Taskforce on Nature-related Financial Disclosures

GRI

GRI & TNFD case studies

Identifying risks and opportunities to organizations arising from dependencies and impacts on nature

June 2025

tnfd.global

globalreporting.org

Content

Acknowledgments

We would like to express our sincere gratitude to the companies and individuals who generously contributed their time and expertise to this report, thereby enhancing the practical relevance of this publication. We extend our special thanks to the following contributors: Esther An and Priscilla Tan (CDL), Melissa Restrepo Monsalve, Claudia Lorena Ortiz Melo, Xiomara Sanclemente and Diego Puentes Mojica (Ecopetrol S.A.), Cristiana La Marca, Erika Cristina Calderara and Giulio Belz (Enel), Isabel Tomé, Emilio Tejedor, Jesus Carrasco, Chiara Magaz and Beatriz Crisostomo Merino (Iberdrola S.A.), Harshal Ashok Limdi (JSW Steel), David Croft (Reckitt), Camila Cantagalli and Letícia Guimarães (Vale).

1. Context

In September 2023, the Taskforce on Nature-related Financial Disclosures (TNFD) published its disclosure recommendations and guidance to help businesses and financial institutions assess, report, and act on nature-related dependencies, impacts, risks and opportunities (DIROs). In January 2024, the Global Sustainability Standards Board (GSSB) published *GRI 101: Biodiversity 2024*, enabling organizations to report on their biodiversity impacts.

The GRI Standards focus on an organization's most significant impacts on the economy, environment, and people (sometimes referred to as impact materiality). The GSSB views that nearly all, if not all, of an organization's most significant impacts will eventually translate into risks and opportunities. Therefore, understanding the organization's impacts is a necessary first step in identifying risks and opportunities that result from those impacts. The process to determine material topics (using GRI's materiality approach focusing on impacts) is described in *GRI 3: Material Topics 2021*.

The TNFD has developed the LEAP approach (Locate, Evaluate, Assess, Prepare), which is an integrated approach to identify and assess nature-related DIROs. Based on the evaluation of dependencies and impacts on nature identified in the Locate and Evaluate phases, organizations identify and assess their nature-related risks and opportunities in the Assess phase.

In 2024, GRI and TNFD published a joint interoperability mapping between the GRI Standards and the TNFD recommended disclosures and metrics, to help GRI's 14,000 reporters globally align with the TNFD Recommendations, and assist TNFD adopters in their sustainability reporting according to GRI Standards. Growing interest from report preparers and stakeholders has created demand for practical guidance on how to use GRI's materiality approach to identify and disclose impacts and the TNFD LEAP approach to further identify dependencies, impacts, risks and opportunities, under a financial or double materiality lens.

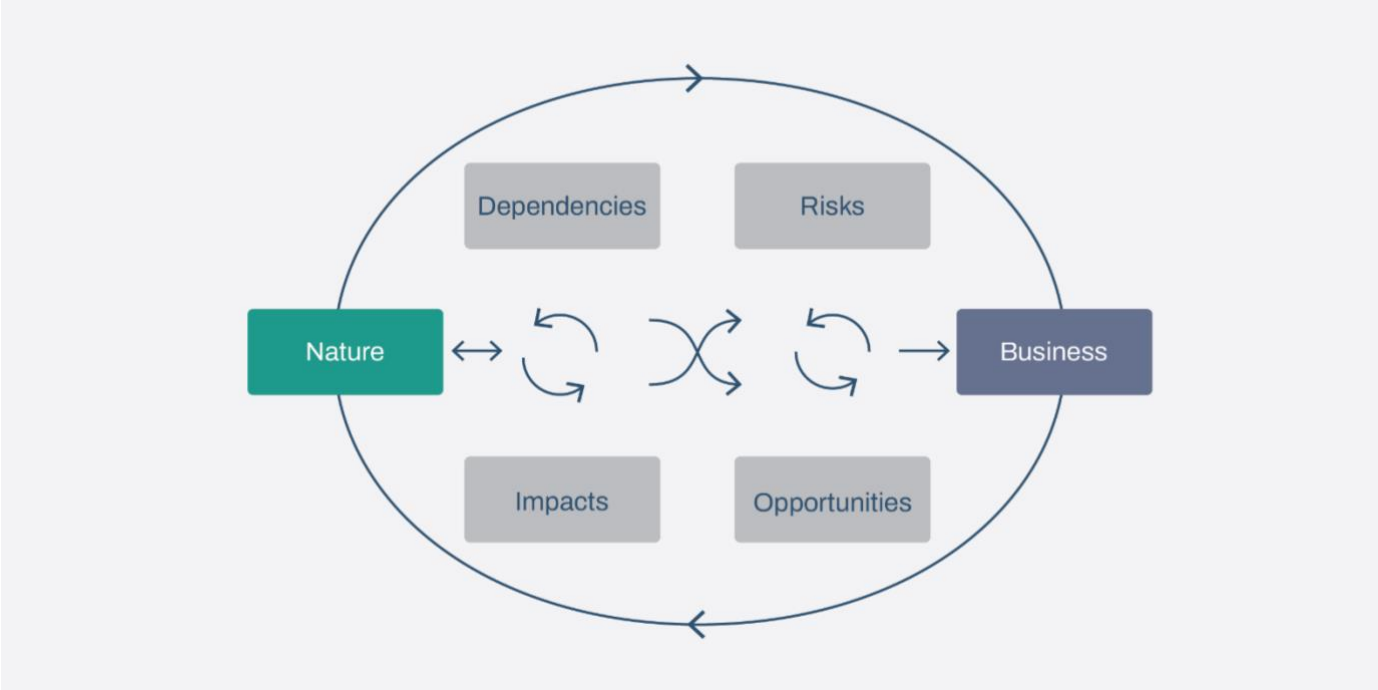
This report summarizes the findings from seven corporate case studies developed through a collaboration between GRI and TNFD. They highlight current and emerging practices in assessing nature-related DIROs (see Appendix 1 for the list of companies).

2. Introduction to nature-related dependencies, impacts, risks and opportunities

GRI and the TNFD recognize that organizations have dependencies and impacts on nature, and that these give rise to nature-related risks and opportunities to the business. These four concepts are collectively referred to by the TNFD as nature-related issues and include (see Figure 1):

- **Dependencies** – of the organization on nature;
- **Impacts** – on nature by the organization;
- **Risks** – to the organization stemming from their dependencies and impacts; and
- **Opportunities** – for the organization that benefit nature through positive impacts or mitigation of negative impacts on nature.

Figure 1: Nature-related dependencies, impacts, risks, and opportunities



Source: TNFD 2023

While GRI Standards focus on information about impacts, both the TNFD and GRI align in recognizing that dependencies and impacts can give rise to nature-related risks to organizations. According to GRI, the impacts of an organization's activities and business relationships on the economy, environment, and people can have negative and positive consequences for the organization itself. These consequences can be operational or reputational, and therefore in many cases financial. While the impacts of an organization's activities may give rise to financially material risks and opportunities, sustainability reporting is also inherently relevant as a public interest activity. It enables understanding of an organization's role in society and the implications of its business model, independent of financial considerations.

The TNFD states that dependencies and impacts can lead to nature-related risks through:

- Changes to the state of nature itself, caused by business impact drivers or external factors and trends;
- Changes to the flow of ecosystem services associated with the changes to the state of nature (and on which a business and other stakeholders may depend); and
- Impacts to society resulting from business impacts on nature that may affect the organization, for example, through lack of access to land due to damaged stakeholder relations, or damage to reputation following the release of pollutants that affect the health of local communities.

Nature-related opportunities instead can occur:

- When organizations avoid, reduce, mitigate or manage nature-related risks, for example, connected to the loss of nature and its associated ecosystem services that the organization and society depend on (including the organization's dependencies and impacts on nature that are a source of these risks); and/or
- Through the strategic transformation of business models, products, services, markets and investments that actively work to halt or reverse the loss of nature, including the implementation of conservation, restoration, and nature-based solutions or support for them through financing or insurance.

3. Key takeaways from GRI-TNFD case studies

The following are key insights from the seven case studies, highlighting current and emerging practices in assessing nature-related DIROs.

