ancient and endangered forests at a global scale.
Trase (cotton)	An online platform that provides data and tools for monitoring forests.
WWF's Biodiversity Risk Filter	Industry-agnostic risk mapping tool
WRI Aqueduct	Aqueduct's tools use open-source, peer reviewed data to map water risks such as floods, droughts and water stress.
WWF's Water Risk Filter.	Corporate and portfolio-level screening tool to assess physical, regulatory and reputational water-related risks

Tool name	Description
Textile Exchange Materials Impact Explorer	A tool to identify the potential risks and opportunities associated with the fibres and raw materials in their portfolios. The tool provides tailored recommendations on mitigating risk, reducing environmental impact and supporting local and global sustainability initiatives.
SBTN High Impact Commodity List	Includes commodities known to have significant contributions to environmental pressures at a global or regional level.
Textile Exchange's Biodiversity Benchmark Companion Guide	Provides a "quick start" to contextualising biodiversity risk from a materials sourcing starting point.
Textile Exchange's Materials Terminology Guide	The guide unpacks terminology such as "taking a portfolio approach" and explains how a company can determine a "priority material" for its business. It explains the difference between a "preferred material" and the wider scope of a "sustainability program", as defined by Textile Exchange. It also includes a comprehensive listing of fibre and material programmes and the acronyms used in the benchmark.
The Fashion Pact Biodiversity Strategy Tool Navigator	Site that is designed to guide a fashion company through the stages of developing a biodiversity strategy that is aligned with the Science Based Targets Network (SBTN) and to find the tools and resources that can help.
The Fashion Pact/Conservation International: Fashion Nature Risk Lens	An interactive website and dashboard to understand land-use footprint and deforestation risk across the globe for select raw materials.
Textile Exchange – Certified Materials Trackit	Data exchange platform for documentation related to certified materials and their traceability throughout the supply chain.
SBTN's guide for setting, implementing and tracking progress on science-based targets for nature and SBTN's materiality screening tool	A company can get a quick overview of the issue areas associated with the economic activities (and associated sourced raw materials) of its sector and use this at the first Scoping phase.
Textile Exchange and The Fashion Pact (2023) Biodiversity Landscape Analysis Report	Report helping companies understand the landscape of biodiversity tools and initiatives.

2.3. Evaluate impacts and dependencies on nature

This section provides additional guidance to help apparel, accessories and footwear sector organisations with the Evaluate phase of the LEAP approach.

E1: Identification of environmental assets, ecosystem services and impact drivers

Guiding questions:

What are the business processes and activities to be analysed?

What environmental assets, ecosystem services and impact drivers are associated with these business processes, activities and assessment locations?

Guidance for components E1 and E2 is provided together under E2.

E2: Identification of dependencies and impacts

Guiding question:

What are our dependencies and impacts on nature?

This section focuses primarily on dependencies and impacts in the direct operations of apparel, accessories and footwear organisations. Organisations should refer to the relevant TNFD sector guidance for forestry and paper, oil and gas, and food and agriculture for dependencies and impacts upstream and downstream.

Impacts

Table 6 and Table 7 provide examples of business activities in the apparel, accessories and footwear sector, the associated impact drivers, and examples of environmental assets and ecosystem services that the impact drivers typically affect. These tables describe impacts over different environmental assets, and organisations should consider how relevant these impacts are and where they may apply, given their specific locations and areas of influence.

To note, animal welfare is not covered extensively in this guidance, but the Taskforce recommends that organisations include this issue from the SASB Meat, Poultry & Dairy Standard if relevant to their business model and pay particular attention to animal welfare-related issues of Concentrated Animal Feeding Operations (CAFOs).

Table 6: Examples of impact pathways for natural fibre and livestock farming for animal-based fibre production

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Land/freshwater/ocean-use change **Land and land-use change:** Natural fibre and livestock farming for animal-based fibre production can cause changes in land use and drive land degradation by increasing demand for specific crops and accelerating deforestation through the procurement of leather, a co-product of the meat sector. For instance, cotton production accounted for 2.5% of the world's arable land in 2015. Approximately 20% of pastureland worldwide is considered degraded because of livestock overgrazing, compaction and erosion due to livestock farming.	*Environmental assets:* Terrestrial land-based ecosystems Land ecosystems *Ecosystem services:* Soil fertility Biological control Soil and sediment retention Flood mitigation Biomass provisioning Nursery population and habitat maintenance Pollination Other cultural services	Natural fibre production can lead to pressures on land, to high prevalence of monoculture planting, intensive agrochemical usage and ecosystem conversion[4]. Growing the same crop year-on-year reduces the availability of certain nutrients and can lead to soil exhaustion. Additionally, ecosystems and ecological functions are affected due to reduced habitat extent, degradation and fragmentation. Fragmentation impedes species' feeding and reproduction patterns, reducing populations and increasing extinction risk. Large-scale livestock farming for animal-based fibres can result in soil depletion and biodiversity loss. Overgrazing can lead to bare unprotected soil with higher erodibility, higher temperatures and reduced soil microbes and organic matter, causing structural changes that affect the soil's ability to infiltrate water. Further, the income dependency of landscape stewards, such as herders, can increase the pressure driver that can affect an ecosystem, exceeding the grazing capacity of the land by the livestock[5], when demand for a specific product from a specific location remains high. Finally, the construction of new assets or transportation routes could affect communities, including the rights of Indigenous Peoples and potentially their displacement.

[4] For more impacts associated with farming for natural fibres, refer to the TNFD food and agriculture guidance.
[5] The grazing capacity is the number of grazing animals a piece of land can support. Piipponen, J. et al. (2022) Global trends in grassland carrying capacity and relative stocking density of livestock.

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Pollution/pollution removal **Water pollutants:** Major sources of pollution from livestock farming include wastes, antibiotics and hormones, fertilisers and pesticides used for feed crops, chemicals from tanneries and sediments from eroded pastures. Pollutants mentioned in the soil pollutant section can also be released into waterways. Wastewater discharge from production sites can be a significant source of hazardous chemicals and pollution in key production regions. 20% of industrial water pollution globally is attributable to the dyeing and treatment of textiles. Microplastics from packaging waste entering waterways and the ocean are also a material issue for the sector: it has been estimated that around half a million tonnes of plastic microfibres shed during the washing of plastic-based textiles such as polyester, nylon or acrylic end up in the ocean annually. According to the IUCN, 35% of primary microplastics entering the ocean are released through the washing of textiles.	*Environmental assets:* Freshwater and subterranean freshwater ecosystems Water resources Terrestrial and subterranean terrestrial ecosystems Marine (ocean) ecosystems *Ecosystem services:* Water flow regulation Water supply Water purification Biological control Nursery population and habitat maintenance Soil and sediment retention Flood mitigation Cultural services	The release of untreated wastewater can contaminate water resources. Nitrogen-, phosphate- and potassium-based synthetic fertilisers can leach into groundwater, polluting waterways and leading to oxygen depletion in aquatic ecosystems, the acidification of soils and waters, and reductions in bird, insect, amphibian and soil biological diversity. Moreover, plastic microfibres may escape wastewater treatment plants and can enter rivers, lakes and oceans. Aquatic organisms throughout the food chain consume microplastics and microfibres both directly and indirectly. Water pollution may also lead to the deterioration of health and living conditions of surrounding local communities. For more impacts associated with farming for natural fibres, refer to the TNFD food and agriculture guidance.
Pollution/pollution removal	*Environmental assets:*	**Natural fibre farming:**

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Soil pollutants: It has been estimated that producing 1 kg of textiles requires 0.58 kg of chemicals. The production of cotton was estimated in 2017 to require 200,000 tonnes of pesticides and 8 million tonnes of fertilisers annually. Cotton production uses 2.5% of the world's arable land while accounting for 16% of all pesticides used in 2014. Cotton production also accounts for 4% of nitrogen and phosphorus fertiliser use globally. Animal-based fibre, such as sheep wool, also typically uses pesticides during production processes. For instance, to protect the sheep fur from parasites, pesticides can be released into the environment without proper management. Additionally, fur requires significant chemical treatment, which has been identified by the World Bank[6] as one of the industries with the highest prevalence of toxic chemicals use. Chemical-based cleaning of silk may also enter freshwater ecosystems in the absence of adequate water treatment systems. Moreover, packaging waste that is dropped as litter or discarded in landfill sites can	Terrestrial and subterranean land-based ecosystems Freshwater ecosystems Marine (ocean) ecosystems *Ecosystem services:* Water flow regulation Biological control Water purification services Nursery population and habitat maintenance Soil and sediment retention Flood mitigation Air filtration Cultural services	Soil pollutants in agriculture can lead to soil contamination, a decline in insect populations including pollinators and in soil microorganisms, soil erosion and compaction issues, and freshwater contamination. To identify the impacts on ecosystem services of soil pollutants of pesticide and excess nitrogen and phosphorus, an organisation can: • Identify pesticide-intensive crops and source data from suppliers to account for actual pesticide use per toxicity hazard level in the business model; • Identify nitrogen and phosphorus-intensive commodities, for example, by using IFA fertiliser-use data to identify the most nitrogen and phosphorus-intensive crops and regions in its value chain; • Leverage eDNA to measure changes to pollinator abundance and complexity; • Measure changes to nutrient and pathogen regulation and sequestration services; and • Measure changes to soil structure and soil organic carbon content.[7] **Manufacturing:** Complex effluent containing several dyes, heavy metals and other organic agents can accumulate in soil if disposed of without treatment or after incomplete treatment. This has negative effects on soil productivity, as the excessive concentration of pollutants in soil reduces fertility and the quality

[6] Wheeler, D. et al. (1999). The industrial pollution projection system. The World Bank.
[7] Organisations can refer to the TNFD Food and Agriculture sector guidance for additional information on identifying material impacts.

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
degrade and lead to microfibres leaking into soil.		of soil and ingress in food web. For instance, heavy metal enriched soil adversely affects the density of earthworms. Additionally, landfills generate pollutants and microfibres that can runoff and impact, for example, water purification services, solid waste remediation, air filtration, nursery population and habitat maintenance services. Soil pollution may also lead to the deterioration of health and living conditions of surrounding local communities. For more impacts associated with farming for natural fibres, refer to the TNFD food and agriculture guidance.
Pollution/pollution removal **Solid waste:** Currently, less than 1% of textiles produced for clothing are recycled into new clothes and 87% of material used for clothing production is landfilled or incinerated after its final use, generating considerable waste. It has been estimated that 92 million tonnes of textiles are wasted globally every year.	*Environmental assets:* Terrestrial, freshwater and marine (ocean) ecosystems *Ecosystem services:* Various	Solid waste contributes to the degradation of the ecosystems where it is disposed of and disrupts the ecosystem services those assets provide. Non-compostable textiles can harm wildlife when not disposed of appropriately. When waste is disposed in landfills, it decomposes or biodegrades slowly. Moreover, chemicals and constituents from the waste can leak into surface water, groundwater, soil and plants. This affects their physicochemical parameters and results in heavy metal concentration.

