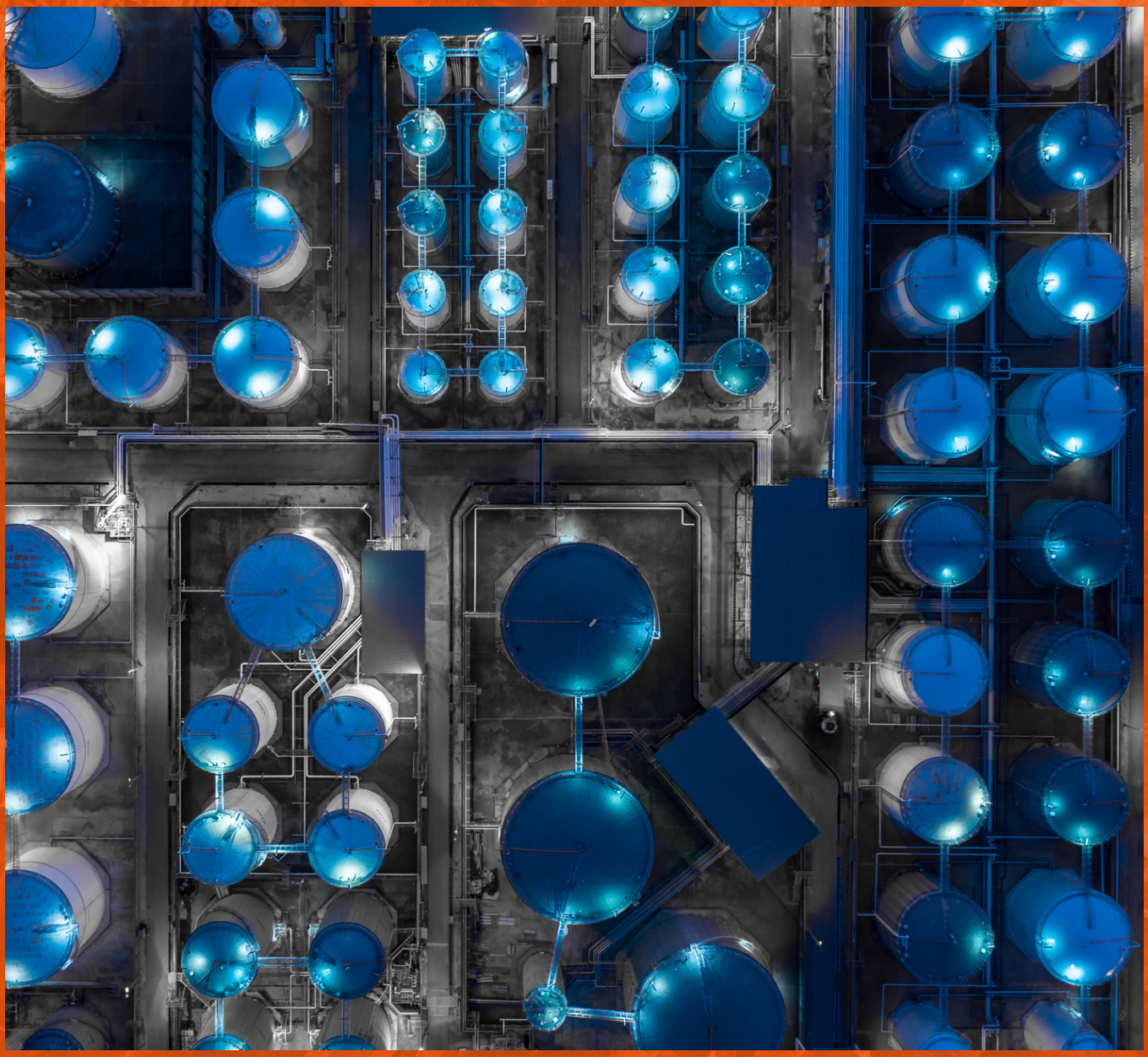


Draft sector guidance
Chemicals

December 2023
For market consultation and feedback

SASB sectors:
Chemicals (RT-CH)

tnfd.global

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 via the TNFD website by 29 March 2024.

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

Introduction

The purpose of this guidance

In September 2023, the TNFD published its recommendations for disclosure of nature-related issues. Accompanying those recommendations is a set of additional guidance, including Guidance on the identification and assessment of nature-related issues: The LEAP approach. The TNFD recognises that there can be significant differences across sectors for corporates applying the LEAP approach. It has published this additional guidance to help chemicals industry 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 Table 1 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 recommended sector disclosure metrics for the chemicals industry, including: 1) guidance on the application of the core global disclosure indicators and 2) recommended core sector disclosure metrics. These complement the disclosure metrics outlined in Annexes 1 and 2 of the TNFD recommendations.

What this guidance covers

This guidance covers those organisations with business models or value chains in the SASB chemicals industry.[1] These are referred to as 'chemicals industry organisations' in this guidance.

1 SASB (2018) SASB's Sustainable Industry Classification System (SICS).

Box 1: Industry in scope of this guidance

Entities in the chemicals industry transform organic and inorganic feedstocks into more than 70,000 diverse products with a range of industrial, pharmaceutical, agricultural, housing, automotive and consumer applications. The industry is commonly segmented into:

- Basic (commodity) chemicals, including bulk polymers, petrochemicals, inorganic chemicals and other industrial chemicals (the largest segment by volume produced);
- Agricultural chemicals, including fertilisers, crop chemicals and agricultural biotechnology; and
- Specialty chemicals, including paints and coatings, agrochemicals, sealants, adhesives, dyes, industrial gases, resins and catalysts.