Evolution of nature-related materiality assessments

- **Double materiality is now widely adopted.**

  All companies interviewed have adopted a double materiality approach to identify material DIROs, using guidance from the TNFD LEAP approach and GRI. Previously, many focused mainly on impacts, assessing the company's effects on the economy, environment, and people.

- **Dependencies and impacts inform the identification of risks and opportunities.**

  All companies agree that nature-related risks and opportunities stem from their impacts and dependencies on nature, both of which can give rise to financial risks.

- **Stakeholder engagement remains central to materiality assessments although Indigenous Peoples and Local Communities (IPLCs) are more commonly engaged through other processes, such as environmental impact assessments.**

  Stakeholder input, collected primarily through surveys and interviews, is a key part of the materiality process. Several companies use stakeholder engagement to rank predefined lists of material issues across both financial and impact dimensions. None of the companies interviewed engages with IPLCs specifically to identify material issues.

- **Recognition of the nature-climate nexus is growing.**

  Approximately half of the companies highlighted a strong interconnection between climate and nature in their DIRO assessments. However, challenges remain in applying scenario analysis to nature-related risks to the same degree as for climate-related risks.

More established practices for impact than for dependency, risk and opportunity assessment

- **Regulations shape companies' impact assessments.**

  Legal requirements, particularly those related to environmental and social impact assessments, are a significant driver of impact identification, especially for companies in the extractive sector.

- **Assessing dependencies provides crucial additional value.**

  Several companies noted that dependencies – often overlooked in traditional impact assessments – offer crucial insights, especially for assessing risks and opportunities. Water was the most frequently assessed dependency across the seven case studies.

- **Risk and opportunity assessment practices are still maturing.**

  While companies progress in assessing nature-related risks and opportunities, most report that these methods are less developed than those used to evaluate dependencies and impacts. Companies often resort to proxies for their identification, and still face challenges in measuring related financial effects. Unlike risk identification, none of the companies linked opportunities to specific assessment frameworks (e.g., LEAP or GRI guidance), which could have supported more effective evaluation and measurement of these opportunities.

Embedding materiality assessments into corporate systems and decision-making

- **Corporate and site-level assessments create a complementary feedback loop.**

  Over half of the companies described a complementary relationship between corporate and site-level assessments. Site-level insights, such as identified dependencies and impacts, informed organizations' broader materiality identification, while corporate insights helped shape future site-level assessments.

- **Enterprise risk management (ERM) systems are integrating nature.**

  About half of the companies explicitly mentioned using centralized ERM systems to identify nature-related risks. These systems enabled the integration of nature-related dependencies and impacts into broader risk management frameworks.

- **Effective management of impacts and dependencies reduces residual risks.**

  Companies with impact and dependency management plans in place generally report lower exposure to nature-related risks, reducing the need for additional mitigation efforts.

Various methods and tools for assessing DIROs

- **Nature-related dependencies and impacts are assessed using various tools.**

  All companies combine internal methodologies and external tools such as ‘Exploring Natural Capital Opportunities, Risks and Exposure’ (ENCORE) and the ‘Integrated Biodiversity Assessment Tool’ (IBAT), and stakeholder input to assess nature-related dependencies and impacts. The TNFD LEAP approach is commonly used to guide this process, especially in structuring assessments.

- **The TNFD LEAP approach is widely used to assess risks and opportunities.**

  Most companies follow the TNFD LEAP approach, especially the Assess phase, to identify nature-related risks and opportunities. Some apply the LEAP approach at both corporate and site levels.

4. Companies' approaches to nature-related DIROs: findings of the GRI-TNFD case studies

The report draws on case studies from seven publicly listed enterprises operating across diverse sectors and geographies, providing a rich basis for identifying key insights in nature-related reporting practices. These companies include **CDL** (real estate, operating in 29 countries and regions), **Ecopetrol S.A.** (oil and gas, with majority state ownership and a strong presence in Colombia with shareholding in other companies within the Ecopetrol Group), **Enel** (utilities, active in 28 countries), **Iberdrola S.A.** (renewable energy, with a presence in over a dozen countries including Australia, Brazil, and Spain), **JSW Steel** (extractives and mineral processing, operating in India, Italy, and the US), **Reckitt** (consumer goods, with a global footprint across 60+ countries), and **Vale** (metals and mining, active in Brazil, Canada, China, and other regions). See Appendix I for additional information on the companies interviewed.

4.1. Corporate materiality assessment

Double materiality assessment

Across the companies interviewed, all have now adopted a double materiality approach to identify material DIROs. Previously, a large number of assessments focused mainly on impact materiality, identifying the company's effects on the economy, environment, and people. This evolution is largely driven by regulatory changes and the introduction of sustainability reporting standards such as the European Sustainability Reporting Standards (ESRS) of the EU Corporate Sustainability Reporting Directive (CSRD) and the International Financial Reporting Standards (IFRS) S1 and S2 of the International Sustainability Standards Board (ISSB). All companies reported using the TNFD guidance, particularly the TNFD LEAP approach, and GRI Standards to inform their corporate-level assessments, with most also drawing on the ESRS and ISSB's IFRS Standards. Stakeholder engagement remains a key component of the process, primarily through surveys and interviews.

Since 2014, **CDL** has used *GRI 3: Material Topics 2021* to help define material topics. In 2024, CDL conducted a double materiality assessment to prepare for alignment with IFRS S1 and S2, evaluating both financial and impact materiality. The 2024 materiality assessment identified 'Nature and Biodiversity Conservation' as a material topic based on its significance.

Similarly, **JSW Steel** has historically focused on assessing impact materiality, but in 2023, it expanded its scope to double materiality. Its impact materiality assessment was based on the *GRI Universal Standards 2021*, while the financial materiality assessment was conducted in alignment with the IFRS and the Sustainability Accounting Standards Board (SASB) Standards.

Reckitt applies a double materiality lens to nature-related issues in accordance with the requirements of the ESRS and the latest guidance from the European Financial Reporting Advisory Group (EFRAG):

- The impact assessment builds on how Reckitt has previously identified and assessed sustainability-related impacts based on GRI Standards, including a combination of external drivers, trends and data with the views and knowledge of internal contributors, to determine relevant areas of focus.
- The financial assessment of sustainability-related risks and opportunities was made, where possible, by quantifying their effects and supplementing them with qualitative assessments, linking this to existing corporate financial risk parameters.

Iberdrola Group operates in jurisdictions that fall under the CSRD. As such, for its 2024 report, Iberdrola followed a double materiality approach that aligns with the ESRS, which identified a number of actual or potential material impacts and dependencies (based on the ESRS definitions related to climate change, pollution, water and marine resources, species and ecosystems, and circular economy).

Vale explained that collaboration between the different standards and frameworks helped their approach to materiality assessment. For example, the fact that TNFD and GRI use equivalent definitions for how to identify sensitive locations further facilitated Vale's assessment.