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Resource use/replenishment **Water use:** Water is used for field irrigation, as well as throughout the fibre manufacturing process, from dyeing to fibre washing. The volume of fresh water consumed by the fashion industry in 2015 was estimated to be nearly 79 billion cubic metres, with an estimation that water use will increase by at least 50 percent by 2030.	*Environmental assets:* Water resources Freshwater and subterranean freshwater ecosystems *Ecosystem services:* Water flow regulation Water supply Water purification Biological control Nursery population and habitat maintenance Cultural services	Water use can lead to the depletion of aquifers, subterranean freshwater ecosystems and other water resources, especially in arid and drought-prone areas. This can lead to reduced water flow regulation and increased drought severity and frequency. Such water use affects the supply of water to other users and to nature, with many ecosystem services impacted such as water purification, water flow regulation, water supply and recreation-related services. At present, many of the key cotton-producing countries often experience high water stress, including China, India, the USA, Pakistan and Turkey. For further impacts associated with water use for nature- based fibre farming, refer to the TNFD food and Agriculture guidance.
Resource use/replenishment **Other resource use:** Fibres made from wild plants and animals, such as wood pulp, skins or fur, can have significant impacts on nature when harvested unsustainably. Wild animals account for 15% of the world's fur trade and other wild species include pythons, crocodiles and vicuna (the latter two being farmed as well).	*Environmental assets:* Terrestrial and subterranean land-based ecosystems Freshwater ecosystems Marine (ocean) ecosystems *Ecosystem services:* Biological control Nursery population and habitat maintenance	Organisations should understand the requirements of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a multilateral treaty to ensure that international trade of animals and plants included does not threaten the survival of the species in the wild. CITES protects over 37,000 species of animals and plants. Wild animal and plant use can have significant ecosystem impacts when harvested unsustainably (e.g. diminished wildlife populations, local extirpations). It can also increase pressures on local communities and have knock-on effects on other species. [8]

[8] Business for Nature (2023) Fashion and apparel: Priority actions towards a nature-positive future.

Drivers of nature loss	Example environmental assets and ecosystem services affected	Guidance to identify impacts
	Cultural services	
Sources: Business for Nature (2023) Fashion and apparel: Priority actions towards a nature-positive future; Changing Markets Foundation (2017) Dirty fashion: How pollution in the textiles supply chain is making viscose toxic; EEA (2023) How pesticides impact human health and ecosystems in Europe; EMF (2017) A new textiles economy: redesigning fashion's future; FAO (2006) Livestock's long shadow: environmental issues and options; International Union for Conservation of Nature (IUCN) (2017), Primary microplastics in the oceans: A global evaluation of sources, IUCN (2020) Biodiversity risks and opportunities in the apparel sector; Markandey et al. (2022) Hazardous consequences of textile mill effluents on soil and their remediation approaches; Textile Exchange (2023) Biodiversity landscape analysis; UNEP (2023) Sustainability and circularity in the textile value chain; World Bank (2013) The Industrial Pollution Projection System; WWF (2021). Open letter on sustainable post-Covid recovery in textile sector.		

Table 7: Examples of impact pathways for man-made fibre production

Impact pathways	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Land/freshwater/ocean-use change **Land and ocean-use change:** Man-made fibre production can cause land-use change, when manufacturers are sourcing from unverified wood pulp suppliers. Currently, most man-made cellulosic fibres (MMCF) products are produced by cutting down forests and processing the trees in a pulp mill to strip out the cellulose fibre and remove the lining, mainly through chemical processes. It is estimated that more than 300 million trees are logged every year and turned into cellulosic fabric such as viscose, and less than 60% of these forest-based fibres are being sourced from certified forests. Other man-made fibres, including polyester, require fossil fuel-based chemicals, the primary raw material of which is crude oil.	*Environmental assets:* Terrestrial land-based ecosystems Land ecosystems Marine (ocean) ecosystems *Ecosystem services:* Soil fertility Biological control Soil and sediment retention Flood mitigation Biomass provisioning Nursery population and habitat maintenance Pollination Other cultural services	If MMCFs are sourced from forests that are not certified by a reputable standard, there is a high risk that these forests experience deforestation and illegal logging, causing significant impacts on biodiversity and the communities that rely on forests. For more details, refer to the TNFD forestry, pulp and paper guidance. Fossil fuel extraction to produce synthetic fibres requires site preparation for construction and surface mining. This includes seismic testing, drilling, asset and facility construction, infrastructure development, pipeline installation and road building. This can also be done offshore through deep sea mining and drilling and the construction footings of offshore structures, resulting in the destruction of marine and seabed habitats. For more impacts resulting from fossil fuel extraction, refer to the TNFD oil and gas guidance.
Pollution/pollution removal **Soil pollutants**	*Environmental assets:* Terrestrial and subterranean land-based ecosystems Freshwater ecosystems Marine (ocean) ecosystems *Ecosystem services:*	Some synthetic fibres are non-biodegradable, causing major impacts on the environment. Chemicals and dyes used in the textile manufacturing process can result in soils in a poor physical and chemical state and susceptible to erosion, leading to loss of productivity, sustainability and diminished food chain quality.

Impact pathways	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Chemicals and dyes used in the textile manufacturing process can pollute soils. Moreover, microfibres can infiltrate soil layers through various pathways, such as: • Airborne microplastics deposited on roads and pavements. Run-off then transports them to roadsides and sewers, and they are then transported to waste water treatment plants, the sewage sludge from which is used as fertiliser on fields; • Textile or packaging waste that is dropped as litter or discarded in landfill sites can degrade and lead to microfibres leaking into soil; • Organisms such as earthworms have the capacity to transport significant amounts of microplastics from the soil surface to deeper layers.	Water flow regulation Biological control Water purification services Nursery population and habitat maintenance Soil and sediment retention Flood mitigation Air filtration Cultural services	Microplastic pollution in soils significantly affects the composition and abundance of the effects of soil fauna. Additionally, microplastics strongly cascade through the soil food webs, leading to the modification of microbial functioning, with further potential consequences on soil carbon and nutrient cycling. Soil pollution may also lead to the worsening health and living conditions of surrounding local communities.
Pollution/pollution removal **Water pollutants**: It is estimated that about 20% of global water pollution is caused by dyeing and finishing textile product. During production, facilities producing polyester, other fibres or leather have a high risk of causing environmental harm without treating wastewater through the release of heavy metals and toxic chemicals. The washing and disposal of polyester contributes to a significant amount of water pollution in terms of heavy metals, toxic chemicals, and plastic pollution (in the form of microplastics).	*Environmental assets:* Freshwater and subterranean freshwater ecosystems Water resources Terrestrial and subterranean terrestrial ecosystems Marine (ocean) ecosystems *Ecosystem services:* Water flow regulation Water supply	It is estimated that globally about 80% of all wastewater produced is discharged into the environment without adequate treatment, although the levels vary across regions. Dye wastewater is extremely toxic and is comprised of suspended solids, dyes, different chemicals as well as high concentrations of heavy metals like cadmium, zinc, antimony, copper and nickel. Such effluents pollute the water surface, making it hazardous for irrigation purposes. Furthermore, an excessive amount of textile

Impact pathways	Example environmental assets and ecosystem services affected	Guidance to identify impacts
Additionally, viscose production is acknowledged to be a particularly polluting process when manufactured irresponsibly, as the process of breaking down cellulose to transform and regenerate it into viscose fibre is highly chemical and mechanical. Microplastics from textile or packaging waste entering waterways and the ocean are a material issue for the sector: it has been estimated that around half a million tonnes of plastic microfibres shed during the washing of plastic-based textiles such as polyester, nylon or acrylic end up in the ocean annually. According to the IUCN, 35% of primary microplastics entering the ocean are released through the washing of textiles.	Water purification Biological control Nursery population and habitat maintenance Soil and sediment retention Flood mitigation Cultural services	dyes in water bodies affects aquatic life and hinders the photosynthesis process for plants and algae. Additionally, heavy metals can cause serious health problems for aquatic organisms and the people that consume them. Moreover, plastic microfibres escape wastewater treatment plants and can enter into rivers, lakes and oceans. Aquatic organisms throughout the food chain consume microplastics and microfibres both directly and indirectly. Viscose production is also chemical-heavy. Central to the process is carbon disulphide, a highly volatile and flammable liquid, which can have negative impacts on human health. Other chemicals include hydrogen sulphide, sodium hydroxide and sulphuric acid, which all present hazards to human health. The viscose production process is carried out with strong alkaline or acidic water conditions, so poor treatment of wastewater can have a significant localised impact on water bodies such as lakes and rivers surrounding factories. Pollutants characteristically found in wastewater from viscose production are sulphuric acid, sulphates, sulphur and sulphides, as well as metals (e.g. zinc salts: zinc sulphates and zinc sulfonate cellulose). Inadequately treated wastewater can also contain significant amounts of organic material, which can lead to high levels of

Impact pathways	Example environmental assets and ecosystem services affected	Guidance to identify impacts
		chemical oxygen demand (COD). High levels of COD mean less dissolved oxygen available for aquatic organisms, such as fish, resulting in their death.
Resource use/replenishment **Water use:** Many stages of the manufacture of apparel are significant users of water, from dyeing to raw material manufacture. Textiles production (including cotton farming) uses around 93 billion cubic metres of water annually, representing 4% of global freshwater withdrawal. Clothing accounts for over two-thirds of this water use. Beyond production, washing clothing using washing machines is estimated to require an additional 20 billion cubic metres of water per year globally.	*Environmental assets:* Water resources Freshwater and subterranean freshwater ecosystems *Ecosystem services:* Water flow regulation Water supply Water purification Biological control Nursery population and habitat maintenance Cultural services	Water use from areas that are under high water stress may impact water supply. Water stress, i.e. a potential lack of water, is expected to be a growing issue in many areas which have significant parts of the textile supply chain as a result of climate change, inefficient use and untreated disposal. In China, for instance, 80-90% of fabric, yarn and plastic-based fibres are made in water-scarce or water-stressed regions.
Resource use/replenishment **Other resource use:** Producing plastic-based fibres for textiles uses an estimated 342 million barrels of oil every year. Polyester is the most widely used fibre in the world, and accounts for roughly half of the overall fibre market and around 80% of synthetics fibre. In 2016, polyester fibre production was estimated at 52 million metric tons. Manmade cellulosics fibers (MMCFs) – including viscose, lyocell, modal, acetate and cupro – are commonly made from	*Environmental assets:* Terrestrial and subterranean terrestrial ecosystems Mineral and energy resources Underwater mineral and energy resources Marine (ocean) ecosystems *Ecosystem services:*	Synthetic fibres are made out of petroleum, a natural non-renewable resource, thus contributing to its depletion. Synthetic fibre production also requires substantial energy, which further requires non-renewable resources.

