

Towards a robust measurement of business dependencies on nature

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1. Introduction

1.1 Business dependencies on nature

Over USD44 trillion of global economic value generation, more than half of the world's total GDP, is moderately or highly dependent on nature (World Economic Forum [WEF] 2020). Businesses across all economic sectors rely on ecosystems to provide resources (e.g. water, timber), and to regulate and maintain the conditions within which business operations can run effectively (e.g. flood and storm protection, water filtration, erosion control). Businesses also depend on ecosystems to provide cultural connections with people and the societies within which businesses operate. The aspects of ecosystem services that businesses rely upon are referred to as business dependencies on nature (see Box 1 below).

While there is a growing recognition that business dependencies on nature are associated with material risks and opportunities for businesses and financial institutions, there is a lack of clarity on how these dependencies should be measured. The Kunming-Montreal Global Biodiversity Framework (GBF) and the Taskforce on Nature-related Financial Disclosures (TNFD) are bringing reporting and disclosure of business dependencies on nature to the forefront, alongside impacts. However, approaches to measuring dependencies are less well developed than approaches to measuring business impacts on nature.

Box 1: Definitions of business impacts and business dependencies on nature

Definitions of business impacts and business dependencies on nature

Business impacts on nature

Changes in the state of nature, which may result in changes to the capacity of nature to provide social and economic functions. Impacts can be positive or negative. They can be the result of an organization's or another party's actions and can be direct, indirect or cumulative.

Business dependencies on nature

Aspects of ecosystem services that an organization or other actor relies on to function. Dependencies include ecosystems' ability to regulate water flow, water quality, and hazards like fires and floods; provide a suitable habitat for pollinators (who in turn provide a service directly to economies); and sequester carbon (in terrestrial, freshwater and marine realms).

(Taskforce on Nature Related Financial Disclosure [TNFD] 2022a)

(Science Based Targets for Nature [SBTN] 2022)

(Climate Disclosure Standards Board [CDSB] 2021)

1.2 About this guidance

This guidance aims to strengthen financial institutions' understanding of business dependencies on nature and how they can be measured. It builds on UNEP-WCMC's research on the preparedness of businesses for nature-related disclosure (UN Environment Programme [UNEP] 2022), recommendations from the Aligning Accounting Approaches for Nature (Align) project (UN Environment Programme World Conservation Monitoring Centre [UNEP-WCMC] et al. 2022) and research supporting the development of the Nature Risk Profile methodology (UNEP 2023). Besides financial institutions, it will be useful for businesses looking to strengthen their assessment and disclosure practices. It is intended to complement existing guidance, including TNFD's guidance and recommendations on evaluating business dependencies and on assessing dependency-related risks and opportunities.¹

The guidance consists of five sections. Section 1 is the introduction. Section 2 outlines the importance of measuring business dependencies on nature. Section 3 summarises three key insights about measurement of business dependencies on nature. Section 4 describes what components should be included for robust measurement. Finally, Section 5 outlines action points for the TNFD, financial institutions and businesses to strengthen measurement of nature-related dependencies.

¹ More information available at the TNFD online framework platform: framework.tnfd.global/the-leap-nature-risk-assessment-process/evaluate/ and in the TNFD and Capitals Coalition guidance on impact and dependency analysis: framework.tnfd.global/wp-content/uploads/2022/07/TNFD-Impact-and-Dependency-Analysis-June-2022-Beta-v0-2-V2.pdf





2. Importance of measuring business dependencies on nature

2.1 Measuring dependencies to fully understand nature-related risks and opportunities

Until recently, measurement and reporting of interactions with nature by businesses and financial institutions has mainly focused on impacts on nature. This impact focus has been essential for ensuring compliance with local, national and international regulations across multiple sustainability issues including water, waste and biodiversity and for meeting societal expectations related to sustainability. Where organizations have been measuring their dependencies on nature, this has tended to be limited to a few key ecosystem services and often with little consideration for the state of nature and future trends in ecosystem capacity. This has led to an incomplete understanding of the scope of dependency-related risks and limited the ability of organizations to manage these risks.