Larger entities may produce basic, agricultural and specialty chemicals, but most entities are specialised. Chemicals entities typically manufacture and sell products globally.[2]

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.

2 SASB Standards (2023) Chemicals Sustainability Accounting Standard.

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

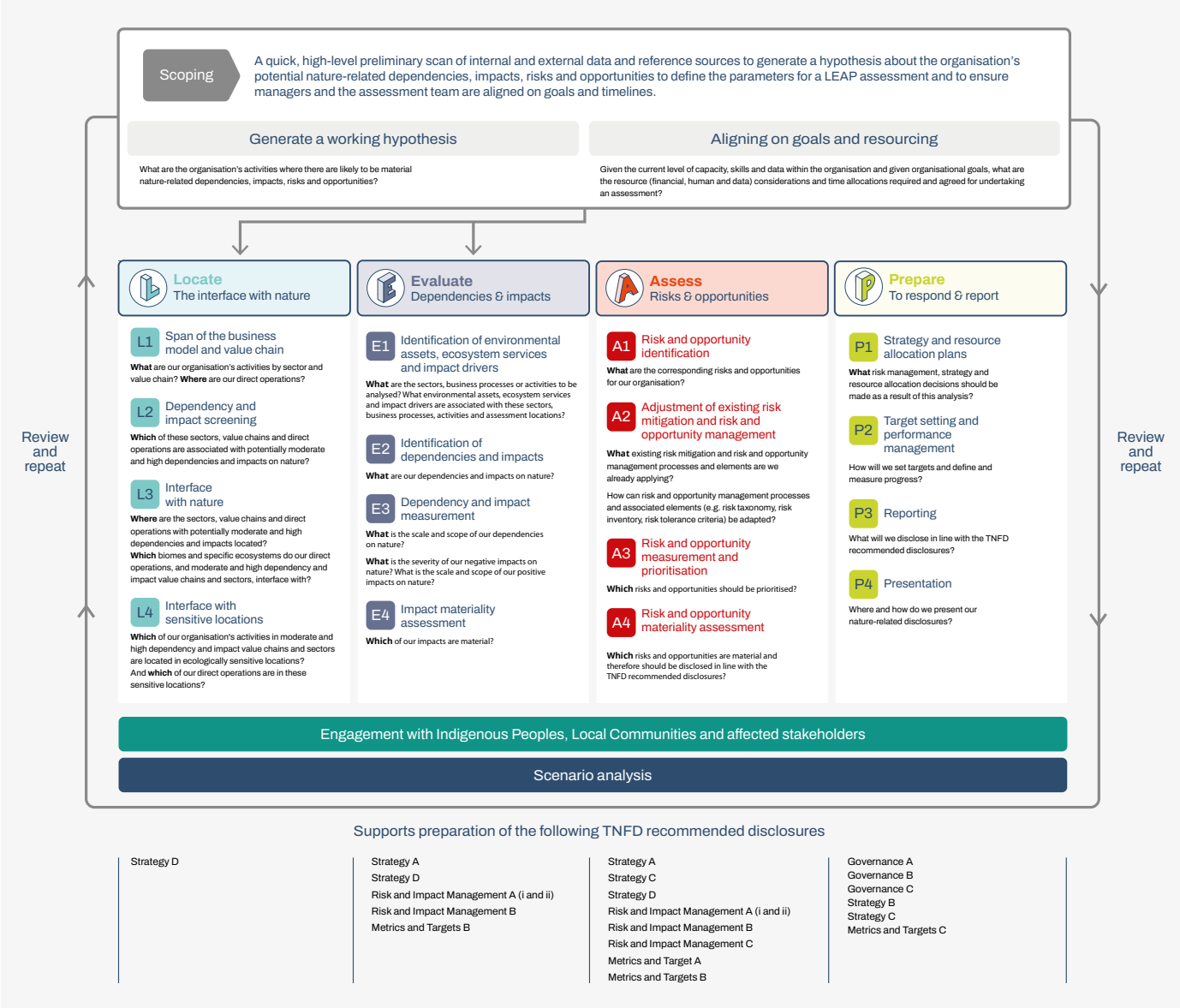


Table 1: Areas of LEAP with additional guidance for the chemicals industry

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

Scoping a LEAP assessment

General working hypothesis:

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

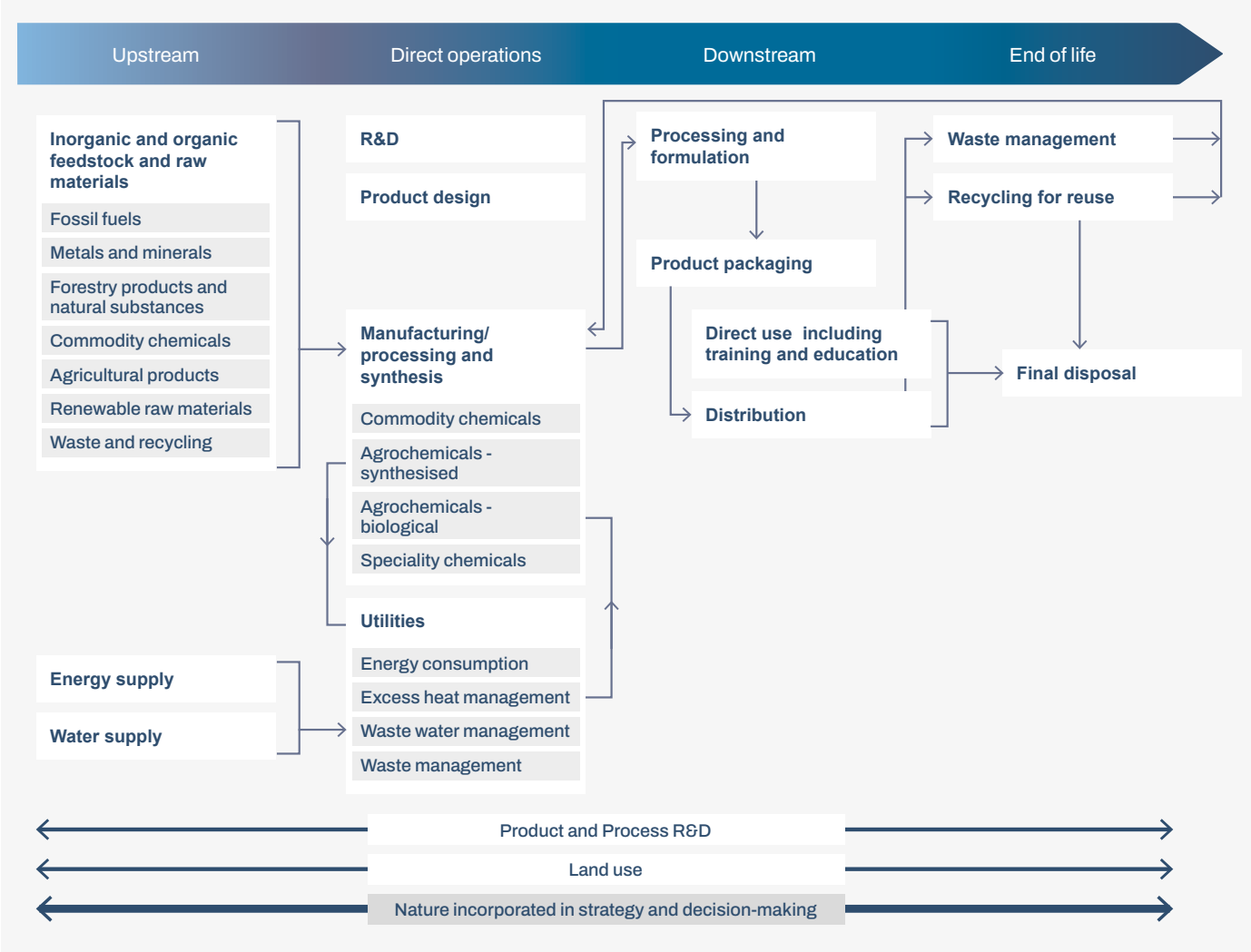
Goals and resource alignment:

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?

The activities and processes in the chemicals value chain that typically have interfaces with nature are presented in Figure 2.[3] Land-use is to be considered in organic feedstock sourcing, building facilities, circularity loops and waste treatment across the value chain including the end-of-life of chemical products. For further guidance on downstream use of agrochemicals, organisations should refer to the TNFD Food and agriculture guidance.

3 Depending on the level of vertical integration of their business activities, organisations may have different components of the value chain from those represented in Figure 2.

Figure 2: Typical activities and processes of chemicals industry value chain



For the value chain assessment, organisations should ensure the widest possible approach when screening areas of potentially material nature-related issues across their value chain. When scoping a LEAP assessment, organisations may want to take account of the system boundaries of their Life Cycle Assessment (LCA) methodologies[4] as determined by regulatory requirements for their operations and/or internal risk management processes. However, organisations should include any elements of the value chain that might produce material dependencies, impacts, risks and opportunities, regardless of whether they sit in or outside LCA system boundaries.

Where activities across the value chain overlap with other sectors, organisations are recommended to refer to the relevant TNFD sector guidance, where available.

4 Life Cycle Assessments (LCA) under the standard ISO 14040:2006 and common methods to measure the life cycle environmental performances of Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF).

Table 2 contains questions that could be used by the chemicals industry to help scope the boundaries for their nature-related assessments.

Table 2: Questions for chemical industry to help scope a LEAP assessment

Direct operations	1. Which stakeholders should you engage with in your direct operations?
Upstream	2. What inorganic and organic feedstock is sourced from areas where there are potentially material dependencies, impacts, risks and opportunities? 3. Which suppliers and other stakeholders should you engage with in your upstream operations? 4. What is your organisation's sphere of control and influence for engagement across your value chain, taking a circular economy approach (i.e. use of post-consumer recycled materials or innovating for recyclability)?
Downstream	5. What are the potentially material nature-related impacts associated with downstream use of the products your organisation produces, sells or finances? What is the geographic scope and what are the likely locations of those potentially material impacts? 6. Which stakeholders should you engage with in your downstream and end-of-life operations?

Locate the organisation's interface with nature

This section provides additional considerations to support chemicals sector 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 should map their value chains and consider that their nature-related dependencies and impacts could be material at the following stages of the value chain, as well as direct operations:

- Upstream, for example, due to extraction of fossil fuels and/or production of bio-based feedstock;
- Downstream, for example, due to use of products by customers and end consumers; and
- End-of-life, due to persistent residues and leaks, if appropriate measures are not taken.

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?

No additional sector-specific guidance identified for L2.

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?