Impact pathways	Example environmental assets and ecosystem services affected	Guidance to identify impacts
wood pulp and have a global production volume of around 7.2 million tonnes. MMCFs had a market share of around 6.4% in 2021 and this production increased from 6.5 million tonnes in 2020. Viscose is the most important manmade cellulosic, having a market share of roughly 80% of all MMCFs and a production volume of around 5.8 million tonnes in 2021. Like other MMCFs, viscose is mostly derived from pulp from wood, but other raw materials in use or under development include bamboo and agricultural by-products, as well as post-consumer and industrial waste. This also includes upstream mining of minerals for jewellery and accessories production.	Soil and sediment retention Biological control Nursery population and habitat maintenance Soil and sediment retention Flood mitigation Cultural services	For the impacts associated with timber and wood pulp for man-made fibre production, refer to the TNFD forestry, pulp and paper guidance. Extraction of metals and minerals, as well as oil and gas, also result in a variety of impacts on nature. For more information, refer to the TNFD metals and mining guidance and TNFD oil and gas guidance.
Sources: Canopy (2023) Canopystyle initiative; Changing Markets Foundation (2017) Dirty fashion, how pollution in the global textiles supply chain is making viscose toxic; Ekpo (2013) Influence of heavy metals concentration in three common fish, sediment and water collected within quarry environment, Akamkpa L .G. area, cross river state, Nigeria; EMF (2017) A new textiles economy: redesigning fashion's future; European Environment Agency (2019) Textiles in Europe's circular economy; European Environment Agency (2022) Microplastics from textiles: towards a circular economy for textiles in Europe; European Investment Bank (2022) Wastewater as a resource; Forest Stewardship Council (2023) Forest friendly fashion: are MMCFs sustainable?; Global Fashion Agenda and the Boston Consulting Group (2018) The pulse of the fashion industry 2018; International Union for Conservation of Nature (IUCN) (2017), Primary microplastics in the oceans: A global evaluation of sources; Lin, D. et al. (2020) Microplastics negatively affect soil fauna but stimulate microbial activity: insights from a field-based microplastic addition experiment; Mehta, R., and Yadav, K. (2013) Soil contamination due to textile effluent-case study on the printing cluster of Jaipur; Panhwar, A. et al. (2024) Water resources contamination and health hazards by textile industry effluent and glance at treatment techniques: A review; Planet Tracker (2024) Ripple effect quantifying water risks in the apparel supply chain; Muthu, S. S. (2020) Assessing the environmental impact of textiles and the clothing supply chain; Textile Exchange (2017) Preferred fiber materials report; Textile Exchange (2022) Preferred fiber and materials market report.		

Dependencies

Table 8: Examples of dependency pathways for the apparel, accessories and footwear sector

Business activity	Environmental asset and ecosystem services depended on	Description
Natural fibre and livestock farming for animal-based fibre production	*Environmental assets:* Terrestrial and subterranean terrestrial land-based ecosystems Freshwater ecosystems Marine (ocean) ecosystems Water resources *Ecosystem services:* Nursery population and habitat maintenance Water supply Water purification Rainfall pattern regulation Biological control Soil and sediment retention Flood mitigation Storm mitigation Local and global climate regulation Cultural services	The production of natural fibres requires materials such as cotton, wool, leather, silk, rubber and dyes. Some of these are derived from plants and may rely on pollination, soil health and quality, pest and disease control, flood mitigation and soil and sediment retention to ensure the availability of functioning agricultural land for their production. Livestock farming for animal-based fibres also depends on soil health owing to the plant and animal material required for fodder and fertiliser use. Agricultural processes are further supported by provisioning services such as the supply of clean water and regulating services protecting sites from landslides, floods and storms. The sector is highly dependent on water supply for the mining of raw materials and rainfed crops through regular irrigation. Fabric dyeing is also very dependent on water resources. Where water is sourced from third party providers, that organisation's dependencies on water resources should also be analysed. The use of wild plants and animals for fibres is highly dependent on healthy ecosystems for the provision of services such as soil and sediment retention, nursery population and habitat maintenance, as well as water supply and purification services. The fashion sector is dependent on feedstocks for energy supply as it is a critical input for every step of the fashion value chain.

Business activity	Environmental asset and ecosystem services depended on	Description
Man made fibre production	*Environmental assets:* Terrestrial and subterranean terrestrial land-based ecosystems Mineral and energy resources Underwater mineral and energy resources Freshwater ecosystems Marine (ocean) ecosystems Water resources *Ecosystem services:* Nursery population and habitat maintenance Water supply Water purification Rainfall pattern regulation Biological control Soil and sediment retention Flood mitigation Storm mitigation Local and global climate regulation Cultural services	The manufacturing process for man-made fibres is a highly water-intensive process, albeit slightly lower than for plant-based fibres, and is particularly dependent on water supply for fabric dyeing. Where water is sourced from third-party providers, that organisation's dependencies on water resources should also be analysed. The production of man-made fibres is also dependent on fossil fuels. For instance, conventional polyester – the most widely used fibre worldwide – is made from fossil fuel-based chemicals, the primary raw material of which is crude oil. Other fossil-fuel-derived fibres include nylon, elasthane, polypropylene, polyurethane and acrylic. The manufacturing process is additionally dependent on protection from natural hazards (such as flood protection and erosion control). The fashion sector relies on energy feedstocks throughout its value chain, from growing raw materials to manufacturing processes, retail and consumer washing.

External factors

Organisations should also consider potential external factors that may affect the quantity and quality of environmental assets and ecosystem services they depend on. Climate change is of particular relevance, causing a higher frequency of extreme weather events, such as drought and floods, and affects ecosystem condition, for example, through longer-term changes to rainfall patterns and lowering of water tables. This affects many of the provisioning and regulating ecosystem services that the apparel, accessories and footwear sector depends on, such as soil and sediment retention and water supply. Water shortages as a result of climate change are expected to be a growing issue in many areas that have significant parts of the textile supply chain. This could affect crop yields as well as other

activities such as dyeing and tanning.[9] Climate change could also increase the risk of flooding (both riverine and coastal) in many areas, potentially putting workers and factories at risk of inundation and damage.[10]

E3: Dependency and impact measurement

Guiding questions:

What is the scale and scope of our dependencies on nature?

What is the severity of our negative impacts on nature? What is the scale and scope of our positive impacts on nature?

Organisations should refer to the apparel, accessories and footwear metrics in Section 3.

Suggested data sources and approaches for organisations in this sector to estimate impacts on nature include:

- Deforestation: If organisations have supplier geolocation data, they can use Copernicus open source satellite data, Global Forest Watch or another earth observation data platform to quantify the area deforested before and after business activity.

- Nitrogen and phosphorus excess: If farmgate nitrogen and phosphorus balance data are not available, organisations can use global fertiliser sales numbers per crop to estimate nitrogen and phosphorus usage. Our World in Data and FAOSTAT offer access to data on jurisdictional quantities of nitrogen and phosphorus inputs per crop or per quantities of fibre produced. These data sets can be used to create an initial estimate. Alternatively, organisations can use LCA methodologies, as nitrogen emissions are usually considered in life cycle assessments.

- Pesticides: Organisations can use pesticide sales numbers per crop type to create an initial estimate until location-specific data are available.

- Plastic leakage: Organisations can research whether their products are likely to results in microfibre leakage and follow or participate in initiatives such as the Plastic Footprint Network and, the Microfibre Consortium. On packaging, organisations can start by identifying their interface with the top ten rivers that account for plastic in the ocean. Seven of these ten rivers are in the Philippines, two are in India and one is in Malaysia.[11] Organisations can use sales numbers from these high leakage jurisdictions to estimate an impact. If the main landfills where packaging ends up are known, an organisation can use earth observation data such as the Plastic Watch database on landfills to estimate impacts.

[9] Planet Tracker (2024) Ripple effects – quantifying water risks in the apparel supply chain.
[10] Bauer, A. et al. (2023) Higher ground? Report 2: Climate resilience and fashion's costs of adaptation.
[11] Ritchie, H. (2021) Where does the plastic in our oceans come from?

Suggested data sources and approaches for organisations in this sector to estimate dependencies on nature include:

- Freshwater: Organisations can use the list of crops with a high freshwater dependency identified in E2 and identify water dependencies for processes such as dyeing, tanning and washing. Organisations can then overlay detailed location data on the catchment area of each crop category or water-intensive operation location, using spatial maps of current levels of water stress to estimate the size of the dependency. Organisations can use data sources such as the open source WRI Aqueduct Food Platform to access water stress spatial maps as well as water risk scores per crop per catchment area. Organisations may engage with the Water Resilience Coalition to build resilience in their own operations and the communities and ecosystems in which they operate where water-stressed basins have been identified.

- Pollination services: Organisations can use pollination dependency ratings for crop categories to classify procured or produced crops into groups of those with a moderate, high or essential dependence on pollinators. Thereafter, organisations can estimate the size of the dependency by the quantity of the crops procured.

- Biodiversity: Organisations can use the Integrated Biodiversity Assessment Tool (IBAT) to identify Key Biodiversity Areas (KBAs), protected areas and conduct site-specific assessments to identify actions that they can implement to deliver positive outcomes for identified areas. Organisations may find it useful to refer to the IUCN Species Threat Abatement and Restoration (STAR) metric. STAR is calculated from data on the distribution, threats and extinction risk of threatened species derived from the IUCN Red List of Threatened Species and can help identify actions that have the potential to bring benefits for threatened species.