Stakeholder engagement

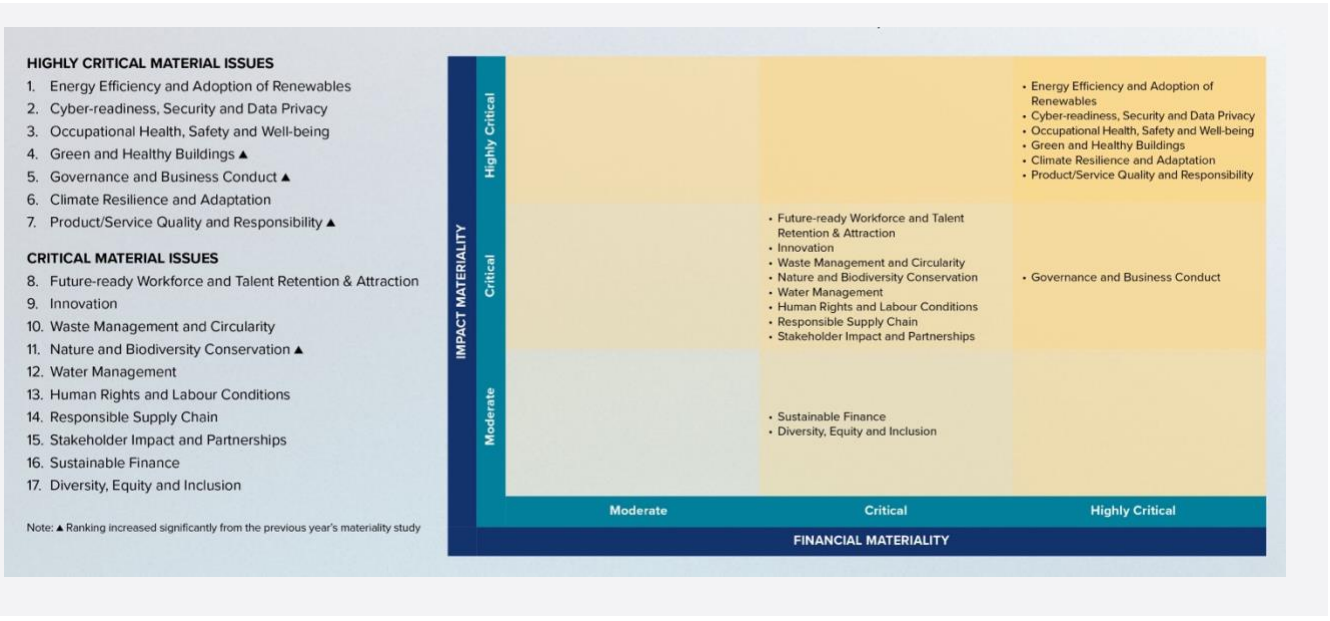
Stakeholder engagement remains a central component in materiality assessments. Several companies reported using surveys to collect input from key stakeholders, including employees, investors, regulators, and suppliers. In some cases, companies used stakeholder engagement to rank a predefined list of material issues according to both materiality dimensions (impact and financial). **JSW Steel** reported using a scoring system to filter 18 high-priority material topics, nine of which were nature-related, including climate change, air quality, water, biodiversity, and the circular economy. **Enel's** stakeholder engagement process in 2024 involved approximately 70,000 stakeholders who were asked to evaluate relevant DIROs in terms of probable occurrence and significance, following a structured process aligned with the AA1000 Stakeholder Engagement Standard (AA1000SES). In 2024, key affected stakeholders included customers, the financial community, institutions (public institutions and non-governmental organizations), Enel's

workforce, and suppliers. These stakeholders were directly involved in the DIRO evaluation through surveys, with:

- Impacts being assessed by both internal and key external stakeholders; and
- Risks and opportunities being assessed by internal stakeholders and key users of financial reporting ('primary users').

CDL's materiality assessment also follows a structured approach (Figure 2). For the 2024 financial year, an initial list of 17 prioritized material issues was defined and then ranked based on both impact and financial materiality through online surveys and interviews with internal and external stakeholders, including employees, investors, regulators, industry and sustainability experts, tenants, and suppliers. The material issues are then presented to the company's executive committee, senior management, and key executives from business units, and subsequently to the Board's Sustainability Committee. Nature and biodiversity conservation was rated as 'Critical' under both impact and financial materiality.

Figure 2: Overview of CDL's 2024 material ESG issues



Source: Zero in on action: Integrated sustainability report 2025, CDL

Based on the interviews conducted, no company engaged with IPLCs specifically to identify material issues; rather, engagement was primarily focused on risk mitigation or the identification of material sites, despite the TNFD guidance recommending such engagement across all phases of LEAP, including E4 and A4 (identification of material DIROs).[1]

[1] See TNFD's guidance on engagement with Indigenous Peoples Local Communities and affected stakeholders.

Centralized enterprise risk management

Companies integrate nature-related information into centralized ERM systems. About half of the organizations in the case study sample reported using ERM systems to help identify their nature-related risks. These systems can integrate nature-related dependencies and impacts to identify a company's potential risks.

Reckitt integrated its evaluation of nature-related dependencies and impacts into its corporate risk framework to identify potential risks. It applied the same risk assessment process to nature as it does to other non-sustainability topics considered in the risk assessment. **JSW Steel** collaborated with the Confederation of Indian Industry (CII) to develop a technical standard to assess and prioritize sites based on nature-related risks. The standard uses a 4x4 risk matrix of nature-related impacts against nature-related dependencies (Figure 3). This matrix is similar to other risk matrices within the organization's ERM framework.

Figure 3: Risk matrix to select sites with material nature-related risks. HD = High Dependency, MD = Medium Dependency, LD = Low Dependency, ND = No Dependency, and the same acronyms apply for Impact classifications (i.e., High, Medium, Low, No Impact).These are defined by referencing ENCORE materiality ratings.

	HD	MD	LD	ND
HI	Very High Material Risk	Very High Material Risk	High Material Risk	High Material Risk
MI	Very High Material Risk	High Material Risk	Medium Material Risk	Medium Material Risk
LI	High Material Risk	Medium Material Risk	Low Material Risk	Low Material Risk
NI	High Material Risk	Medium Material Risk	Low Material Risk	Very Low Material Risk

Source: JSW Steel

Feedback loop between corporate and site-level materiality assessments

A key finding across most case studies is the existence of a feedback loop between corporate and site-level materiality assessments. Over half of the organizations specifically mentioned that nature-related dependencies and impacts identified at the site level can inform their materiality assessment and identification of material topics at the corporate level. Similarly, the results of the materiality assessment at the corporate level can inform further analysis at the site level, creating a complementary feedback loop between corporate-level and site-level nature-related assessments.

For **Vale**, results from its nature-related dependency and impact evaluation at each site also informed the company's materiality assessment.

Enel employed a two-stage approach to assessing DIROs. First, conducting a corporate-level materiality assessment that identifies biodiversity as a material topic and then performing site-level analyses to identify priority sites ('hotspots') that require deeper assessment. Enel also used information from detailed site-level assessments to inform its overall understanding of biodiversity impacts. This created a feedback loop where corporate-level priorities can now inform site-level assessments, and site-level findings can possibly be elevated to corporate attention.

To determine its material topics, **JSW Steel** conducted a nature-related dependency and impact assessment for all its sites and used subsequent findings to inform materiality company-wide, recognizing that financial risks arise from both nature-related dependencies and impacts.

Following the TNFD guidance in the LEAP approach, **Iberdrola** conducted a detailed site-level analysis to locate physical assets (i.e., facilities) that are material due to nature-related impacts and dependencies, particularly on species and ecosystems. The materiality analysis used an impact materiality approach and was based on the following criteria:

- Facilities located in highly sensitive areas according to the criteria in the TNFD LEAP approach (LEAP phase L4), including areas important to IPLCs (ecosystem service provision importance), protected areas, areas of water stress (high physical water risk), Key Biodiversity Areas, and distribution areas of endangered species (areas important for biodiversity).
- The magnitude and severity of the impacts or dependencies on nature.
- Whether the asset has a biodiversity action plan implemented.

Material assets regarding freshwater dependencies or impacts were defined based on whether they are located within areas under water stress ('Extremely High' values), and/or they use freshwater.

Nature-climate nexus

The case studies reveal a growing recognition of the deep interconnection between climate and nature. About half of the companies highlighted this interconnection in their materiality and DIRO assessments, although some companies find it challenging to apply scenario analysis to nature in the same way they do for climate risks.

Enel deliberately linked biodiversity and climate-related risk assessments, recognizing that many nature-related risks for energy utilities are closely connected to climate change impacts, particularly those related to dependencies, such as water availability.

Nature-related DIROs are also identified in **CDL's** third climate change scenario analysis, which identifies linkages and dependencies between nature-related impacts, climate change impacts, and actions.

Innovative methods to assess DIROs

Companies are developing innovative methods to improve assessment quality.

Ecopetrol developed and piloted a socioecological resilience tool with the Humboldt Institute to support internal decision-making processes, to better understand and manage its interactions with nature and evaluate the capacity of socioecological systems to absorb disturbances. At an early stage, it enables the spatial analysis of ecosystems' distribution and condition, identifies critical ecosystem services (e.g., water flow regulation, flood mitigation, and biological support), and models scenarios that examine how changes in ecosystem services could affect operational continuity and, conversely, how company activities may impact ecosystem resilience. Further work will be needed to align these efforts with TNFD guidance on biomes' ecosystems typologies, which is based on the International Union for Conservation of Nature (IUCN) Global Ecosystem Typology.