As a general guide and starting point for this analysis, organisations in the chemicals industry typically interface with the following biomes in their direct operations and upstream or downstream value chains:

- Tropical-subtropical forests (T1);
- Temperate-boreal forests and woodlands (T2);
- Shrublands and shrubby woodlands (T3);

- Savannas and grasslands (T4);
- Intensive land-use systems (T7);
- Shoreline systems (MT1);
- Maritime vegetation (MT2);
- Artificial shorelines (MT3);
- Vegetated wetlands (TF1);
- Brackish tidal systems (MFT1);
- Rivers and streams (F1);
- Lakes (F2);
- Artificial wetlands (F3);
- Subterranean freshwaters (SF1);
- Artificial subterranean freshwaters (SF2);
- Coastal inlets and lagoons (FM1);
- Open ocean waters (M2); and
- Deep sea floors (M3).

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

Organisations should 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?

No additional sector-specific guidance identified for L4.

List of datasets and tools

A tool that can help organisations in the chemical industry in the Locate phase is The Nature Conservancy ESII/EI (Field app – ESII Tool).

Organisations should also reference tools in the LEAP guidance and TNFD Tools Catalogue.

Evaluate dependencies and impacts on nature

This section provides additional guidance to help chemicals industry 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?

The definitions and criteria used in impact assessment methodologies and life cycle analysis, such as eco-toxicity or the extent of a producer's responsibility to consider the use and disposal of the chemical products at their end-of-life, may vary, depending on regional and/or regulatory specificities. Organisations should refer to the guidance under E2 for examples of specific environmental assets, ecosystem services and impact drivers.

E2: Identification of dependencies and impacts

Guiding question:

What are our dependencies and impacts on nature?

Table 3 and Table 4 present an illustrative (non-exhaustive) list of significant dependencies and impacts that organisations may consider in their evaluation.[5]

5 WEF (2023) Nature Positive: Role of the Chemical Sector.

Table 3: Significant dependencies on nature of the chemicals sector

Value chain stage	Environmental assets	Ecosystem services	Activities
Upstream Direct operations	Water resources Freshwater ecosystems Subterranean freshwater ecosystems	Provisioning (Water supply)	Freshwater is an essential resource, and freshwater withdrawal and consumption are significant activities for the sector.
Direct operations	Water resources Freshwater ecosystems Subterranean freshwater ecosystems	Regulating and maintenance (Water purification, water flow regulation)	Production processes have water quality-related thresholds. Insufficient freshwater quality leads to additional operational costs such as water treatment.
Upstream	Mineral and energy resources Terrestrial (land based) ecosystems Subterranean terrestrial ecosystems Underwater mineral and energy resources Marine (ocean) ecosystems	Provisioning (Other provisioning services)	The chemicals sector uses fossil resources as raw material for a variety of products. Petroleum products and liquefied natural gas are important feedstocks used in the chemical sector, as they serve as sources of hydrogen and carbon, which are used as raw materials to produce basic chemicals such as ethylene, propylene and ammonia.[6] Many chemicals are also dependent on mined resources.
Upstream	Land Terrestrial (land based) ecosystems Cultivated biological resources Renewable energy resources	Provisioning (Biomass provisioning)	The chemical sector increasingly uses biomass and plant-based raw materials in bio-based feedstock and in energy production.

6 IEA (2023) Tracking Clean Energy Progress 2023.

Table 4: Significant impacts on nature of the chemical sector

Value chain	Drivers of nature change	Impact drivers	Activities
Upstream Direct operations	Climate change	Greenhouse gas (GHG) emissions	The chemical sector is the largest industrial energy consumer and the third largest industry subsector in terms of direct CO_2 emissions. Ammonia production is responsible for the highest share of emissions accounting for 45% of emissions from primary chemical production, followed by methanol (28%) and high-value chemicals (27%).[7] Use of green hydrogen, lower-carbon raw materials and increased energy efficiency through excess heat management can reduce the negative impact on climate and nature.
Upstream	Land/freshwater/ ocean-use change	Land ecosystem use	Substituting petrochemical feedstock with bio-based feedstock requires significant areas of land for production and – if not sustainably produced – this can drive soil degradation, land conversion and deforestation.[8]
Upstream	Resource use/ replenishment	Other resource use	Replacing non-renewable resources with renewable feedstock such as natural biomass-based resources including plant-derived chemical products, food waste, forestry residues enhances waste recycling and reuse, mitigating soil and water pollution.
Upstream Direct operations	Resource use/ replenishment	Water use	Production processes are water-intensive and extensive withdrawal of freshwater can contribute to water scarcity and water stress, affecting water quantity, quality, ecosystem health and water access for both the organisation and other stakeholders. Implementing better water management systems can save water, reduce water consumption and enhance recycling.

7 High value chemicals: ethylene, propylene, benzene, toluene and mixed xylenes. IEA (2023) Tracking Clean Energy Progress 2023.

8 WEF (2023) Nature Positive: Role of the Chemical Sector.

Value chain	Drivers of nature change	Impact drivers	Activities
Direct operations Downstream End-of-life	Pollution/pollution removal	Non-GHG air pollutants Water pollutants Soil pollutants Solid waste	The organisation should refer to the TNFD hazard, risk and vulnerability definitions considering the air, soil and water pollution caused by the persistent chemicals, during manufacturing, and/or downstream use and/or at their end-of-life cycle. Chemicals and associated impacts on nature should be identified as prescribed by international conventions, and the conventions for emerging pollutants (e.g. the PFAS family[9]), for new substances or substances already present for a while in the environment-food-human continuum, but causing a new concern,[10] as well as plastic pellets, flakes or powders considered as one of many sources of micro plastics in the environment.

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?

Table 5 and Table 6 provide additional considerations and examples of assessment metrics to evaluate dependencies and impacts on nature.