- Global and local climate regulation and flood and storm mitigation: Organisations can use the lists of drought, storm and flood-sensitive crop varieties identified in E2 to develop an initial estimate of the size of their dependency on these regulating ecosystem services. For many organisations, this information is already part of the physical climate-related risk data disclosed as part of the IFRS S2 Climate-related Disclosures.

E4: Impact materiality assessment

Guiding question:

Which of the identified impacts are material?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

List of datasets and tools

The following tools can help organisations in the apparel, accessories and footwear sector with the Evaluate phase of LEAP, in addition to those listed in the cross-sector LEAP guidance. Organisations should also reference tools in the TNFD Tools Catalogue.

Table 9: Additional tools for apparel, accessories and footwear organisations in the Evaluate phase of LEAP

Tool name
• ZDHC Roadmap to Zero • Textile Exchange – Materials Impact Explorer • eQosphere by Quantis, which includes the World Apparel & Footwear Life Cycle Assessment Database • Sustainable Apparel Coalition Higg Material Sustainability Index • Textile Exchange - Preferred Fiber and Materials Matrix • Our World in Data – Total nitrogen used per crop • FAO guidelines to quantitatively assess biodiversity impacts of livestock • Polymer prioritisation framework • Guidance on deforestation-free sourcing • Plastic Footprint Network

2.4. Assess nature-related risks and opportunities

This section provides additional considerations to help apparel, accessories and footwear industry organisations with the Assess phase of the LEAP approach.

A1: Risk and opportunity identification

Guiding question:

What are the corresponding risks and opportunities for our organisation?

Table 10 provides a list of illustrative nature-related physical and transition risks for the apparel, accessories and footwear sector.

Risks

Table 10: Illustrative nature-related risks for the apparel, accessories and footwear sector

Risk type		Illustrative risk in the apparel, accessories and footwear sector	Magnitude indicator
Physical, transition or systemic-type risk	**Risk category**		
Physical risk	Acute risk	Landslides as a result of declining soil stability damage infrastructure. Increased risk of damage from floods and storms if protective terrestrial ecosystems are degraded. Wildfires, tropical cyclones, extreme heat and other extreme weather events damage infrastructure or interrupt business activities. Decreased precipitation resulting in the disruption of water flows, affecting a number of processes (e.g. dyeing, washing). Droughts affect agricultural production.	Increased operational costs due to interruption of operations/supply chain, including reduced productivity. Increased closure and rehabilitation costs (degradation in soil quality, insufficient material balance). Write-offs and early retirement of existing business assets. Decline in value of business assets due to availability of natural resources that may sustain continuity. Increased insurance costs.
Physical risk	Chronic risk	Changes in regulating and maintenance ecosystem services (e.g. water purification, waste remediation). Changes in weather patterns that may affect the availability of water for crops and production processes.	Changes in the condition of ecosystems on which the organisation is dependent. Quantity and concentration of pollutants emitted leading to a change in species abundance and population numbers of keystone species.

Risk type		Illustrative risk in the apparel, accessories and footwear sector	Magnitude indicator
Physical, transition or systemic-type risk	**Risk category**		
		Decrease in the supply of natural inputs (timber, cotton) for materials production. Changes in the quality of natural inputs for materials production, e.g. climate change can negatively affect cotton fibre length.[12] Increase in the amount of microplastics in the waterways and oceans due to the regular washing of synthetic or blended fabrics. Genetic modification technologies, while potentially able to deliver efficiency and productivity gains, carry risks to biodiversity if not appropriately managed. Depleted aquifers (underground water reserves) caused by intensive groundwater pumping for irrigation pose a threat to biodiversity and to the availability of water supply to grow essential crops (e.g. cotton).[13] Decreases in water quality if runoff includes fertilisers, pesticides and livestock effluents that pollute waterways and groundwater.	Increased capital expenditure on adaptation (e.g. mechanical or hand pollination). Reduction in revenue due to interruptions of operations/supply chain. Restoration costs.
Transition risk	Policy and legal	Changes to legislation/regulation aimed at achieving nature-positive outcomes (trade restrictions, taxes), leading to more stringent nature-related reporting obligations. Regulatory risks from potential changes to water costs, access rights or social license to operate.[14]	Increased costs of operations, inputs, personnel and monitoring of activities required. Increased compliance costs. Clean up costs.
Transition risk	Market	Shifting customer/investor values or preferences to fashion products and/or services that help avoid and reduce negative impacts on nature	Reduction in revenue due to lower demand for products and services.

[12] Dai et al. (2017) Simulative global warming negatively affects cotton fiber length through shortening fiber rapid elongation duration.
[13] Textile Exchange (2023) Biodiversity landscape analysis.
[14] Planet Tracker (2024) Ripple effects – quantifying water risks in the apparel supply chain.

Risk type		Illustrative risk in the apparel, accessories and footwear sector	Magnitude indicator
Physical, transition or systemic-type risk	**Risk category**		
		and contribute to nature-positive outcomes. Changes to costs of materials. Decline in brand and value proposition due to nature performance being perceived as worse than competitors.	Loss of market share and investor goodwill. Costs related to substituting existing products and services.
Transition risk	Reputational	Reputational risks from adverse coverage of a brand's water impacts.[15] Reputational risks due to declines in water availability, as crops such as cotton are seen as competing with food crops for land. Reputational risks due to soil degradation caused by conventional cotton cultivation.	

Opportunities

Table 11 provides a list of illustrative nature-related opportunities for the apparel, accessories and footwear sector.

Table 11: Illustrative nature-related opportunities for the apparel, accessories and footwear sector

Opportunity type	Illustrative opportunity in the apparel, accessories and footwear sector	Magnitude indicator
Ecosystem restoration, protection and regeneration	Implementation of nature-based solutions. Regenerative production practices used on depleted land have the potential to improve the condition of ecosystems and sequester carbon. Investment in natural flood management activities upstream of quarries, extraction areas or roads to prevent flooding of the organisation's assets.	Restoration of areas of degraded land. Improvement in ecosystem extent and condition and species abundance and extinction risk. Transmission mechanisms to business performance benefits through reputational capital leading to increased capital flow and financing.

[15] Planet Tracker (2024) Ripple effects – quantifying water risks in the apparel supply chain.

Opportunity type	Illustrative opportunity in the apparel, accessories and footwear sector	Magnitude indicator
	Direct and indirect restoration and conservation of ecosystems, habitats and species. Integrated multi stakeholder action at land and jurisdictional scale. Protection, conservation and sustainable use and management of threatened species.	
Resource efficiency	Transition to processes with increased positive impacts on nature, including those with increased efficiency and reduced resource extraction (water, timber, plants). Transition to efficient and circular production systems and value chains. Circular design approaches include: • During use – durability/longevity, reusability, repairability; and • End of use – disassembly, design for remanufacture/refurbishment, recyclability, compostability.[16] Diversification of use of nature-related resources. The need for virgin resources is minimised by increasing the use of existing products and materials. Transition to next-generation materials containing agricultural residue, pre and post-consumer waste or other innovative sources (e.g. fungi, bacteria, CO_2).	Reduced exposure to raw material and natural resource price volatility. Increased market valuation through resilience planning. Tax benefits for certifications. Increased resilience to reduction in availability of natural resources.
Products and services	Use of owned or managed environmental assets to create or enhance ecosystem services that may be monetised (e.g. natural flood risk management). Resource efficient products, circular production systems, nature-based solutions and business models that benefit nature (e.g. sustainable wild	Increased resilience due to business diversification. Reduced costs of raw materials and production inputs. Increased market valuation through resilience planning.

[16] EMF (2022) Circulytics indicators, see Circulytics indicator 6d, p30.

Opportunity type	Illustrative opportunity in the apparel, accessories and footwear sector	Magnitude indicator
	plant collection, regenerative agriculture). The creation of new clothing rental models such as subscription models or personal shopper experiences taking changing customer needs into consideration – examples include short-term use, practical requirements or fast evolving fashion preferences. The transition to innovative resale models and partnerships to make resale attractive to a wide range of customers and capture the value of the increasing average quality and durability of clothing on the market. Indeed, resale has grown 21 times faster than retail over the past five years and 56 million women bought second-hand products in 2018, up from 44 million in 2017.[17] The introduction of more clothing care services, such as garment restyling or consulting; advice on upgrades, customisation and at home mending; repair and other services in-store; and the formation of partnerships with repair and restyle providers based in local communities. The introduction of new sales models such as order by demand or just in time manufacturing to reduce stocks.	
Reputational capital	Collaborative engagement with stakeholders at local, national and international levels, including Indigenous Peoples and Local Communities. Actions that create positive changes in sentiment towards the organisation/brand due to positive impacts on environmental assets and ecosystem services that have impacts on society and local economic capabilities.	Increase in revenue due to improved reputation. Increase in brand value. Reduced costs due to engagement of suppliers and stakeholders.

[17] Ellen McArthur Foundation Fashion and the circular economy – deep dive.

Opportunity type	Illustrative opportunity in the apparel, accessories and footwear sector	Magnitude indicator
Sustainable use of natural resources	Reuse and recycling of natural resources, including opportunities for the increase in recycled fibres for apparel manufacture. Certification for projects, products and services.	Reduced resource extraction, pollution and waste. Through redesign, materials or substances that would become waste are eliminated, become feedstock for another production process, or are safely returned to the biosphere. Transmission mechanisms to business performance benefits through reputational capital leading to increased capital flow and financing.

A2: Adjustment of existing risk mitigation and risk and opportunity management

Guiding questions:

What existing risk and opportunity management processes and elements are we already applying?

How can risk and opportunity management processes and associated elements (e.g. risk taxonomy, risk inventory and risk tolerance criteria) be adapted?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

A3: Risk and opportunity measurement and prioritisation

Guiding question:

Which risks and opportunities should be prioritised?

Organisations should consider the following dependencies that may create material nature-related risks and opportunities for this sector:

- Soil degradation in connection with cotton;
- Water availability in countries with high water stress, for both crops (where irrigated) and processing, in connection with availability, cost increases, and reputational risks and opportunities; and
- Any other material nature-related risks or opportunities arising from the organisation's impacts and dependencies on nature.

A4: Risk and opportunity materiality assessment

Guiding question:

Which risks and opportunities are material and therefore should be disclosed in line with the TNFD recommended disclosures?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

2.5. Prepare to respond and report

This section provides additional considerations to help apparel, accessories and footwear industry organisations with the Prepare phase of the LEAP approach.