There is an increasing awareness that business dependencies on nature lead to material risks and opportunities for businesses, and therefore need to be measured. Businesses and their operations can be directly or indirectly harmed by a decline in availability or quality of an ecosystem service they depend on, which can be driven by nature loss. Equally, businesses can derive significant opportunities through restoring nature and increasing the flow of ecosystem services that they and others depend on. Due to the globally observed decline in the state of nature (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES] 2019; WWF 2020), the exposure of businesses to risks and opportunities from their dependencies on nature will continue to increase.

2.2 Growing expectations to measure and disclose nature-related dependencies

The Kunming-Montreal Global Biodiversity Framework expressly recognizes the importance of involving all actors, including businesses and financial institutions, in achieving all its goals and targets. It also specifically refers to measurement of business dependencies and impacts on biodiversity in Target 15. Through Target 15, the 196 countries that are parties to the Convention on Biological Diversity (CBD), commit to “[t]ake legal, administrative or policy measures to encourage and enable businesses, and in particular to ensure that large and transnational companies and financial institutions [...] regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity” (Convention on Biological Diversity [CBD] 2022). This is expected to shape future national and international regulations and standards as well as market best practice in the coming years.

Further support and guidance on measurement and disclosure of business dependencies on nature is provided by the TNFD. The TNFD is following in the footsteps of the Task Force on Climate-related Financial Disclosures (TCFD) whose recommendations have already been incorporated into the International Sustainability Standards Board (ISSB) Sustainability Standards, voluntary disclosure frameworks as well as regulatory requirements in several countries.² Voluntary disclosure frameworks (e.g. CDP or the Global Reporting Initiative (GRI)) are already incorporating some aspects of the TNFD recommendations and extending their coverage of biodiversity and nature (Global Reporting Initiative [GRI] 2022; CDP 2022). At the CBD COP15, the ISSB announced that it will draw on the TNFD recommendations to complement its climate-related disclosures and to address nature-related disclosures (The International Financial Reporting Standards Foundation [IFRS] 2022).

2.3 Benefits to financial institutions from rigorous measurement of nature-related dependencies

A growing number of financial institutions are adopting the concept of double materiality³ in relation to nature. They encourage businesses to assess and report on how their activities are both impacting and depending on nature because this has implications for the economy, society, as well as the businesses in question. An illustration of the connections between impacts and dependencies can be found in Section 3 below.

2 For example, the United Kingdom and Switzerland have both introduced mandatory climate-related financial disclosure in line with TCFD recommendation for certain companies and financial institutions. More information available at: [gov.uk/government/news/uk-to-enshrine-mandatory-climate-disclosures-for-largest-companies-in-law](https://www.gov.uk/government/news/uk-to-enshrine-mandatory-climate-disclosures-for-largest-companies-in-law) [admin.ch/gov/en/start/documentation/media-releases.msg-id-91859.html](https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-91859.html).

3 Double materiality is the concept that companies should disclose not only how nature may impact the company's immediate financial performance ('outside-in') but also how the organization impacts nature ('inside-out') because this will become material for the company over time (TNFD 2021).

Ensuring business dependencies are rigorously measured will allow financial institutions to assess and manage the full scope of the nature-related risks in their portfolio.

Financial institutions need to understand not only what ecosystem services the businesses in their portfolio are dependent on, but also their level of reliance on these and nature's capacity to provide these services in the future. Results from measurement of business dependencies on nature, in combination with data on business impacts, will reveal which nature-related risks and opportunities the businesses are facing and help identify potential management responses. This will allow financial institutions to conduct a comprehensive assessment of risks and opportunities at the portfolio level, where dependency-related risks and opportunities from different investments can compound or create feedback loops with nature-related impacts of other businesses in the portfolio.