Vale used data collected over the years through site environmental impact assessments and *GRI 304: Biodiversity 2016* (updated to *GRI 101*) to assess their dependencies and impacts. The company also has invested in scientific research through the Vale Institute of Technology in Brazil, which generates data used in the dependency and impact assessment. This research center conducts genetic or genomic analyses of fauna and flora across the country, providing critical knowledge about biodiversity at sites in the Amazon and how its degradation could bring risks to the company. Results from the research projects informed decision-making on nature management at the site level, particularly for decisions related to species and habitat conservation and restoration. **JSW's** 4x4 impact-dependency risk matrix is another example of methodological innovation (see Figure 3).

4.2. Impact and dependency identification and assessment

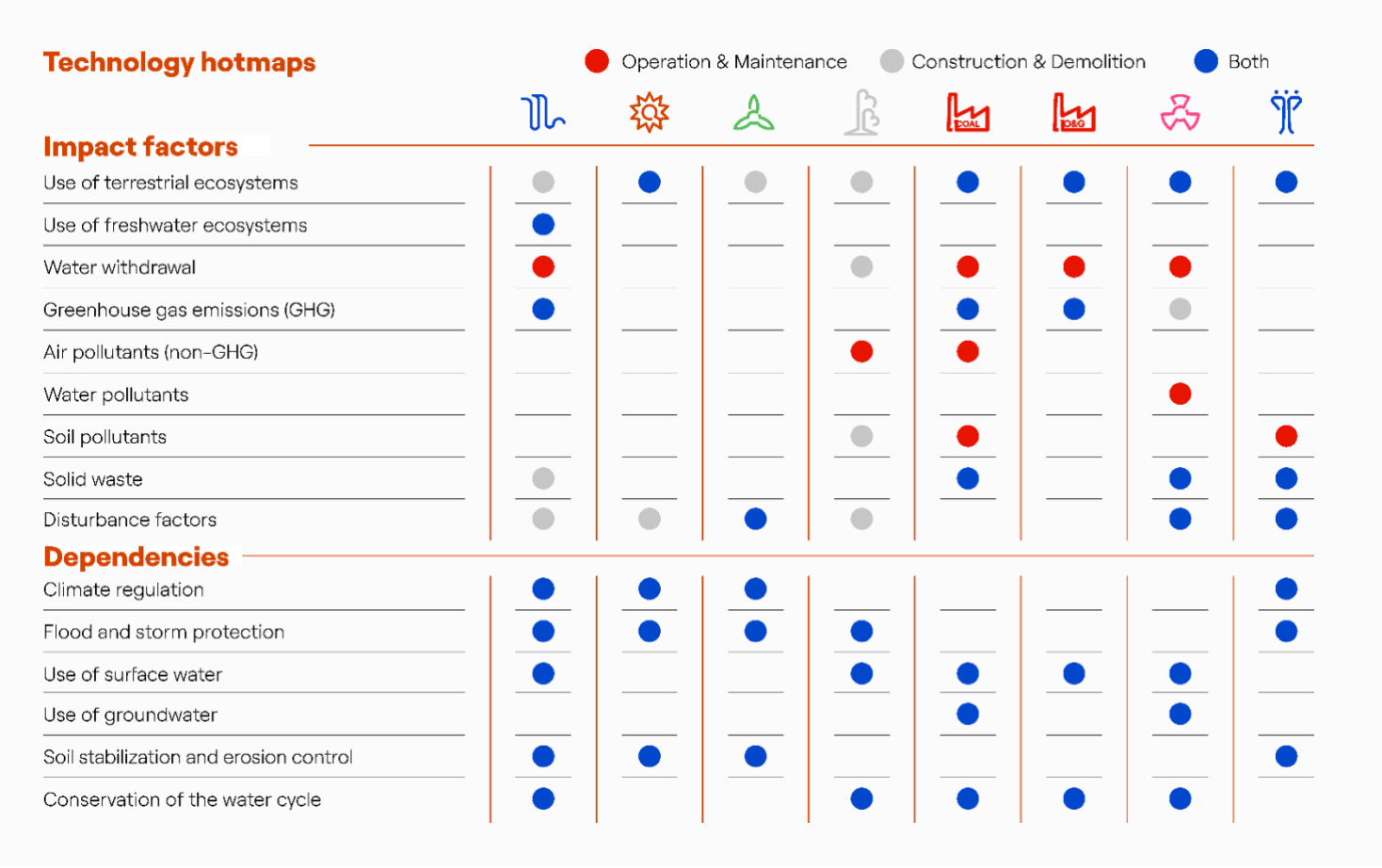
Use of internal and external tools, including the TNFD LEAP approach

All companies applied a combination of internal methodologies, external tools, and stakeholder engagement to assess their nature-related dependencies and impacts,

including the TNFD LEAP approach to structure assessments. While tools like ENCORE and IBAT supported high-level screening in the Locate phase, most companies emphasized the need for context-specific data and expert input for materiality analysis.

Enel also used the TNFD LEAP guidance and steps one and two (assess and prioritize) of the Science-Based Targets for Nature (SBTN) methods to structure its analysis. The ENCORE tool was used to conduct a preliminary materiality analysis of impact drivers (or pressures) and dependencies on ecosystem services for each energy technology (coal, geothermal, grids, hydro, nuclear, oil and gas, solar, wind) at the group level (Figure 4). Enel then performed a critical evaluation of the results from the ENCORE tool and adapted this general assessment to its specific business operations.

Figure 4: Technology hotmaps based on ENCORE Tool for preliminary data.



Source: Integrated Annual Report 2024, Enel

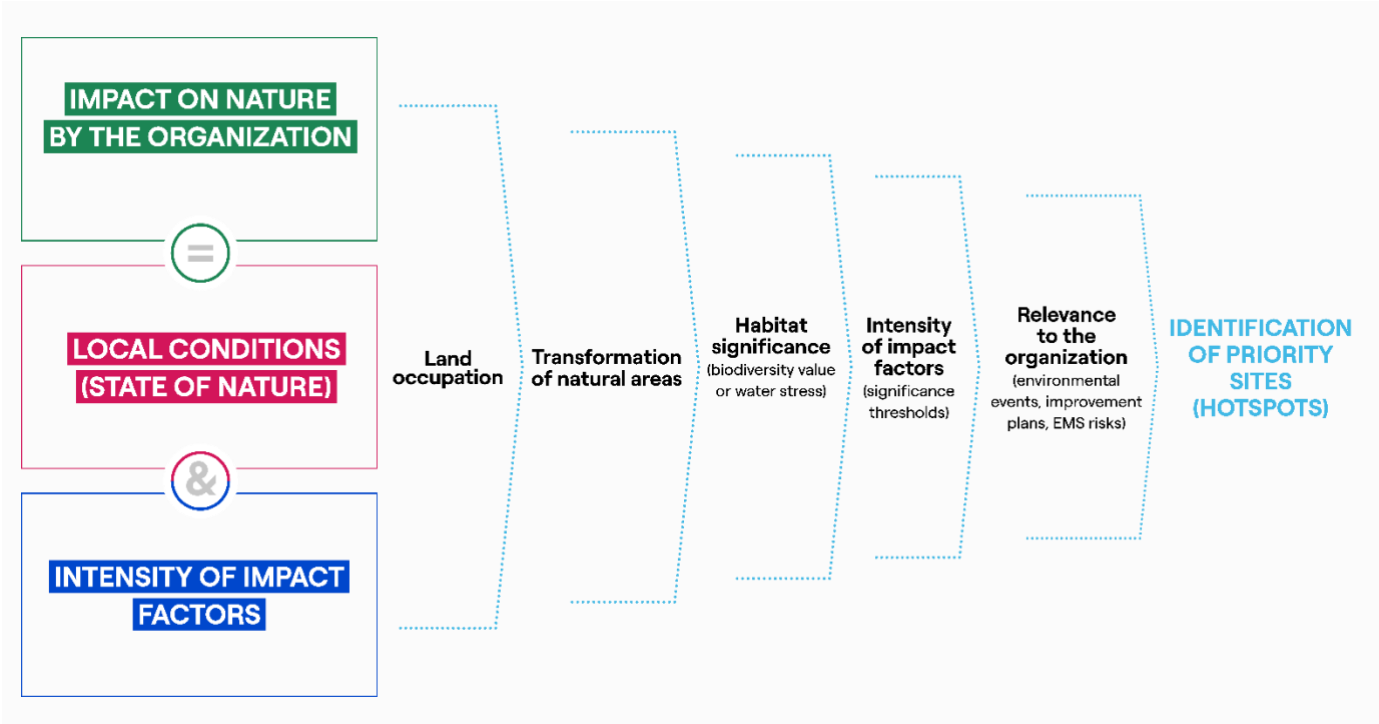
Then, Enel performed a site-level analysis to identify priority sites ('hotspots') that require deeper assessment (Figure 5). To identify the hotspots, the company ranked its assets based on:

- Their contribution to impact drivers relevant to the asset technology, based on the materiality analysis and using existing key performance indicators (e.g., land occupancy, pollutant emissions, and water withdrawal).
- State of Nature Indicators, such as:
    - the location of physical assets in natural or modified habitats; and
    - the proximity to or overlap of assets with sensitive locations, including protected areas, critical habitats, areas with threatened species, or water-stressed areas.
- Past incidents, known issues, and other priorities identified through ISO 14001 environmental management system.

For measuring the state of nature, Enel also used international databases, including the Habitat Type Classification and Red List of Threatened Species from the IUCN and IBAT. A critical aspect of Enel's approach is the extensive GIS mapping of all assets (28 countries worldwide, producing energy with approximately 91 GW of total capacity and with a network of 1.9 million kilometers)), which enables spatial analysis of the intersection between physical assets and ecologically sensitive areas.

Through this process, Enel identified 54 hotspot locations, including power lines' territorial technical units. These are sites or areas with operational plants or infrastructures that present the highest potential level of impact or risk, due to the simultaneous occurrence of the established natural and impact conditions of significance.

Figure 5: Identifying hotspots based on a company's impacts on nature.



Source: Integrated Annual Report 2024, Enel

Reckitt follows the TNFD LEAP approach to assess its nature-related dependencies and impacts, with an emphasis on the Evaluate phase. Reckitt's approach focuses on key natural raw material supply chains, where traceability is critical. To identify and manage the impacts related to the use of natural raw materials, Reckitt focuses on two approaches:

- **Proximity to ecologically sensitive locations:** to prioritize its manufacturing sites, Reckitt considers the proximity of the sites to ecologically sensitive areas and their environmental impacts, including those related to water, GHG emissions, species rarity, ecosystem degradation risk, and fragmentation. Reckitt combines location and environmental impact data to create a site sensitivity score.
- **Landscape-level assessment:** for key natural raw materials such as palm oil, and latex, and to a lesser extent cocoa and three core fragrances, Reckitt is applying the Nature Analytics framework. This methodology was developed by Nature based Insights (NbI) to assess and quantify their impacts on nature, including a Biodiversity Impact Metric (BIM) score and a multidimensional analysis of local risks and opportunities within the landscape boundary, which is typically defined at the water catchment areas upstream and downstream from the locations Reckitt sources from. The Nature Analytics model uses the framing of the BIM, combined as a function of six pressures, including land use intensity, fragmentation or

proximity to noise disturbance from roads. To translate spatial features and land use into biodiversity impact, the Nature Analytics model relies on GLOBIO 4.

Reckitt and NbI work with implementing partners (e.g., Earthworm Foundation, WWF) to combine top-down desk-based analysis, which synthesizes 20+ global and local datasets, maps, and models, with bottom-up quantitative data collected from field campaigns. This combination of data sources enables an in-depth multidimensional evaluation of dependencies and impacts, as well as comparisons among sites. For example, this allows comparison of the impact of different farming practices on biodiversity, such as large latex monoculture plantations versus smallholder latex farms transitioning to intercropping and agroforestry.

In 2023, **JSW** used the World Resources Institute Ecosystem Services Review (WRI ESR) guidelines to identify and assess dependencies and impacts at the site level. It complemented this approach with:

- *GRI 3: Material Topics 2021* to determine material topics at the site level and *GRI 301* to *GRI 308* to assess environmental impacts.
- On-site grievance mechanisms through which stakeholders, such as IPLCs, may raise concerns, which help identify impacts on nature.
- Regulatory authorities' updates and insights gained from stakeholder engagement activities.

Through this assessment method, JSW identified whether sites had no, low, medium, or high dependencies and impacts. The company also used data tools, such as ENCORE and the WWF Biodiversity Risk Filter, in the analysis and ranking of the nature-related dependencies and impacts. JSW used the GRI-TNFD interoperability mapping when reconciling the information aligned with the TNFD disclosure recommendations, gathered via the LEAP approach, and the respective GRI standards. The strong alignment was especially helpful for the Locate phase.

For **Iberdrola**, the assessment of dependencies was made using the ENCORE tool and the SBTN materiality tool as the starting point. The results were then cross-checked with other relevant databases and approaches, including the Natural capital and the Spanish energy sector Working Group. This process allowed for the identification of ecosystem services that support the technologies used by the group and on which its activities depend. To identify sites in ecologically sensitive areas/sensitive locations, Iberdrola uses several data sources, including the World Database on Protected Areas (WDPA), Key Biodiversity Areas (KBA), Important Marine Mammal Areas (IMMAs), and field data from sites on biodiversity metrics. It piloted the Ecosystem Integrity Index for the same purpose, but the results showed uneven data coverage across Iberdrola's countries of operation, so it was subsequently discontinued. Stakeholder engagement, particularly with IPLCs, also informed Iberdrola's identification of material sites, which was based on TNFD's guidance on engagement with IPLCs and affected stakeholders and surveys conducted at each site. Consultation with

IPLCs on the potential impact of the company's operations on the services provided was established both prior to construction in the environmental impact assessment processes and during operation.

Importance of dependencies

Several companies highlighted the added value of explicitly assessing dependencies, an aspect often overlooked in standard impact assessments. The LEAP approach helped reveal this blind spot, with water being the most commonly assessed dependency.

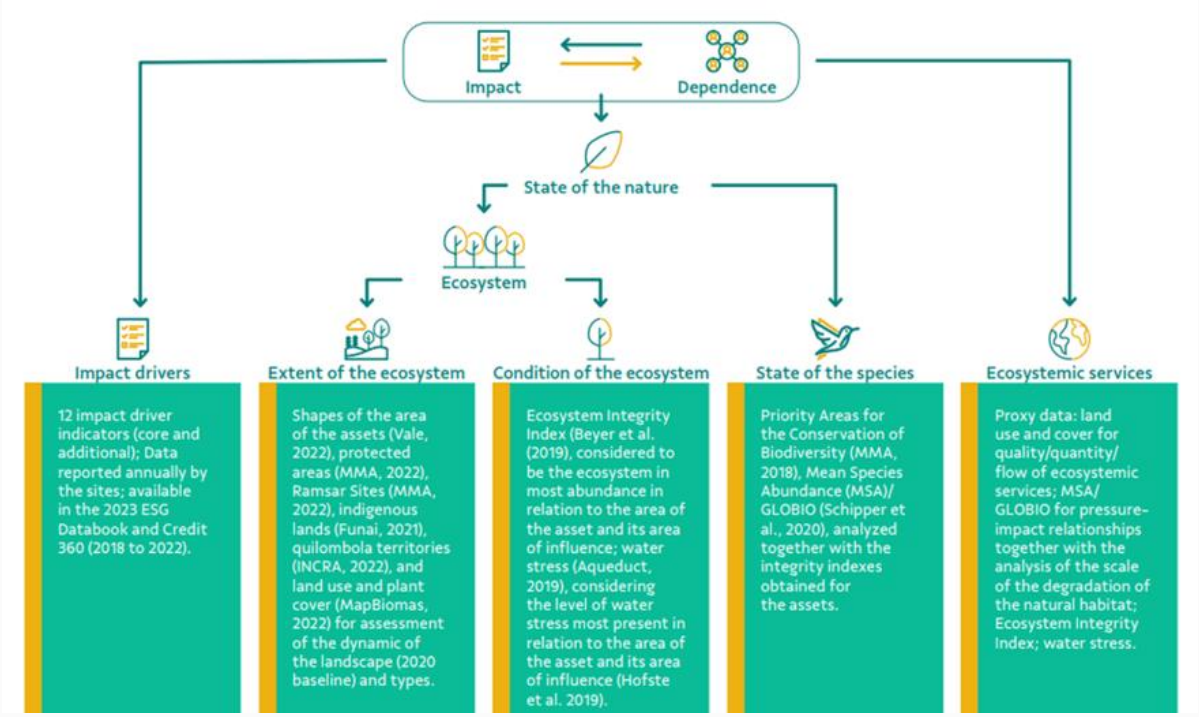
For example, **CDL** analyzed how changes in ecosystem services, such as water scarcity or habitat degradation, could affect its operations. Water is also a key environmental asset for **Reckitt's** operations, and it is particularly interested in its dependency on water flow regulation in the catchment areas where it operates and how this ecosystem service is affected by local water stress. Tools used to support the assessment include the Aqueduct Water Risk Atlas, the Water Footprint Network's scarcity factors, and external data sources. Reckitt bases its materiality assessment on the likelihood of long-term water stress, considering the increased presence of droughts and greater demand in the tropical countries where it manufactures and also sources key raw materials.