P1: Strategy and resource allocation plans

Guiding question:

What risk management, strategy and resource allocation decisions should be made as a result of this analysis?

Table 12 maps a non-exhaustive list of actions in the apparel, accessories and footwear sector based on TNFD's interpretation of SBTN's AR3T framework (and pending alignment with future development of SBTN's Step 4 guidance), which covers mitigation hierarchy principles when determining responses to identified nature-related issues.

Figure 4: SBTN's AR3T framework

Table 12: Illustrative priority and transformative actions for the apparel, accessories and footwear sector mapped to the AR3T framework

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
Climate change	Refer to the SBTi-FLAG Guidance.	SBTi-FLAG Guidance					
Land-use change	For new developments, avoid all protected areas, internationally recognised areas, critical habitat (including but not limited to Natura 2000 sites or geography-specific equivalent						

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	network or standard) and areas with the potential to become protected by countries under updated National Biodiversity Strategies and Action Plans (NBSAPs).						
	Implement policies and commitments to reduce or eliminate agricultural-driven natural ecosystem conversion with specified targets and cut-off dates for the organisation's own production, sourcing of animal feed and products sourced for aggregation, processing or trade. For example, set zero deforestation targets for no later than 2025 in accordance with the Accountability Framework Initiative, or for leather, abide by the Deforestation-Free Call to Action for Leather and commit to sourcing bovine leather from deforestation/conversion-free supply chains by 2035 or earlier.	GRI 13, (2022); SBTN targets for Land; SBTi FLAG Guidance; TNFD food and agriculture guidance; Deforestation-Free Call to Action for Leather.					
	Create a soil management plan that identifies the main threats to soil health, describes soil management practices used and outlines an approach to input optimisation, including the use of fertilisers.	GRI 13 (2022); TNFD food and agriculture Guidance.					
	Establish a plan with time-bound targets to reduce excess fertiliser use intensity per fertiliser nutrient type (N, P2O5, K2O) with an open methodology for the specific production system.	FAO (2021); related to GBF target 7; TNFD food and agriculture guidance.					
	Invest in precision technologies to increase nutrient use efficiency and decrease runoff and eutrophication, as well as technologies for nutrient recycling and organic fertilisers.	TNFD food and agriculture guidance.					
	Invest in pesticide efficiency technologies and environmentally friendly pest control.	FAO (2021); TNFD food and agriculture guidance.					
	Develop and adhere to an Integrated Pest Management Plan, in line with best practices	FAO (2021); TNFD food and					

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	from the International Code of Conduct on Pesticide Management, to prevent, mitigate and remediate negative impacts associated with the use of hazardous pesticides and excess pesticide use.	agriculture guidance.					
	Support developments of nature-based solutions for water quality and flood risk management in river catchments containing the organisation's operations. Support other nature restoration projects in the organisation's areas of influence.	WEF					
	Invest in rewilding/regeneration initiatives, such as natural vegetation in cropped landscapes, rewilding, flower strips and tree cover on crop land.	TNFD food and agriculture guidance.					
	Increase fibre value by branding its geographic origin and its regenerative landscape management practices, similar to food and its ingredients.						
	Implement strategies to manage the use of genetically modified organisms (GMOs).	SASB: Agricultural Products (2018)					
Resource use/replenishment: water use	Illustrative examples of quantifiable, actionable and time-bound targets: • Substantially increase water-use efficiency across processes, with specified targets and cut-off dates. • Reduce water use in high water impact parts of the value chain with specified targets and cut-off dates. • Increase water reuse by treating and recycling wastewater generated during production processes for non-potable purposes such as cleaning or irrigation, or by implementing	WEF, SBTN					

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	rainwater harvesting systems.						
Resource use/replenishment	Improve transparency on substances used in production processes to increase accountability for the materials used to make products, demonstrate the health of supply chains and reduce reputational risk.						
	Organisations can follow the Ellen MacArthur Foundation's principles on the **waste hierarchy**, where keeping products in use through rental, repair, reuse and remaking activities, should be prioritised over recycling.[18] When designing products, follow **circular economy principles,**[19] such as: **In the use phase**: Designed for **maintenance, longevity and durability** in such a way that encourages longer use than the industry standard in practice and at scale (e.g. marketing repair rather than replacement, timeless design with durable material choices) and in such a way that does not compromise circular treatment at the end of functional life; Designed for **reusability** in such a way that ensures actual reuse in practice and at scale (e.g. secondary markets, packaging reuse systems, standardised design); and Designed for **repairability** in such a way that uses existing systems for repair in practice and at scale (e.g. network of	OECD WEF Ellen MacArthur Foundation (2020) Vision for a circular economy for Fasion EMF (2022) Circulytics indicators					

[18] The waste hierarchy is illustrated by the OECD (OECD Circular economy – waste and materials) and Ellen MacArthur Foundation The butterfly diagram: visualising the circular economy.
[19] EMF (2022) Circulytics indicators, Circulytics indicator 6d p30.

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	repair shops or own repair service). Examples of design choices include modular design; built in predictive maintenance sensors, repair diagnostics; designs with right to repair by third parties; designs for remanufacturing; using standardised components across a sector. **At the end of functional life:** Designed for **disassembly** (e.g. product-component passports, modular design, reversible connections); Designed for **remanufacturing/refurbishment** (e.g. modular design); Designed for **recycling** (e.g. low materials complexity, low toxicity, ease of separating materials), in such a way that uses existing recycling systems that operate in practice and at scale; and Designed for **nutrient recirculation** that meets the qualifying conditions[20] (e.g. composting and anaerobic digestion) in such a way that uses systems in practice and at scale.						
	Make business models that keep products in use at their highest value – like rental and recommerce – the norm across the industry, decoupling its economic development from resource consumption. Adopt business models and partnerships such as short-term clothing rental models, resale	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fashion WEF					

[20] See Circulytics indicator 6d p.31 for the qualifying conditions. EMF (2022) Circulytics indicators

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	models and clothing care models. Examples include garment restyling or consulting; advice on upgrades, customisation and at home mending; repair and other services in-store; and the formation of partnerships with repair and restyle providers based in local communities.						
	Ensure all products that are made are used – excess inventory should be minimised and never destroyed.	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fasion WEF					
	Empower users and customers with the necessary knowledge, tools and services to maintain the physical and emotional appeal of their products.	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fashion WEF					
	Contribute to the support of infrastructure to ensure the organisation's products are collected and reused, remade or recycled in practice.	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fashion WEF					
	Illustrative examples of quantifiable, actionable and time-bound targets: • Set specified targets and cut-off dates to reduce extinction threat to species; • Avoid sourcing from areas of high species extinction risk; • Support these species' restoration.	TNFD, SBTN					
Pollution removal: Soil and	Adopt collaborative industry-led practices such as ZDHC's Roadmap to Zero to eliminate	EMF (2017) A new textiles					

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
water pollutants	harmful chemicals from fashion's global value chain, that include: The ZDHC Man-Made Cellulosic Fibres (MMCF) Guidelines, which support the MMCF supply chain in implementing industry best practices in sustainable chemical management, wastewater and air emissions, detailing performance criteria to monitor progress and track continuous improvement; The ZDHC Manufacturing Restricted Substance List (MRSL), which provides a continually-updated list of harmful substances. This restricts the intentional use of harmful substances and enables the manufacturing processes in the apparel, textile, leather and footwear industries to switch to safer, more sustainable alternatives, using the ZDHC Gateway. The ZDHC Wastewater Guidelines, which set a single, globally unified expectation across the apparel, textile, leather and footwear industry supply chain for industrial wastewater and sludge. They define the guidelines for wastewater discharge, sludge quality and disposal pathways. The ZDHC CMS Framework, which provides the apparel, textile, leather and footwear industry with a set of best practices and requirements for sustainable chemical management within the supply chain. The Apparel and Footwear International RSL Management (AFIRM) Group additionally lists restricted substances found in finished products - AFRIM Restricted Substances List.	economy: redesigning fashion's future ZDHC Guidelines AFRIM Restricted Substances List WEF					

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	Larger brands often have their own Restricted Substance List (RSL), but harmonisation and the adoption of a common RSL and MRSL could more rapidly eliminate the most hazardous substances by simplifying the requests placed on manufacturers.						
	Improve transparency on chemicals used across the supply chain to help phase out the most polluting substances.	EMF (2017) A new textiles economy: redesigning fashion's future WEF					
	Preferentially source and use non-virgin material and, where not possible, renewable and regeneratively sourced virgin materials.	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fashion WEF					
Pollution removal: Plastic pollution	Engage with and adopt tools developed by the Microfibre Consortium.	The Microfibre Consortium					
	Research and investigate the release of microfibres in waterways during the use phase of products and explore and implement mitigation actions and/or alternative materials accordingly.	TNFD					
	Align with the Ellen MacArthur's Global Commitment on plastics with any of the following measurable targets: • Set specified targets and cut-off dates to decrease the use of virgin plastic in packaging (weight of undertakings' virgin plastic packaging in million metric tonnes (MMT)).	Ellen MacArthur's Global Commitment on plastics.					

Impact driver	Example of response actions	Global framework alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	• Set specified targets and cut-off dates for ensuring 100% of the organisation's plastic packaging is reusable, recyclable or compostable. • Set specified targets and cut-off dates to increase the share of post-consumer recycled content across all packaging used. • Set specified targets and cut-off dates eliminate all problematic or unnecessary plastic packaging.						
Pollution removal: soil pollutants	Drive collective innovation efforts to develop and scale safe material products and production processes, free from unrecommended chemicals.						
	Design innovative business models to improve end-of-life prospects of apparel, textiles and accessories, such as in-store repair offers, recycling models and waste management strategies.	Ellen MacArthur Foundation (2020) Vision for a circular economy for Fashion					
	Encourage a move towards sustainable agriculture across the value chain: create a soil management plan that identifies main threats to soil health, describes soil management practices used and outlines an approach to input optimisation, including the use of fertilisers.	TNFD food and agriculture guidance					
	Establish a plan with time-bound targets to reduce excess fertiliser use intensity per fertiliser nutrient type (N, P_2O_5, K_2O) with an open methodology for the specific production system.	TNFD food and agriculture guidance					
	Invest in precision technologies to increase nutrient use efficiency and decrease runoff and eutrophication, as well as technologies for nutrient recycling and organic fertilisers.	TNFD food and agriculture guidance					

Box 2: The circular economy

The Ellen MacArthur Foundation describes the three principles of a circular economy:[21]

1. Eliminate waste and pollution

Substances that are of concern to health or the environment are designed out and no pollutants such as plastic microfibres are inadvertently released into the environment and ocean. With a focus on design, the concept of waste can be eliminated. Many products could be circulated by being maintained, shared, reused, repaired, refurbished, remanufactured, and, as a last resort, recycled. This also means adopting reusable packaging or using less packaging.