3. Three insights into measurement of business dependencies on nature

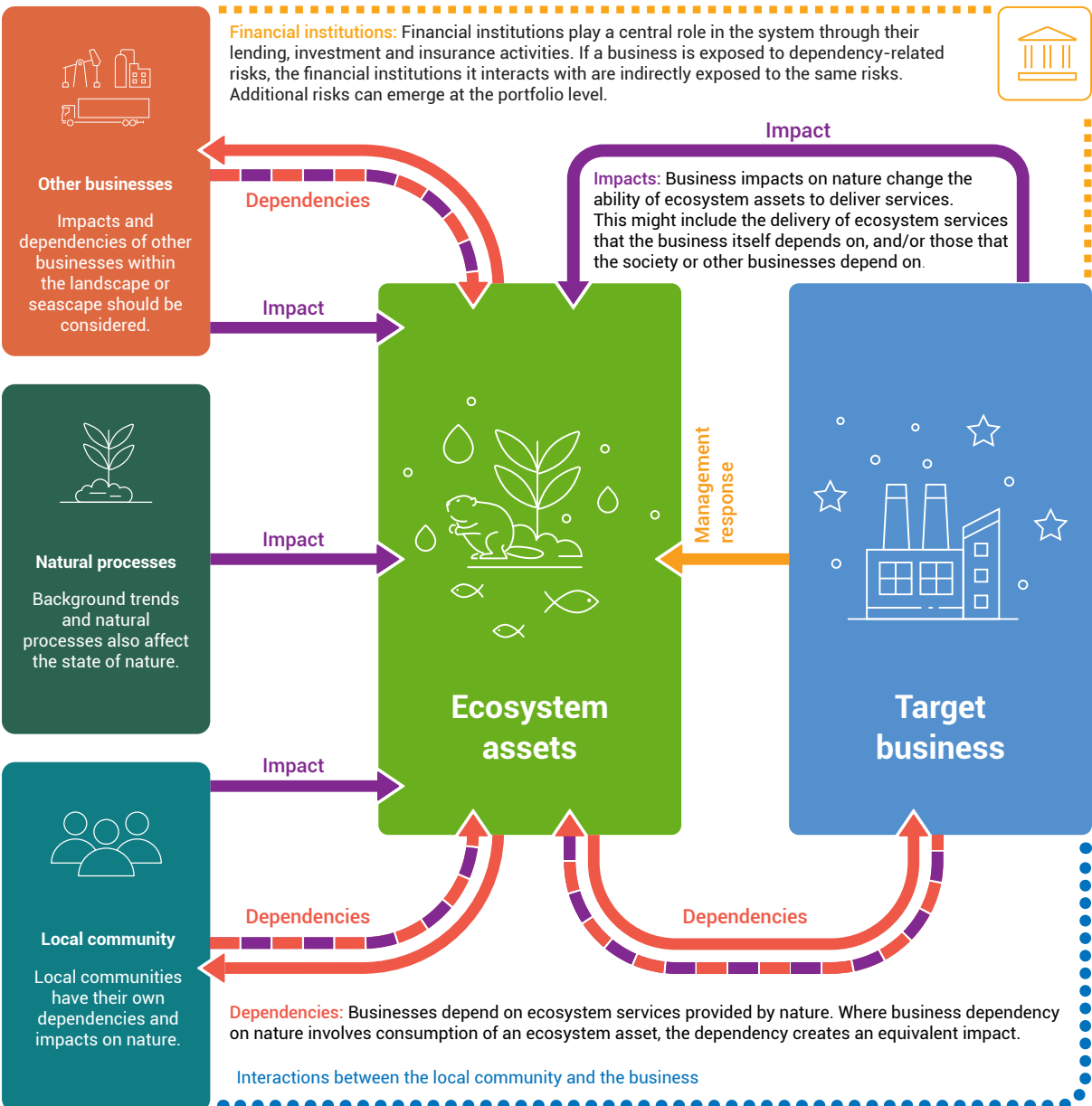


Figure 1: Interconnectedness of dependencies and impacts on nature

Insight 1: Measurement of business dependencies on nature should be informed by interconnections between businesses, nature and local communities

The level of dependency-related risk is not determined solely by how dependent the business is on the ecosystem service. The risk associated with any dependency on nature is also determined by the state of nature and can be increased by the business's own impacts, the impacts of other businesses, the impacts of the local community and natural processes. Measuring dependency related risk requires an understanding of these impacts and associated trends in the state of nature. Figure 1 above illustrates the interconnectedness of dependencies and impacts on nature.