Role of regulation in impact assessments

Legal requirements, especially those related to environmental and social impact, played a key role in shaping impact assessments, especially for extractive companies. For example, **Ecopetrol** noted that its decades of environmental data collection within the framework of Colombia's regulatory context underpinned its impact and dependency assessments.

Similarly, in the regions where **Vale** operates, environmental and social impact assessments are legally required to authorize the construction and operation of sites. Aligned with these regulations, Vale conducted nature-related assessments for all its mining, logistics, and energy sites and uses established monitoring programs to report on impacts each year. The local legislation on environmental impact assessment and GRI biodiversity-related disclosures informed Vale's data collection system. The data collected over the years has allowed Vale to assess its dependencies and impacts on nature and to report them according to the GRI Standards, TNFD recommendations, and other standards and frameworks relevant to the local context.

Figure 6: Identifying impact and dependence - data and tools used.



Source: TNFD Report 2023, Vale

4.3. Risk and opportunity identification and assessment

Building on the identification and assessment of nature-related dependencies and impacts, companies interviewed shared insights on how they approach identifying and assessing associated risks and opportunities as part of their financial materiality assessments.

Using the TNFD LEAP approach to identify and assess nature-related risks and opportunities

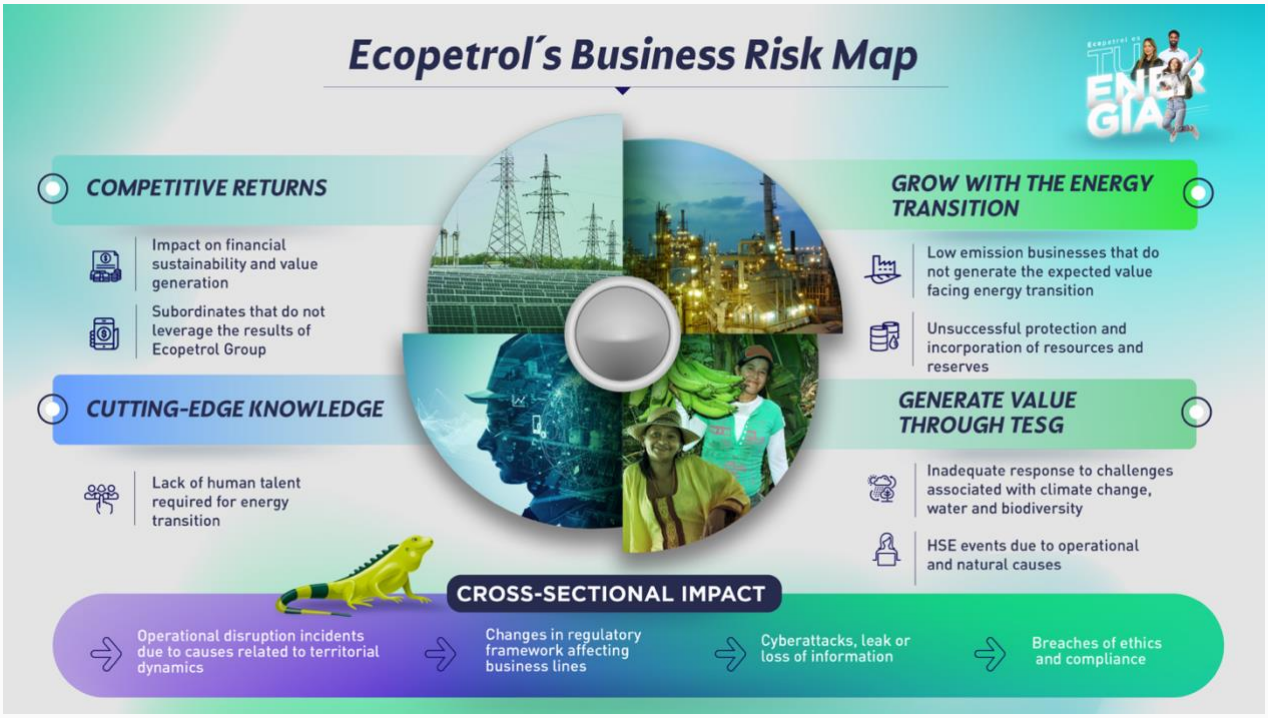
Most companies reported that they follow the Assess phase of the TNFD LEAP approach to identify and evaluate nature-related risks and opportunities, with several applying LEAP systematically, both at the corporate and site level. For example, **Enel** is implementing the full LEAP approach across each of its 54 identified biodiversity hotspots, using the Assess phase specifically to map out risks and opportunities.

The Assess phase of the LEAP approach was cited by companies in the sample as particularly useful for helping companies:

- **Prioritize and rank nature-related risks based on materiality and exposure** – For example, **Ecopetrol**'s TNFD LEAP pilot collected inputs, which allowed the inclusion of one of the business risks related to inadequate management of climate change, water and biodiversity as one of the company's main risks (see Figure 7). This risk relates to the "company's vulnerability to adverse impacts [that] arises from a limited ability to respond promptly, efficiently, and effectively to commitments, obligations, and expectations associated with climate change, water, and biodiversity" (Integrated Management Report 2024, Ecopetrol);

  JSW also uses the LEAP approach in its scoring system to prioritize sites, aligning with component A3 of the Assess phase. The scoring system assigns a different weighting to physical risks, policy risks, and other transition risks, recognizing the varied business implications of different risk categories.

Figure 7: Ecopetrol's Business risk map.



Source: Integrated Management Report 2024, Ecopetrol

- **Estimate potential financial effects, often using qualitative methods – CDL** evaluates financial exposure related to biodiversity loss, such as the impact of declining ecosystem services on property valuations and insurance costs. These are mainly drawn from its climate change scenario study, which identifies climate-related risks and opportunities, as well as their related financial impacts. CDL's assessment of financial effects resulting from climate change physical risks also captures the financial risk of loss of regulating ecosystem services (see Figure 8).

Figure 8: Nature-related risks identified from CDL's 3rd climate change scenario analysis.