2. Circulate products and materials at their highest value.

This means keeping materials in use, either as a product or, when the product can no longer be used, as components or raw materials, which eliminates the production of waste and retains the intrinsic value of products and materials.

Circular business models require accelerating necessary systems-level action and infrastructure to keep products in use. It could include business models based on sharing, so users get access to a product rather than owning it and more people get to use it over time. It could involve reuse through resale. It could mean cycles of maintenance, repair and refurbishment.

3. Regenerate nature

By shifting the economy from linear to circular, the focus is shifted from extraction to regeneration. Instead of continuously degrading nature, natural capital should be built up. The aim is to adopt farming practices that allow nature to rebuild soils, increase biodiversity and return biological materials to the earth.

P2: Target setting and performance management

Guiding question:

How will we set targets and define and measure progress?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach, which includes additional guidance on target setting in this component P2.

Organisations may wish to refer to the target-setting methods developed by the Science Based Targets Network and the summary guidance on SBTN's methods for setting science-based targets for nature, which the TNFD has co-developed with the Science Based Targets Network (SBTN).

Apparel, accessories and footwear sector organisations wishing to set targets may find it useful to consider:

- World Economic Forum's five priority transformative actions that fashion companies can implement to effectively reduce their dependencies and impacts on nature.
- Setting freshwater targets aligned to the SBTN Freshwater science-based targets.
- Setting land science-based targets aligned to the SBTN Land science-based targets:
  - No conversion of natural ecosystems;
  - Land footprint reduction;
  - Landscape engagement.

[21] Ellen MacArthur Foundation Circular economy principles.

- Setting targets to reduce negative and increase positive impacts on biodiversity. Companies can use SBTN's Biodiversity short paper to address biodiversity within science-based targets for nature. The document introduces a forthcoming detailed analysis of biodiversity coverage in the first release of science-based targets for nature, which will inform the development of further SBTN methods.

P3: Reporting

Guiding question:

What will we disclose in line with the TNFD recommended disclosures?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

P4: Presentation

Guiding question:

Where and how do we present our nature-related disclosures?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

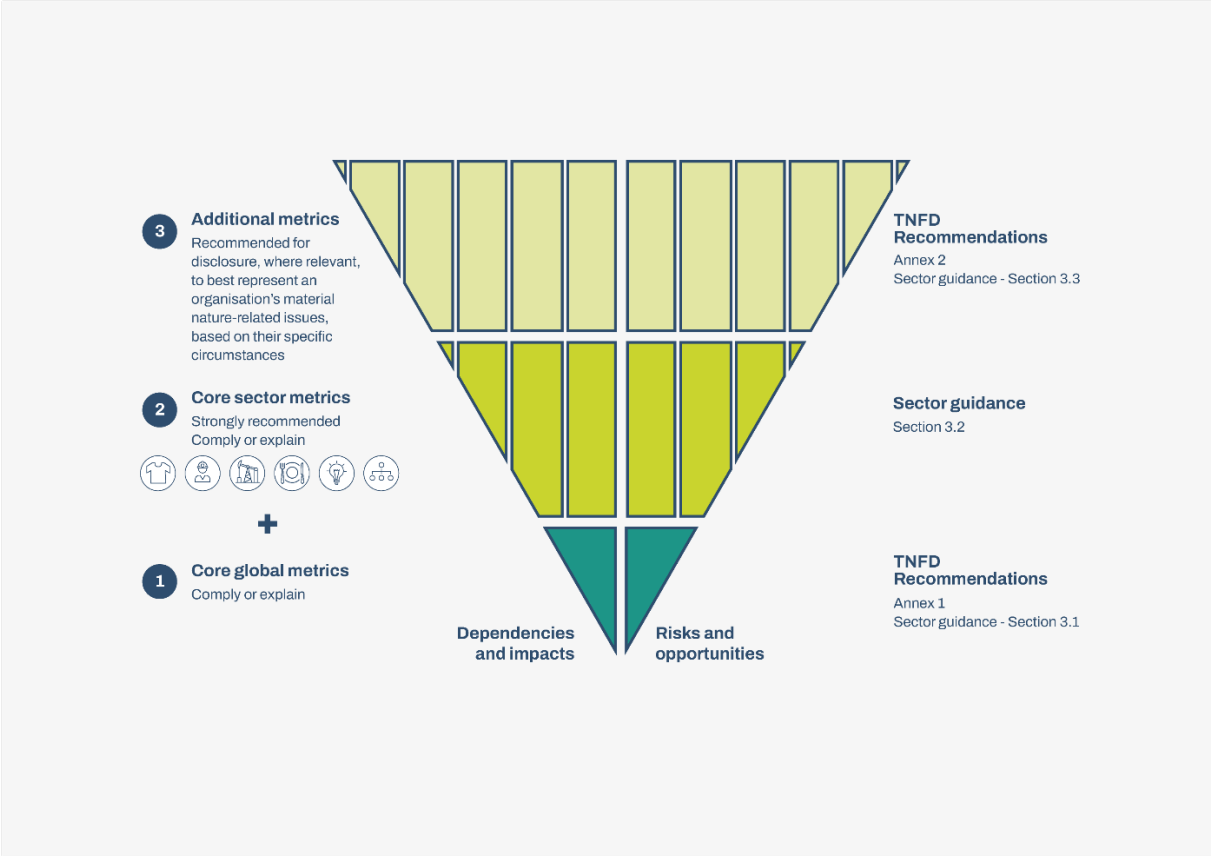
3. Sector-specific disclosure metrics and related guidance – apparel, accessories and footwear

Sector-specific metrics form an important part of the TNFD's measurement architecture (see Figure 5). This reflects the diversity of business models across value chains and their interface with nature across and within sectors. Sector-specific metrics help financial institutions to compare organisations within the same sector, which often face similar nature-related issues.

This section provides the TNFD sector-specific metrics for the apparel, accessories and footwear sector. It includes:

- Guidance on the application of the core global disclosure indicators and metrics to the apparel, accessories and footwear sector (Section 3.1); and
- Core and additional disclosure indicators and metrics for the apparel, accessories and footwear sector (Sections 3.2 and 3.3).

Figure 5: TNFD disclosure measurement architecture



Where available, the TNFD's recommended metrics for disclosure draw from a range of existing standards and frameworks including the IFRS Sustainability Disclosure Standards, Sustainability Accounting Standards Board (SASB) Standards, GRI Standards, the CDP disclosure platform, the Kunming-Montreal Global Biodiversity Framework and other relevant UN frameworks, ESRS and others. A number of organisations, including standard-setting organisations, continue to work on identifying relevant sector-level assessment and reporting metrics. The Taskforce recommends that report preparers stay engaged with year-on-year progress on these developments and implement the latest definitions within their risk management processes and disclosures. The TNFD is working closely with standard-setting organisations and others and will periodically update this guidance on recommended sector metrics for disclosure in line with these ongoing initiatives.

Organisations in the apparel, accessories and footwear sector should refer to Annex 1 of the TNFD Recommendations for further information on the core global disclosure metrics. As outlined in the TNFD Recommendations, core global disclosure metrics should be reported on a comply or explain basis, with the exception of the placeholder metrics.

Where organisations are unable to report against any of the core global metrics, they should provide a short explanatory statement as to why they have not reported those metrics. An organisation should report on the core global disclosure metrics unless:

- It has not been identified as relevant and material to the organisation, e.g. not relevant to business activities or the location the organisation is operating in, or not found to be a material issue for the organisation; or
- It has been identified as relevant and material, but the organisation is unable to measure it due to limitations with methodologies, access to data or because the information is commercially sensitive. In this case, organisations should explain how they plan to address this in future reporting periods.

Companies should report on the same basis for the core sector disclosure metrics outlined in Section 3.2.

Organisations are also encouraged to draw on the TNFD additional sector disclosure indicators and metrics outlined in Section 3.3 and any other relevant metrics to represent most accurately the organisation's nature-related dependencies, impacts, risks and opportunities.

3.1. Proposed guidance on the application of the core global disclosure metrics

This section provides guidance, where relevant, on how to apply the TNFD core global disclosure metrics in the apparel, accessories and footwear sector. If no further sector specific guidance is provided, organisations should refer to the core global disclosure metrics.

As outlined above, core global disclosure metrics should be reported on a comply or explain basis following the guidance for the apparel, accessories and footwear sector where provided.

For the placeholder indicators on invasive alien species and the state of nature, the TNFD encourages organisations to consider and report against these indicators where possible, but are not expected on a comply or explain basis. There are not yet widely accepted metrics for these indicators, but the Taskforce recognises their importance, and will continue to work with knowledge partners to develop further guidance on these metrics.