9 The OECD Environment Directorate Chemicals and Biotechnology Committee defines PFASs as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–).

10 See HBM4EU Substances.

Table 5: Typical considerations for the chemicals sector regarding the scale and scope of potential dependencies on nature

Value chain	Ecosystem services	Additional considerations	Examples of assessment metrics
Upstream Direct operations	Provisioning (Water supply)	Consider high water consumption and water diversion from critical habitats and reduction in ecosystem services to the organisation and affected stakeholders.	For ecosystem services, measure change in the availability and quality of the ecosystem services; capacity of reservoirs or alternative forms of storage (m^3) otherwise needed to provide same surface, volume (m^3) of diverted water flow.
Upstream	Provisioning (Biomass provisioning)	Consider biomass availability and sourcing from the agricultural sector and forestry as residues and/or direct use, as well as bio-waste and/or sustainably sourced feedstock.	Gross tonnes of biomass by type of biomass and sourcing location (e.g. cultivated plants, residues, bio-waste, sustainably sourced). Area, and yield of area providing crops, by crop type.

Table 6: Typical considerations for the chemical sector regarding the scale, scope and severity of potential impacts on nature

Value chain	Impact drivers	Additional considerations	Example of assessment metrics
Upstream Direct operations	Greenhouse has (GHG) emissions	Consider energy efficiency, renewable energy and increased electricity and bioenergy use over coal and fossil fuel use to produce energy.	Refer to ISSB's IFRS S2 climate-related disclosure standard.
Upstream	Land ecosystem use change	Consider evaluating deforestation/ forest conversion, habitat loss, landslides, fragmentation and biodiversity loss at the landscape level.	Mean Species Abundance; Forest Structural Condition/ Forest Structural Integrity Index; Accounting for Nature Econd®.

Value chain	Impact drivers	Additional considerations	Example of assessment metrics
Upstream Direct operations	Water use	Consider availability of water flow with involvement of local communities and affected stakeholders. Analysis should cover the water needs of the ecosystem. Organisations should also look to align with UN SDG 6 (Clean Water and Sanitation for All), and efforts to protect local water sources and to improve access to clean water for drinking, sanitation and hygiene (WASH).	Water withdrawal and consumption (m^3) from areas of water scarcity, including identification of water source. Total volume of water withdrawal and consumption (m^3). Volume of water replenished to the environment through replenishment programmes (split into total and to areas of water scarcity).
Direct operations Downstream End-of-life	Non-GHG air pollutants Water pollutants Soil pollutants Solid waste	Consider relevant regional and national regulations (see Annex 2 for examples), including existing international conventions, conventions for emerging pollutants (e.g. PFAS[11] family), as well new substances and substances that may already be present in the environment–food–human continuum, but causing a new concern for water and soil pollution.[12]	Pollutants released to soil (tonnes) by types. Concentration of key pollutants in the wastewater discharged, by type of pollutant.

E4: Impact materiality assessment

Guiding question:

Which of the identified impacts are material?

No additional sector-specific guidance identified for E4.

List of datasets and tools

The following tools can help organisations in the chemicals sector with the Evaluate phase of LEAP:

- SimaPro (LCA tool); and
- ReCiPe (LCIA tool).

Organisations should also reference tools in the LEAP guidance and TNFD Tools Catalogue.

11 The OECD Environment Directorate Chemicals and Biotechnology Committee defines PFASs as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–).

12 See HBM4EU Substances.

Assess nature-related risks and opportunities

The chemicals industry is diverse and has complex processes along its value chain. How organisations in the chemicals industry consider and assess their nature-related risks and opportunities will differ based on their activities, products, assets, geographical reach of their operations and the regulatory regimes in which they are operating. This guidance therefore does not provide specific examples of risks and opportunities as these should be assessed based on the organisation's individual operational and organisational context.

Organisations are recommended to refer to TNFD Nature-related Risk and Opportunity Registers as a general guide to frame their material nature-related risks and opportunities in relation to the dependencies and impacts assessed in the Evaluate phase.

A1: Risk and opportunity identification

Guiding question:

What are the corresponding risks and opportunities for our organisation?

No additional sector-specific guidance identified for A1.

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?

No additional sector-specific guidance identified for A2.

A3: Risk and opportunity measurement and prioritisation

Guiding question:

Which risks and opportunities should be prioritised?

No additional sector-specific guidance identified for A3.

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?

No additional sector-specific guidance identified for A4.

Prepare to respond and report

This section provides additional considerations to help chemicals 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 7 maps the priority initiatives in the chemicals industry against the SBTN AR3T framework, which covers mitigation hierarchy principles when determining responses to identified nature-related issues.[13]

Table 7: Typical chemicals industry initiatives mapped against AR3T Framework

	Upstream	Direct operations	Downstream/end-of-life
Avoid and reduce negative impacts	• Use of renewable raw materials and energy	• Process energy efficiency • Creation of energy saving products • Elimination, remediation and minimisation of pollution of water and soil[14] • Wastewater reduction • Waste minimisation • Waste recycling • Freshwater management	• Elimination, remediation and minimisation of pollution at molecular level • Educate and/or incentivise end users for ultimate disposal and/or to prevent waste

13 WEF (2023) Nature Positive: Role of the Chemicals Sector.

14 Communications from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (2021) Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'.