Nature-related risks identified from CDL's 3rd climate change scenario analysis

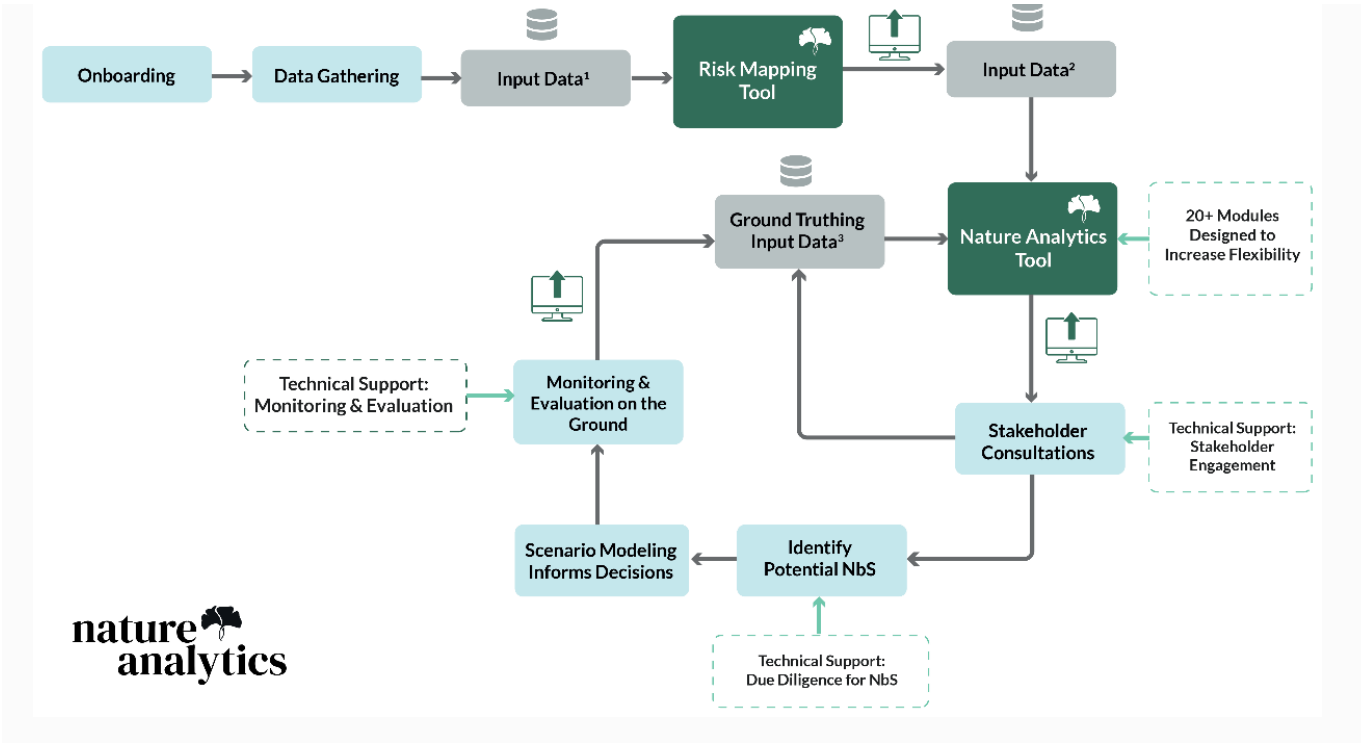
Anticipated timeframe	Short- to long-term	Medium- to long-term	
Classification of risks and relevance to CDL's operations	**Physical risks:** 1. **Loss of ecosystem services creating ad-hoc shocks or pattern:** changes in the pattern and frequency of precipitation and extreme weather may bring hazard to previously unaffected areas. These changes could affect construction activities, water costs, impact heating or cooling costs, or irreversibly damage the cultural value of eco-tourism areas. 2. **Interactions with other ecological issues:** higher average temperatures increase the frequency of acute climate hazards such as tropical storms and heatwaves. These could lower productivity and affect construction activities, water costs, cooling costs or irreversibly damage the cultural value of eco-tourism areas.	**Transition risks (market):** 1. **Increased cost of raw materials:** nature loss may result in regulatory changes that could lead to stricter standards and compliance requirements. Raw materials that are extracted from ecologically sensitive areas might face additional expenses for adapting to and meeting these regulations. Carbon pricing and/or national decarbonisation mandates for carbon intensive industries will also affect the cost of high-carbon construction materials such as steel and cement, as well as energy. Green building standards may also require more technology and innovation that could incur more capital. 2. **Shifts in consumer preferences:** consumer perceptions on environmental and social responsibility may evolve, for e.g., customers may prefer to stay in eco-friendly accommodations. The impacts of nature loss, climate change and carbon pricing may affect people's consumption choices (e.g., accommodation costs and destinations). There might also be more submetering data sharing with building occupants, being occupants or tenants, which could lower energy consumption and increase cost savings.	**Transition risks (policy):** 1. **Rising costs in stormwater management:** an increase in water regulation to manage the impacts of extreme rainfall and flooding is expected to result in an increase in the cost of stormwater management and mitigation requirements for greenfield developments. This is driven by mandated measures to detain stormwater and reduce pollutants discharged into waterways. An increase is also expected in operational costs associated with levies for impermeable surfaces at our assets over time. 2. **Increased expenses from renewable energy mandates:** any potential regulation to mandate the installation of solar photovoltaics in buildings will increase CDL's upfront costs. We may also incur retrofitting costs from the replacement of gas boilers or fossil fuel heating with electric models, as well as increasing demands for retrofit for facilities such as electric vehicle charging stations in building car parks. 3. **Water scarcity and rising costs:** water scarcity is driven by natural systems variability, population growth, change of socioeconomic and land-use factors and technology between now and 2030. We may need to prepare for potential impacts. Increased water pricing will have an impact on operational and construction costs.

Source: Zero in on action: Integrated sustainability report 2025, CDL

- **Clarify the links between nature-related issues –** For **Vale**, the LEAP approach was useful in clarifying concepts that enable a better understanding of risks. In particular, it clarified links between risks and nature-related dependencies and impacts;
- **Validate or refine internal methodologies and processes related to risk management – JSW** applies the LEAP approach in more detail in order to validate the findings of its scoring methodology with local subject matter experts. Additionally, **Iberdrola** updated its Risk Control and Management System using the LEAP approach to identify nature-related risks and opportunities.
- **Formulate strategic responses, including mitigation and adaptation strategies – Reckitt** uses guidance on the Assess phase of LEAP to model different mitigation interventions and risk scenarios. In particular, it translates the state of nature metrics (biodiversity baseline) of a key sourced raw material into the Nature

Analytics model that assesses the consequences and opportunities of different potential interventions. The model supports a comprehensive strategy for implementing a landscape-scale nature strategy with integrity, from initial data analysis to stakeholder engagement and long-term monitoring (see Figure 9).

Figure 9: Combining the NbI Risk Mapping and Nature Analytics tools, Reckitt's framework draws on desk-based synthesis, quantitative field data, and stakeholder consultations to support the planning, implementation, and monitoring of a robust community-led nature-based solutions strategy



Source: Reckitt, Nature-based Insights (NbI).[2]

[2] Input data: 1) Risk Mapping tool requires information on commodities and sourcing countries. 2) Nature Analytics Tool requires geolocations (at the mill, processing centre, farm, or asset level) and yields purchased (where relevant). 3) The preliminary analysis is based on global/regional datasets, these datasets are then ground-truthed using field data collected for each activity through the monitoring and evaluation strategy, or collected by local partners (e.g. national parks, NGOs).

Risks and opportunities assessment methods tend to be less advanced

The case studies demonstrated that companies are becoming more mature in their consideration of nature-related risks and opportunities, increasingly embedding sustainability into financial and strategic factors that can shape long-term value creation and risk management. Nevertheless, companies generally acknowledged that the methods used for identifying and assessing nature-related risks and opportunities remain less advanced than those applied to measuring dependencies and impacts, as explained in the paragraphs below.

i. Risk identification and assessment

Iberdrola identified challenges, particularly related to identifying risks at the site level, and decided to rely solely on an impact materiality approach to identify its material sites, as its double materiality approach was still under development at this level.

While acknowledging the progress made in using relevant risk metrics, **Vale** recognized that quantifying the financial risk associated with nature and biodiversity remains a significant challenge, especially at sites in ecologically sensitive areas. Biodiversity in the areas where Vale operates is abundant, endemic, or vulnerable, and a deep level of understanding is required to visualize and manage the risks emerging from megadiverse regions. Vale has learned that high granularity of data is needed to discern nature-related issues and prioritize sites. Assessments using tools such as the WWF Biodiversity Risk filter should be complemented with additional site-specific data and analysis, as well as expert review, to ensure the relevance and accuracy of the assessment results.