Table 13: Proposed guidance on the application of the core global disclosure metrics

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
Driver of nature change: Climate change				
	GHG emissions	Refer to IFRS S2 Climate-related Disclosures.	No further guidance.	IFRS
Driver of nature change: Land/freshwater/ocean-use change				
C1.0	Total spatial footprint	Total spatial footprint (km^2) (sum of): • Total surface area controlled/managed by the organisation, where the organisation has control (km^2); • Total disturbed area (km^2); and • Total rehabilitated/restored area (km^2).	In reporting this core global disclosure metric, an organisation should include: • Total surface area controlled/managed or sourced from (km2); • Total disturbed area (km2); and • Total rehabilitated/restored area (km2).	TNFD

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C1.1	Extent of land/ freshwater/ocean-use change	Extent of land/freshwater/ocean-use change (km^2) by: • Type of ecosystem[22], and • Type of business activity.	In reporting this core global disclosure metric, an organisation should include: • Agriculture-driven terrestrial natural ecosystem conversion, including, at least, conversion of primary forests, other naturally regenerating (second-growth) forests, savannahs, grasslands, and freshwater natural ecosystems, linked to land owned, leased, operated, financed or sourced from; and • Natural ecosystem conversion driven by other activities for fibre production e.g. oil extraction, including, at least, conversion of primary forests, other naturally regenerating (second-growth) forests and freshwater natural ecosystems, linked to land owned, leased, operated, financed or sourced from. An organisation should refer to the TNFD Glossary for definitions of forest, conversion, deforestation and plantation forests. An organisation may provide information additional to the IUCN Global Ecosystem Typology (GET) to define the type of ecosystem they refer to, such as regional or local classifications.	Refer to Food and agriculture metrics
		Extent of land/freshwater/ocean ecosystem conserved or restored (km^2), split into: • Voluntary; and • Required by status or regulators.	In reporting this core global disclosure metric, an organisation should include area of forest, wetland, savannah and grassland conserved and/or restored/ reforested/rewetted in direct operations or in the supply chain of the organisation, noting if it is in a way that is likely beneficial to wildlife (e.g. with native plantations). An organisation should report area conserved and restored separately, if data is available.	Refer to Food and agriculture metrics

[22] When disclosing on ecosystem types, refer to the International Union for Conservation of Nature Global Ecosystem Typology.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C1.1	Extent of land/ freshwater/ocean-use change	Extent of land/freshwater/ocean ecosystem that is sustainably managed (km^2) by: • Type of ecosystem,[23] and • Type of business activity.	In reporting this core global disclosure metric, an organisation should include: • The area covered by landscape-level initiatives that the company contributes to, including the financial contribution of the company; and • The area managed or sourced from that deploys practices with measurable regenerative outcomes, including the definition of regenerative used for disclosure. Regenerative practices may be considered to have started when a baseline has been undertaken for the organisation to track regeneration of environmental assets.	Refer to Food and agriculture metrics
Driver of nature change: Pollution/pollution removal				

[23] When disclosing on ecosystem types, refer to the International Union for Conservation of Nature Global Ecosystem Typology.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C2.0	Pollutants released to soil split by type	Pollutants released to soil (tonnes) by type, referring to sector-specific guidance on types of pollutants.	In reporting this core global disclosure metric in direct operations and upstream, an organisation should include the following pollutants: • Pesticides used by toxicity hazard level (either extremely hazardous, highly hazardous, moderately hazardous, slightly hazardous, or unlikely to present an acute hazard) against baseline. • Nitrogen balance: [24] • Nitrogen input from livestock manure and fertilisers; and • Nitrogen output. • Phosphorus balance: • Phosphorus input; • Phosphorus output; • If relevant, balances for potassium and other nutrients (e.g. micronutrients); and • Hydrocarbons (including oil and grease).	Refer to Food and agriculture metrics.

[24] It is recognised that N and P are nutrients and only become pollutants when applied in excess. See TNFD Food and agriculture guidance.

C2.1	Wastewater discharged	Volume of water discharged (m_3), split into: • Total • Freshwater; and • Other.[25] Including: • Concentrations of key pollutants in the wastewater discharged, by type of pollutant, referring to sector-specific guidance for types of pollutants; and Temperature of water discharged, where relevant.	In reporting this core global disclosure metric, an organisation should include the pollutants in its direct operations and upstream that are listed on the Zero Discharge of Hazardous Chemicals (ZDHC) programme's Manufacturing Restricted Substance List (MRSL), [26] such as: • Allergenic Disperse Dyes; • Anti-microbials and Biocides; • Total heavy metals; • Organotin Compounds; • Perfluorinated and Polyfluorinated Chemicals (PFAS); • Bisphenol A (BPA); • Phenols; and • Phthalates – including all other esters of ortho-phthalic acid. In reporting this core global metric, an organisation should also report the following pollutants in its direct operations and upstream: • Microfibres; • Hydrocarbons (including oil and grease); • Nutrients (nitrogen and phosphorus);[27] • Pesticides; • Organic loading (including crop and livestock excreta);	Adapted from TNFD Food and agriculture metrics, FAIRR Index, FAO (2017); Zero Discharge of Hazardous Chemicals (ZDHC) programme's Manufacturing Restricted Substance List (MRSL); adapted from SASB CG-AA-250a.1.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
			• Pathogens; • Other and emerging pollutants (including antimicrobials and other veterinary medicines).	

[25] Freshwater: (≤1,000 mg/L Total Dissolved Solids). Other: (>1,000 mg/L Total Dissolved Solids). Reference: GRI (2018) GRI 303-4 Water discharge.
[26] Organisations can refer to the 4S CHEM protocol to check the compliance level of the chemicals used in their production process with ZDHC.
[27] Agricultural water pollutants in wastewater should only include pollutant concentrations measured in cleaning and operations wastewater discharged from farms, livestock cleaning operations, processing plants, factories etc., and should not include agricultural runoff concentrations.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C2.2	Waste generation and disposal	Weight of hazardous and non-hazardous waste generated by type (tonnes), referring to sector-specific guidance for types of waste. Weight of hazardous and non-hazardous waste (tonnes) disposed of, split into: • Waste incinerated (with and without energy recovery); • Waste sent to landfill; and • Other disposal methods. Weight of hazardous and non-hazardous waste (tonnes) diverted from landfill, split into waste: • Reused; • Recycled; and • Other recovery operations.	In reporting the core global disclosure metric "weight of hazardous and non-hazardous waste (tonnes) diverted from landfill", an organisation should disclose in line with the waste hierarchy: • the weight (tonnes) and proportion (%) of unsold apparel products and fabric waste by type in the company's direct operations that are diverted from landfill in line with the waste hierarchy;[28] • the weight (tonnes) and proportion (%) of apparel products by type in the company's direct operations that are kept in use through rental, repair, reuse, and remaking activities in line with the waste hierarchy;[29] • the weight (tonnes) and proportion (%) of unsold apparel products in all selling points that are recycled or donated for reuse; • the weight (tonnes) and proportion (%) of apparel products and fabric waste by type in the company's direct operations that have been diverted due to design choices (i.e. waste designed out). In reporting this core global disclosure metric, an organisation should if applicable refer to the Sustainable Apparel Coalition's Higg Facility Environmental Module (FEM) for types of production hazardous waste (e.g. empty chemical drums and containers, expired/used/unused chemicals).	Sustainable Apparel Coalition (2022); OECD Waste Hierarchy; TNFD

[28] The Waste Hierarchy ranks waste prevention as the most preferred option, and then states that keeping products in use through rental, repair, reuse, refurbishment, re-manufacturing, and remaking activities, should be prioritised over recycling. The waste hierarchy is illustrated by the OECD (OECD: Circular economy – waste and materials) and Ellen MacArthur Foundation (EMF: the butterfly diagram: visualising the circular economy).
[29]The Waste Hierarchy ranks waste prevention as the most preferred option, and then states that keeping products in use through rental, repair, reuse, refurbishment, re-manufacturing, and remaking activities, should be prioritised over recycling. The waste hierarchy is illustrated by the OECD (OECD: Circular economy – waste and materials) and Ellen MacArthur Foundation (EMF: the butterfly diagram: visualising the circular economy).

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C2.3	Plastic pollution	Plastic footprint as measured by total weight (tonnes) of plastics (polymers, durable goods and packaging) used or sold broken down into raw material content.[30] For plastic packaging, percentage of plastics that is: • Reusable; • Compostable; • Technically recyclable; and • Recyclable in practice and at scale.	In reporting this core global disclosure metric, an organisation should include: • total weight (kg/tonnes) of plastic material (primary, secondary and tertiary) used for textile products; For plastic packaging: • weight (tonnes) and proportion (%) of plastic packaging containing virgin plastics; • weight (tonnes) and proportion (%) of plastic packaging containing post-consumer recycled content; • proportion (%) of plastics packaging that is re-usable; compostable; technically recyclable; and recyclable in practice and at scale. In reporting this core global disclosure metric, an organisation should disclose the weight of plastics used in packaging and products (tonnes) commonly classified as problematic (PS, PVC, EPC, multilayer plastic packaging, undetectable carbon black).	TNFD, Ellen MacArthur Global Commitment; Plastic Footprint Network.

[30] Raw material content: % of virgin fossil-fuel feedstock; % of post-consumer recycled feedstock; % of post-industrial recycled feedstock; % of virgin renewable feedstock.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C2.4	Non-GHG air pollutants	Non-GHG air pollutants (tonnes) by type: • Particulate matter $PM_{2.5}$ and/or PM_{10}); • Nitrogen oxides (NO_2, NO and NO_3); • Volatile organic compounds (VOC or NMVOC); • Sulphur oxides (SO_2, SO, SO_3, SO_x); and Ammonia (NH_3).	In determining additional pollutants to report under this core global disclosure metric, an organisation should if applicable refer to the Sustainable Apparel Coalition's Higg Facility Environmental Module (FEM)'s Air Emissions 2022.	SASB and Sustainable Apparel Coalition (2022)
Driver of nature change: Resource use/replenishment				
C3.0	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption[31] (m^3) from areas of water scarcity, including identification of water source.[32]	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

[31] Water consumption is equal to water withdrawal less water discharge. Reference: GRI (2018) GRI 303-5.
[32] Surface water; groundwater; seawater; produced water; third-party water. Reference: GRI (2018) GRI 303-3.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C3.1	Quantity of high-risk natural commodities sourced from land/ ocean/freshwater	Quantity of high-risk natural commodities[33] (tonnes) sourced from land/ocean/ freshwater, split into types, including proportion of total natural commodities.	In reporting this core global disclosure metric, an organisation should include: • Natural fibre or raw material products on the SBTN High Impact Commodity List (i.e. cotton, leather, wool). An organisation should note that for wood products, types refers to biomass, pulp or wood and that it can refer to FAO's classification and definitions of forest products; and • Wild species, indicating what proportion of these represent threatened species listed as vulnerable, endangered and critically endangered on the IUCN red list; and species listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, known as CITES.	SBTN High Impact Commodity List, IUCN Red List of Threatened Species, CITES, TNFD

[33] Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL), species listed as vulnerable, endangered or critically endangered on the IUCN red list, and species listed in appendices I, II and III to CITES.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
		Quantity of high-risk natural commodities[34] (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	In reporting this core global disclosure metric, an organisation should include: • Natural fibre or raw material products on the SBTN High Impact Commodity List (i.e. cotton, leather, wool) certified to a relevant third-party environmental, social, and/or animal welfare standard such as Textile Exchange's Responsible Wool Standard (RWS), Responsible Down Standard (RDS), Responsible Mohair Standard (RMS), Responsible Alpaca Standard (RAS), Global Organic Textile Standard (GOTS), Regenagri; • For forestry and pulp products, an organisation should report on planted forests and native forests respectively. An organisation should provide information on the forest management conditions for the wood or fibre, such as whether these are certified by a broadly recognised third-party certification system with a global presence, such as the Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC) and Sustainable Forestry Initiative (SFI). 'Controlled Wood', 'Controlled Sources' or 'SFI Fiber Sourcing' are excluded. Organisations should refer to the UN FAO definition of 'Sustainable Forest Management' (see TNFD glossary); The organisation should specify which certification applies and the percentages of certified fibres or raw materials by category.	SBTN High Impact Commodity List, adapted from SASB Standards (2023) Apparel, Accessories & Footwear TNFD
Driver of nature change: Invasive alien species and other				