	Upstream	Direct operations	Downstream/end-of-life
Regenerate and restore	• Use of bio-based feedstock • Use of regenerative agriculture to produce bio-based feedstock	• Ecosystem services quantification used to develop opportunities associated with land-use change in direct operations (e.g. nature-based solutions)	Waste recycling and upcycling
Transform ecosystems	• Circular business model along product total life cycle • Service shed level restoration in both direct and indirect operation (e.g. nature-based solutions) • Consideration of nature-climate related trade-offs in relation to the organisation's energy, raw materials and water management		
Source: Science Based Targets Network (2023) Step 4: Act.			

P2: Target setting and performance management

Guiding question:

How will we set targets and define and measure progress?

Table 8 illustrates high level targets based on the five priority actions indicated by the World Economic Forum (WEF) in its report Nature positive: Role of the Chemical Sector.

Table 8: Illustrative list of targets based on five priority actions identified by the WEF

Areas	Example of targets for the chemicals industry	Illustrative indicator
Driver of nature change: Climate change	Increase efficiency in the manufacturing process and expand the use of renewable energy to reduce greenhouse gas emissions and achieve net-zero emissions by 2050, with at least 32.5% improvement in energy efficiency by 2030[15] and a 40% reduction of the sector's long-term emissions reduction targets by 2030.[16]	GHG emissions.
Ecosystem services: Water supply	Improve water stewardship through sustainable water management strategies and practices to reduce the organisation's water withdrawal and consumption by up to 30% by 2030.[17]	Water withdrawal and consumption from areas of water scarcity.

15 European Commission (2023) Transition pathway for the chemical industry.

16 IEA (2023) Tracking Clean Energy Progress 2023.

17 Cefic (2023) Is water management the next priority for Europe and the chemical industry.

Areas	Example of targets for the chemicals industry	Illustrative indicator
Ecosystem services: Biomass provisioning	Source responsibly and explore switching to sustainably sourced bio-based or recycled materials by setting a target for the share of bio-based feedstock used by 2030, while enabling land restoration and regeneration.	Quantity (or ratio of total use) of bio-based feedstock sourced sustainably; quantity (or ratio of total use) of bio-based feedstock sourced from regenerative practices.
State of nature	Support nature conservation and restoration and advocate for policy changes that protect nature and support the halt and reversal nature loss by 2030 and help protect the long-term viability of the chemical sector.	Cost-benefit analysis of different strategic and resource allocation decisions (e.g. options for threat abatement or restoration based on STAR, or relative positive or negative impacts from land-use change using Persistence Score).
Driver of nature change: Pollution/pollution removal	Expand circularity, product innovation and customer education on product use and disposal. Set a target for generated sales or share of revenue by 2030 for solutions that contribute to the circular economy.	Quantity (or ratio of total use) of hazardous waste recycled at end-of-product life for re-use (circularity); generated sales or percentage of generated sales with solutions contributing to circular economy.

Source: WEF (2023) Nature Positive: Role of the Chemicals Sector.

P3: Reporting

Guiding question:

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

Organisations are recommended to prepare to disclose their strategy and management plans to:

- Manage substances of concern including production, sales and waste handling; and
- Develop alternatives with reduced human and/or environmental impact across their value chains.[18]

P4: Presentation

Guiding question:

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

No additional sector-specific guidance identified for P4.

18 SASB Standards (2023) Chemicals Sustainability Accounting Standard.

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 chemicals sector guidance is finalised, based on market consultation and feedback.

Table 9: Concepts and definitions

Concept	Definition
Bio-based	A product wholly or partly derived from biomass. Notes: 1. Bio-based products are normally characterised by the bio-based carbon content or the bio-based content. For the determination and declaration of the bio-based content and the bio-based carbon content, see the relevant standards developed by CEN/TC 411. 2. Product can be an intermediate, material, semi-finished or final product. 3. The term 'bio-based product' is often also used to refer to a product that is only partly bio-based. In those cases, the claim should be accompanied by a quantification of the bio-based content. CEN (2014) Bio-based products – Vocabulary, as cited in European Commission (2021) Bio-based product.
Biomass	Material of biological origin, excluding material embedded in geological formations and material transformed to fossilised material. Biomass includes organic material (both living and dead), e.g. trees, crops, grasses, tree litter, algae, animals, manure and waste of biological origin. In this guidance, biomass excludes peat. ISO (2016) ISO 14021:2016, 3.1.1 as cited in ISO (2023) ISO/DIS 59004(en) Circular Economy – Terminology, Principles and Guidance for Implementation.
Single-use plastic (SUP)	Single-use plastic products (SUPs) are used once, or for a short period of time, before being thrown away. Refer to EU's Directive on Single-use plastics for additional details such as the products included and the measures being applied. European Commission (no date) Single-use plastics.

Annex 1: Sector-specific metrics – Chemicals

The recommended sources, such as the International Sustainability Standards Board (ISSB), the Sustainability Accounting Standards Board (SASB), GRI, CDP, UN frameworks, European Sustainability Reporting Standards (ESRS) and others, represent the most widely adopted standards. Other standards are in development (such as for PFAS[19]), and organisations are recommended to stay engaged with year-on-year progress and implement the latest definitions within their risk management processes and disclosures.

Proposed guidance on the application of the core global disclosure metrics

Chemicals industry organisations should refer to Annex 1 of the TNFD Recommendations for further information on the core global disclosure metrics.

Table 10: Proposed guidance on the application of the core global disclosure metrics

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Sources
Driver of nature change: Climate change				
	GHG emissions	Refer to IFRS S2 Climate-related Disclosure Standard.	No further guidance.	
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).	No further guidance.	

19 The OECD Environment Directorate Chemicals and Biotechnology Committee defines PFASs as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–).