CDL faced challenges when evaluating the actual financial effects of nature-related risks. CDL evaluated financial exposure related to biodiversity loss, such as the impact of declining ecosystem services on property valuations and insurance costs, primarily through qualitative approaches. CDL plans to explore the possibility of using TNFD guidance in upcoming scenario analyses, enabling them to identify the interconnections between nature-related and climate change effects.

Ecopetrol, like CDL and others, used scenario analysis to assess climate change and water-related physical risks; however, they found it challenging to apply this method to other aspects of nature. This is why they currently use the socioecological resilience tool mentioned above (see *Innovative methods to assess DIROs*) as a scenario-based assessment for biodiversity.

ii. Opportunities identification and assessment

Similarly, some of the companies interviewed demonstrated advanced methods for identifying opportunities stemming from their positive impacts on nature and in maintaining the sustained supply of the ecosystem services they rely on. Nevertheless, unlike the identification of nature-related risks highlighted above, no company linked opportunities with any specific assessment guidance (e.g., LEAP or GRI guidance), which may have helped

them assess and measure these opportunities, including in terms of financial benefits for the company's prospects.

CDL has integrated biophilic design and nature-based solutions into its developments. For example, the CDL MicroForest is a collaborative, research-driven regenerative tropical microforest developed with the National University of Singapore. This initiative demonstrates how urban greening can enhance biodiversity, improve air quality, and increase climate resilience. Additionally, the company has secured more than S$9 billion in green and sustainability-linked loans and bonds since 2017, including Singapore's first TNFD-aligned sustainability-linked loan, valued at S$400 million, in 2024. In 2023, CDL also invested in blue carbon credits under the Delta Blue Carbon Project, supporting the protection and restoration of 350,000 hectares of mangrove forest in Pakistan.

Ecopetrol has identified opportunities related to ecosystem conservation and restoration through the creation of Ecoreservas®[3], which are areas owned by Ecopetrol and often co-managed with local communities, presenting opportunities to enhance reputation, build partnerships, and potentially engage with future conservation finance mechanisms.

Opportunities can also be derived from mitigating negative impacts on nature. In this respect, **Reckitt** engages with IPLCs and farmer groups to develop effective measures that mitigate risks, particularly related to water. For example, the company is working with governments and farming communities to implement drought management measures in Indian water catchment areas, and assesses the financial and social impact opportunities for local communities from the restoration of the water courses. However, Reckitt acknowledged that individual efforts to mitigate water risk are limited when other actors in the same catchment do not use water sustainably. Reckitt's approach, therefore, extends beyond their own sites to include working with governments and communities who are part of the catchment. The company engages in advocacy platforms and collaborates in groups to support water protection. Its work in the Hosur and Mysore sites in India exemplifies this approach, which focuses on replenishing water levels (aiming to replenish at least the same amount of water it abstracts in water-stressed locations) and broader advocacy.

Dependencies and impacts on nature serve as the foundation for assessing nature-related risks and opportunities

All companies described nature-related risks and opportunities as stemming from their interactions with nature, recognizing that financial risks can arise from both dependencies and impacts on nature, as well as their interaction. As highlighted in this study's introduction, an organization's risks can arise from its own impacts on nature, the impacts of others on nature, and other external factors, such as climate change, that may affect the ecosystem services on which it depends.

[3] See Measurable and quantifiable positive contributions to nature (Ecopetrol): "Geographically defined areas owned by companies of the Ecopetrol Group, which are voluntarily designated in part or completely to the conservation of biodiversity and the supply of ecosystemic services, without limiting their productive purposes"

As seen above for **JSW**'s risk assessment standard, JSW's 4x4 risk matrix correlates the severity of nature-related risks directly with the level of dependency or impact on an ecosystem service or environmental asset (see Figure 3). If a site has a high dependency or high impact on an ecosystem service or environmental asset, its nature-related risk is also high. JSW plans to develop more advanced methods to quantify the magnitude of the risks identified so far, which may further support them with the risk prioritization process.

CDL also analyzes how changes in ecosystem services, such as water scarcity or habitat degradation, could affect its operations, which helps it understand and address potential risks to operational viability. CDL also identifies water-related risks based on exposure to water stress, flooding risks, and pollution levels.

Vale's approach to nature-related risk assessment is based on the state of nature of each site and its potential changes, which can originate from the company's activities in that site. This approach helps determine whether a risk arises from Vale's impact on nature or from its dependency on natural resources. For example, at a mining site in Carajás, located within the highly biodiverse Amazon Forest, nature-related risks are associated with the impact of Vale's operations (for example, decreased air and water quality, and habitat loss during iron ore extraction and processing). In contrast, for a site in Minas Gerais, a highly deforested region, the nature-related risks are linked to dependencies (for example, water provisioning which is affected by deforestation).

The dependencies and impacts identified by **Reckitt** in its own sites and key sourced raw materials are fed into the company's risk assessment process. The company uses the same risk assessment process for nature as it does to identify the organization's other financial and non-financial risks.

The companies interviewed tend to link dependencies with physical risks and impacts to transition risks. For example, **Ecopetrol** identified:

- Reputational transition risks associated with conflicts around water use with third parties. This risk is associated with the impact of water use.
- Physical risks related to flooding stemming from the dependency on the ecosystem service of flood and storm regulation.

Managing impacts and dependencies helps reduce residual risks

Companies typically report lower exposure to nature-related risks when management plans for impacts and dependencies are in place.

In this respect, **Reckitt** states that its position as an 'off-taker' (i.e., not owning the environmental asset but buying from suppliers) influences how it assesses and responds to the risks associated with its dependencies and impacts on nature. Unlike an asset owner whose financial value is directly tied to specific environmental assets, Reckitt has greater flexibility to mitigate risks in its supply chain, e.g., by diversifying sources or switching to alternative materials. For example, to mitigate biodiversity-related risks from its latex supply

chain in Surat Thani, Thailand, Reckitt can avoid mono-sourcing, use multiple suppliers, or use alternative raw materials to replace latex in its products.

According to the risk assessment methodology published in its Non-Financial Information Statement (NFIS), none of **Iberdrola**'s nature-related material dependencies or impacts lead to financial risks that have materialized (what the company defines as 'actual' material financial risks), due to the measures taken to mitigate these risks. Therefore, no financially material risks are anticipated.

When evaluating its exposure to risk for the first time, **Enel** found that approximately 80% of its assets fell into the lowest level of exposure to nature-related risks, with most hotspots having very low residual risks after accounting for existing control measures. Only for two hotspots over the 18 analyzed in 2024, with action plans still ongoing, it was deemed appropriate to maintain a significant residual risk rating.

Definitions

All nature-related terms and concepts used in this paper align with the definitions provided in the respective glossaries of the TNFD and GRI. Readers are encouraged to refer to the TNFD Glossary and the GRI Glossary for detailed definitions and further clarification.

Appendix I

List of organizations interviewed

Organization	Type	Sector	Countries of operation
CDL	Publicly-listed enterprise	Real estate	Network of 168 locations in 29 countries and regions
Ecopetrol S.A.	Publicly-listed enterprise with majority state-ownership	Oil and gas	Colombia
Enel	Publicly-listed enterprise	Energy (Utilities)	28 countries worldwide, producing energy with approximately 91 GW of total capacity and with a network of 1.9 million kilometers
Iberdrola S.A.	Publicly-listed enterprise	Renewable resources & alternative energy	Australia, Brazil, France, Germany, Hungary, Poland, Italy, Portugal, Greece, Ireland, Mexico, Spain, United Kingdom, United States.
JSW Steel	Publicly-listed enterprise	Extractives & mineral processing	India, Italy, United States
Reckitt	Publicly-listed enterprise	Consumer goods	Over 60 countries worldwide
Vale	Publicly-listed enterprise	Metals & mining	Brazil, Canada, China, Indonesia, Japan, Malaysia, Oman, UK

Appendix II – References

- Zero in on action: Integrated sustainability report 2025, CDL
- Integrated Annual Report 2024, Enel
- Integrated Management Report 2024, Ecopetrol
- Sustainability Report 2024, Reckitt
- Measuring Our Success, Biodiversity, JSW Steel
- TNFD Report 2023, Vale
- Statement of Non-financial Information: Sustainability Report 2025, Iberdrola


T N
F D
Taskforce on Nature-related
Financial Disclosures
GRI