[34] Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL), species listed as vulnerable, endangered or critically endangered on the IUCN red list, and species listed in appendices I, II and III to CITES.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
C4.0	Placeholder indicator: Measures against unintentional introduction of invasive alien species (IAS)[35]	Proportion of high-risk activities operated under appropriate measures to prevent unintentional introduction of IAS, or low risk designed activities.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD
State of nature				
C5.0	Placeholder indicator: Ecosystem condition	For those organisations that choose to report on state of nature metrics, the TNFD encourages them to report the following indicators and to refer to the	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

[35] Due to the measurement of levels of invasive species for organisations being a developing area, the chosen indicator focuses on whether an appropriate management response is in place for the organisation. The additional sets of metrics contain measurement of the level of invasive species within an area. The TNFD intends to do further work with experts to define 'high-risk activities' and 'low-risk designed activities'.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Source
	Placeholder indicator: Species extinction risk	TNFD additional guidance on measurement of the state of nature in Annex 2 of the LEAP approach: • Level of ecosystem condition by type of ecosystem and business activity; • Impacts on mean species extinction risk. There are a number of different measurement options for these indicators. The TNFD does not currently specify one metric as there is no single metric that will capture all relevant dimensions of changes to the state of nature and a consensus is still developing. The TNFD will continue to work with knowledge partners to increase alignment.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

3.2. Proposed core sector disclosure indicators and metrics

The TNFD core sector disclosure metrics for the apparel, accessories and footwear sector are outlined below. These metrics are recommended by the TNFD to be disclosed by all report preparers in the sector on a comply or explain basis.

Table 14: Proposed core sector disclosure indicators and metrics

Metric category	Metric subcategory	Metric No.	Indicator	Proposed core sector metrics	Source
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	AT.C23.0	Percentage of land managed or sourced from that deploys practices with measurable regenerative outcomes	Proportion (%) of land managed or sourced from (for agriculture, grazing and/or forestry) that employs practices with measurable regenerative outcomes, referencing the definition of regenerative agriculture used for disclosure (e.g. from OP2B or Textile Exchange).[36]	Refer to Food and agriculture metrics, related to GBF target 10
Impact driver	Resource use/replenishment	AT.C3.0	Priority materials from recycled sources	Total weight (tonnes) of fibre and materials from recycled sources, by material.	Textile Exchange Corporate Benchmark

[36] The measures start when a baseline has been undertaken for the corporation to track regeneration of environmental assets against, as disclosure data for the metric.

Metric category	Metric subcategory	Metric No.	Indicator	Proposed core sector metrics	Source
Pollution/pollution removal	Plastic Pollution	AT.C2.0	Microfibre release	Weight (tonnes) of synthetic textiles washed and quantity (number) of washings during production. Average mass loss (g/kg) of the original sample weight, using The Microfibre Consortium Test Method for the quantification of fibre release from fabrics during simulated domestic laundering.	Plastic Footprint Network module on microplastics from textile fibres; The Microfibre Consortium

3.3. Proposed additional sector disclosure indicators and metrics

The TNFD additional sector disclosure metrics for the apparel, accessories and footwear sector are outlined below. The TNFD encourages all report preparers in the sector to draw on these and any other relevant metrics where relevant to best represent an organisation's material nature-related dependencies, impacts, risks and opportunities.

Table 15: Proposed additional sector disclosure indicators and metrics

Metric category	Metric subcategory	Metric No.	Indicator	Proposed additional sector metrics	Source
Impact driver	Land/freshwater/ ocean-use change	AT.A1.0	Deforestation and conversion-free products	Percentage of production volume from land owned, leased, managed or sourced from that is determined to be deforestation- and conversion-free (DCF), by product.	Refer to Food and agriculture metrics
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	AT.A23.0	Circular sourcing	Weight (tonnes) and proportion (%) of physical products that are: • Non-virgin products and materials (e.g. using reused and recycled products and materials); • Sourced from by-products/waste streams (e.g. offcuts of a material that has not previously been in a product); • Virgin but renewable and regeneratively produced;[37] • Virgin but renewable and sustainably produced; • None of the above (virgin and not sustainably or regeneratively produced).	Indicator 6a p.28 EMF (2022) Circulytics indicators.

[37] Refer to Indicator 6a (p.28 EMF (2022) Circulytics indicators for a definition of regenerative production for this metric.

Metric category	Metric subcategory	Metric No.	Indicator	Proposed additional sector metrics	Source
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	AT.A23.1	Circularity: use phase	Weight (tonnes) and proportion (%) of physical products designed following use phase circular economy principles.[38]	Indicator 6d p.30-31 EMF (2022) Circulytics indicators.
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	AT.A23.2	Circularity: end of functional life	Weight (tonnes) and proportion (%) of physical products designed following end of life circular economy principles.[39]	Indicator 6d p.30-31 EMF (2022) Circulytics indicators.
State of nature	Ecosystem extent and condition	AT.A5.0	Ecosystem condition	Concentration of key pollutants around key water basins [40] in which the company is operating: nutrients (nitrogen and phosphorus levels), pesticides, organic loading (including crop and livestock excreta), pathogens, metals, other and emerging pollutants (including antibiotics and other veterinary medicines).	Adapted from FAIRR (2022), FAO (2017)

[38] Refer to the TNFD Glossary for a definition of use phase circular economy principles. Based on Indicator 6d p.30-31 EMF (2022) Circulytics indicators.
[39] Refer to the TNFD Glossary for a definition of end of life circular economy principles. Based on Indicator 6d p.30-31 EMF (2022) Circulytics indicators.
[40] Refer to WRI Aqueduct and the WWF Water Risk Filter.

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5. Glossary

In addition to the concepts and definitions provided in the TNFD glossary, the table below outlines concepts detailed in this guidance. The TNFD glossary will be updated with these definitions once the apparel, accessories and footwear sector guidance is finalised, based on market consultation and feedback.

Concept	Definition
Chain of custody (CoC)	Chain of custody ensures that claims about the fibre content in a final product, such as "organically grown" or "recycled," are accurate. The Global Organic Textile Standard (GOTS) and Organic Content Standard (OCS) are examples of standards that employ the chain of custody. Textile Exchange Chain of custody.
End-of-life	Term used for the time at which a product comes to the end of its intended life. The responsible management of a product's end-of-life is a core component of product stewardship. Textile Exchange Glossary.
End-of-life circular economy principles	• Designed for disassembly (e.g. product-component passports, modular design, reversible connections); • Designed for remanufacturing / refurbishment (e.g. modular design); • Designed for recycling (e.g. low materials complexity, low toxicity, ease of separating materials), in such a way that uses existing recycling systems that operate in practice and at scale; and • Designed for nutrient recirculation that meets the qualifying conditions,[41] (e.g. composting and anaerobic digestion) in such a way that uses systems in practice and at scale. EMF (2022) Circulytics indicators, Circulytics indicator 6d, p31.
Fair Trade	A trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalised producers and workers – especially in the South. Fair Trade organisations (backed by consumers) are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade. Fair Trade Advocacy Definition of fair trade.

[41] For qualifying conditions, see Indicator 6d p.31 EMF (2022) Circulytics indicators.

High Impact Commodity	Raw and value-added materials used in economic activities that are known to have material links to the key drivers of biodiversity loss, resource depletion, and ecosystem degradation. Activities associated with high-impact commodities include: extraction of these commodities (e.g., mining, farming), clearing of lands for extraction, processing of commodities (into refined or value-added forms), manufacturing commodities into complex products (with additional inputs), distribution of commodities, and the procurement of commodities (in their raw, value added, or final form). SBTN (2023) Technical guidance for Step 1: Assess.
LCA or life cycle analysis/ assessment	LCA is defined by the ISO 14040 as the compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. Adapted from ISO (2006) 14040:2006 Environmental management — Life cycle assessment — Principles and framework.
Non-virgin materials	Materials that have been previously used. This includes: materials in products that have been reused, refurbished or repaired; components that have been remanufactured; materials that have been recycled. Also referred to as secondary materials. EMF (2021) The circular economy glossary. Ellen MacArthur Foundation.
Recyclability	The ease with which a material can be recycled in practice and at scale. EMF (2021) The circular economy glossary. Ellen MacArthur Foundation.
Recycle	Transform a product or component into its basic materials or substances and reprocessing them into new materials. Embedded energy and value are lost in the process. In a circular economy, recycling is the last resort action. EMF (2021) The circular economy glossary. Ellen MacArthur Foundation.
Traceability	Traceability is the ability to trace a product through all stages of production and processing. The ability to trace a fibre or a material's path through a supply chain is key to ensuring product integrity. Product traceability can be achieved through supply chain mapping. Using a Chain of Custody standard is best practice. Textile Exchange Glossary.
Use phase circular economy principles	• Longevity: Designed for maintenance, longevity and durability in such a way that encourages longer use than the industry standard in practice and at scale (e.g. marketing repair rather than replacement, timeless design with durable material choices) AND in such a way that does not compromise circular treatment at the end of functional life; • Reusability: Designed for multiple uses in such a way that ensures actual reuse in practice and at scale (e.g. secondary markets, packaging reuse systems, standardised design); • Repairability: Designed for repair in such a way that uses existing systems for repair in practice

	and at scale (e.g. network of repair shops, your own repair service). Examples of design choices are: modular design / built in predictive maintenance sensors, repair diagnostics etc. / designed with right to repair by third parties / designed for remanufacturing / using standardised components across a sector; and • Regeneratively grown materials of biological origin. EMF (2022) Circulytics indicators, Circulytics indicator 6d, p31.
Virgin materials	Materials that have not yet been used in the economy. These include both finite materials (e.g. iron ore mined from the ground) and renewable resources (e.g. newly produced cotton). EMF (2021) The circular economy glossary. Ellen MacArthur Foundation.

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