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Sources
C1.1	Extent of land/ freshwater/ocean-use change	Extent of land/freshwater/ocean ecosystem use change (km^2) by: • Type of ecosystem;[20] and • Type of business activity.	No further guidance.	
		Extent of land/freshwater/ocean ecosystem conserved or restored (km^2), split into: • Voluntary; and • Required by statues or regulations.	No further guidance.	
		Extent of land/freshwater/ocean ecosystem that is sustainably managed (km^2) by: • Type of ecosystem;[21] and • Type of business activity.	No further guidance.	
Driver of nature change: Pollution/pollution removal				
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.	**Direct operations, Downstream and End of life** Pollutants to report under the core global disclosure metric should be identified referring to the environmental quality standards in Annex 2.	TNFD

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

21 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	Sources
C2.1	Wastewater discharged	Volume of water discharged (m^3), split into: • Total; • Freshwater; and • Other.[22] Including: • Concentration 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.	**Direct operations, Downstream and End of life** Pollutants to report under the core global disclosure metric should be identified referring to the environmental quality standards in Annex 2.	TNFD
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 into 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.	**Direct operations, Downstream and End of life** In reporting the core global disclosure metric, the organisation should define hazardous wastes in line with the Basel Convention; if the legal or regulatory framework(s) applicable to the jurisdiction(s) where the waste is generated impose greater or more stringent requirements.	GRI 306; SASB RT-CH-150a.1

22 Freshwater: (≤1,000 mg/L Total Dissolved Solids). Other: (>1,000 mg/L Total Dissolved Solids). Reference: GRI (2018) GRI 303-4 Water discharge.

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Sources
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 the raw material content.[23] For plastic packaging, percentage of plastics that is: • Reusable; • Compostable; • Technically recyclable; and • Recyclable in practice and at scale.	**Direct operations, Downstream, and End of life** In reporting the core global disclosure metric, the organisation should consider its plastic footprint to include the leakage of plastic pellets, flakes and powders during production processes.	TNFD
C2.4	Non-GHG air pollution	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).	No further guidance.	
Driver of nature change: Resource use/replenishment				
C3.0	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption[24] (m^3) from areas of water scarcity, including identification of water source.[25]	No further guidance.	

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

24 Water consumption is equal to water withdrawal less water discharge. Reference: GRI (2018) GRI 303-5.

25 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	Sources
C3.1	Quantity of high-risk natural commodities sourced from land/ ocean/freshwater	Quantity of high-risk natural commodities[26] (tonnes) sourced from land/ocean/freshwater, split into types, including proportion of total natural commodities. Quantity of high-risk natural commodities[27] (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	In addition to commodities on the SBTN HICL, organisations should refer to threatened species used on the IUCN Red List.	SBTN HICL, as well as species classified by the IUCN Red List as threatened (vulnerable: VU; endangered: EN; or critically endangered: CE), and species listed on CITES Appendix I, II or II
Driver of nature change: Invasive alien species and other				
C4.0	Placeholder indicator: Measures against unintentional introduction of invasive alien species (IAS28)	Proportion of high-risk activities operated under appropriate measures to prevent unintentional introduction of IAS, or low-risk designated activities.	No further guidance.	

26 Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL) and indicate what proportion of these commodities represent threatened and CITES listed species.

27 Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL) and indicate what proportion of these commodities represent threatened and CITES listed species.

28 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 designated activities".

Metric no.	Core global indicator	Core global metric	Proposed guidance for the sector	Sources
State of nature				
C5.0	Placeholder indicator: Ecosystem condition Placeholder indicator: Species extinction risk	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 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; and • 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 of state of nature and consensus is still developing. The TNFD will continue to work with knowledge partners to increase alignment.	No further guidance.	

Proposed core sector disclosure indicators and metrics

Table 11: Proposed core sector disclosure indicators and metrics

Metric category	Metric subcategory	Indicator	Proposed core sector disclosure indicator or metric	Sources
Impact driver	Pollution/ Pollution removal	Persistent chemicals manufactured	**Direct operations, Downstream and End of life** List and quantity (tonnes) of chemicals manufactured and used as defined in EU REACH Annex XIV, REACH SVHCs, PIC, POP substances.	Refer to Annex 2

Metric category	Metric subcategory	Indicator	Proposed core sector disclosure indicator or metric	Sources
Impact driver	Pollution/ Pollution removal	Revenue generated from substances hazardous to health and environment	**Direct operations, Downstream and End of life** Percentage of total revenue generated from products that contain Globally Harmonised System of Classification and Labelling of Chemicals (GHS) Category 1 and 2 Health and Environmental Hazardous Substances.	TNFD
Impact driver	Pollution/ Pollution removal	Hazard assessment	**Direct operations, Downstream and End of life** Percentage of products that have undergone a hazard assessment as defined in SASB RT-CH-410b.2.	SASB RT-CH-410b.1 and b.2
Impact driver	Pollution/ Pollution removal	Revenue generated from pesticides used by toxicity level	**Direct operations, Downstream and End of life** Percentage of total revenue generated from pesticides, by toxicity hazard level (Ia extremely hazardous, Ib highly hazardous, II moderately hazardous, III slightly hazardous, or U unlikely to present an acute hazard) according to the WHO classification.[29] An organisation should also refer to Annex 3 of this document for EU definitions of hazardous pesticides.	TNFD
Impact driver	Pollution/ Pollution removal	Rate of change of PFAS production	**Direct operations, Downstream and End of life** Percentage increase or decrease in PFAS[30] produced and used during the reporting period versus the previous reporting period. Organisations should refer to the list of PFAS in Annex 2.	TNFD

29 WHO (2019) The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification 2019.

30 The OECD Environment Directorate Chemicals and Biotechnology Committee defines PFAS as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–).

Metric category	Metric subcategory	Indicator	Proposed core sector disclosure indicator or metric	Sources
Impact driver	Pollution/ Pollution removal	Non-compliance incidents	**Direct operations, Downstream and End of life** Number of incidents of non-compliance associated with soil quality permits, standards and regulations. Number of incidents of non-compliance associated with water quality permits, standards and regulations.	TNFD
Impact driver	Pollution/ Pollution removal	Hazardous waste recycling during production	**Direct operations, Downstream and End of life** Percentage of hazardous waste recycled for reuse, defined as total weight of hazardous waste generated during production that was recycled (circularity), divided by the total weight of hazardous waste generated.	GRI 306: SASB RT-CH-150a.1
Impact driver	Pollution/ Pollution removal	Hazardous waste recycling at end-of-life	**Direct operations, Downstream and End of life** Percentage of hazardous waste recycled at end-of-product life for reuse (circularity), defined as total weight of hazardous waste recycled from end-of-life or final disposal for reuse, divided by the weight of total input (e.g. same substance from new and recycled sources) used in production.	GRI 306: SASB RT-CH-150a.1
Impact driver	Pollution/ Pollution removal	Plastic pollution	**Direct operations, Downstream, and End of life** Percentage of plastic resin volume attributed to single-use plastic.	Directive (EU) 2019/904 Doc. 32019L0904, Reduction of the impact of certain plastic products on the environment

Metric category	Metric subcategory	Indicator	Proposed core sector disclosure indicator or metric	Sources
Impact driver	Resource use/ replenishment	Water replenished	**Direct operations** Volume of water (m^3) replenished to the environment through replenishment programmes (split into total and to areas of water scarcity).	TNFD
Impact driver	Resource use/ replenishment	Bio-based feedstock	**Upstream** Percentage of total feedstock/raw materials (by weight/mass) that are bio-based, by material, and whether that material is typically associated with high impacts on nature, referring to the SBTN HICL and IUCN Red List of threatened species.	SBTN HICL, as well as species classified by the IUCN Red List as threatened (vulnerable: VU; endangered: EN; or critically endangered: CE), and species listed on CITES Appendix I, II or II.
Impact driver	Resource use/ replenishment	Bio-based feedstock sourced from regenerative practices	**Upstream** Percentage of bio-based feedstock produced under regenerative practices by weight/mass and material, and whether that material is typically associated with high impacts on nature, referring to the SBTN HICL and IUCN Red List of threatened species.	SBTN HICL, as well as species classified by the IUCN Red List as threatened (vulnerable: VU; endangered: EN; or critically endangered: CE), and species listed on CITES Appendix I, II or II.
Impact driver	Resource use/ replenishment	Products under LCA assessment	**Upstream, Direct operations, Downstream and End of life** Percentage of products that undergo a full or simplified Life Cycle Assessment (LCA).	TNFD

Proposed additional sector disclosure indicators and metrics

No additional sector disclosure indicators and metrics are proposed for the chemicals industry.

Annex 2: List of environmental quality standards for pollutants

Chemicals industry organisations should refer to the lists of standards contained in relevant regional and national regulations, including existing international conventions, conventions for emerging pollutants (e.g. PFAS[31] family), as well as new substances and substances possibly already present in the environment-food-human continuum, but causing a new concern for water and soil pollution.[32]

Table 12: List of environmental quality standards for pollutants

List	Number of substances	Link to resource
EU REACH Annex XIV Authorisation list	59 substances	Authorisation List – ECHA
REACH SVHCs	476 substances	Candidate list of substances of very high concern for authorisation
EU POP Regulation (EU) 2019/2021	31 unique substances/entries 10 unique new proposed substances	POPs Regulation – ECHA The new POPs
EU PIC Regulation (EU) No 649/2012	287 substances	Chemicals subject to PIC – ECHA
EU Water Framework Directive, Annex X	Priority substances	Pollutants in EU waters: Update of chemical substances listed for control
SVHC Intentions List (to be used as a proxy)	269 substances	Registry of SVHC intentions until outcome
Emerging chemicals – HBM4EU – science and policy for a healthy future	The first round of HBM4EU priority substances in 2016 (and family of substances) and the second round of prioritization between 2017 – 2018	HBM4EU Substances
For AMR classifications and indicators refer to JIACRA III Report	Refer to antimicrobial classes identified	JIACRA III – Antimicrobial consumption and resistance in bacteria from humans and animals

31 The OECD Environment Directorate Chemicals and Biotechnology Committee defines PFASs as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–).

32 See HBM4EU Substances.

List	Number of substances	Link to resource
PFAS	PFAS TRI disclosures 1. Entities should stay abreast of further development on PFAS such as the OECD PFAS definition in Europe, grounded in ECHA and EPA methodologies 2. List of applicable disclosures should adhere to relevant regional and national chemicals regulations	Toxics Release Inventory (TRI) Program – United States Environment Program

Annex 3: List of hazardous pesticides

Table 13: Hazardous pesticides in the European Union

List	Number of pesticides	Link to resource
Annex to Sustainable Use of Pesticides Directive 1107/2009	Approval criteria for active substances by specifying the approval procedure	EU Pesticides Database
MRL residues lists 396/2005	29 449 unique substances/entries	EUCLEF Annexes II, III, IV, VII

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Taskforce on Nature-related Financial Disclosures

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