Insight 2: Different types of nature-related dependencies are associated with different pathways to risks and opportunities

When measuring business dependencies on nature, it is important to consider whether the ecosystem service that the business is dependent upon is a provisioning ecosystem service or not. For most regulating and maintenance ecosystem services or cultural ecosystem services, a business's dependence on the ecosystem service does not limit the benefit available to others, and does not necessarily impact on the ecosystem asset. For provisioning ecosystem services (e.g. timber, water supply, wild fish), businesses are consuming the ecosystem assets they are dependent upon and therefore need to consider how they are impacting the ecosystem services through their consumption.⁴ Examples illustrating the difference between provisioning ecosystem services and other types of ecosystem services can be found in Box 2 below.

Box 2: Examples of the relationship between nature-related dependencies of a business and the ecosystem asset that underpins the dependency.

EXAMPLE 1	EXAMPLE 2
<p>Provisioning ecosystem service: business impacts the ecosystem asset that underpins its dependency through its own consumption in addition to impact drivers associated with other activities</p>	<p>Regulating and maintenance ecosystem service: business's dependency does not impact the ecosystem asset underpinning the service</p>
<p>An agricultural producer is dependent upon a clean water supply. The availability of sufficient quality and quantity of water will be impacted by both the consumption of water if unsustainable, as well as the agricultural producer's use of fertilisers that pollute groundwater.</p>	<p>An electricity distribution company benefits from erosion control provided by soil stabilising forests, which reduces likelihood of landslides affecting its transition lines. This dependency does not limit the availability of the same ecosystem service to other businesses and rights holders in the area.</p>

⁴ For definitions of the three categories of ecosystem services (provisioning services, regulating and maintenance services, and cultural services), see the UN SEEA Ecosystem Accounting (SEEA EA). Available at: seea.un.org/ecosystem-accounting

Insight 3: Ecosystems that support nature-related dependencies can reach tipping points

The ecosystem services that businesses depend upon can only be provided by ecosystems with sufficient capacity. Ecosystems in better condition generally have higher capacity to generate ecosystem services and sustain them into the future. While it is difficult to measure ecosystem capacity, measurement of ecosystem extent (i.e. size) and ecosystem condition (i.e. quality) in the given location can provide a good proxy.⁵

The condition of some ecosystem assets can reach tipping points or thresholds beyond which their capacity to provide ecosystem services is significantly reduced or destroyed. Multiple direct and indirect impacts in a given landscape can combine to trigger tipping points or thresholds in ecosystem degradation. As these are reached, dependency-related risk to businesses can spike up or rapidly increase. Measurement of business dependencies on nature should take into consideration this potential non-linear change. Nature scenarios that reflect planetary boundaries and predict the tipping points in ecosystem decline should inform all components of dependency measurement as well as subsequent assessment of dependency-related risks.

5 Further guidance on measuring the state of nature can be found in the Align project recommendations. Available at: capitalscoalition.scribhub.com/documents/14



4. Components of a robust measurement of business dependencies on nature

Although still in development, the TNFD's LEAP approach has the potential to establish robust measurement of nature-related dependencies as best practice for businesses and financial institutions. The LEAP approach involves four phases of analysis: **Locate** your interface with nature, **Evaluate** your dependencies and impacts, **Assess** your risks and opportunities, and **Prepare** to respond to nature-related risks and opportunities and report to investors and other stakeholders (TNFD 2023). While the TNFD is still refining its recommendations on how to evaluate nature-related dependencies (TNFD and Capitals Coalition 2022), this section highlights which components financial institutions and businesses should include in their measurement of nature-related dependencies in **Evaluate** phase step E3 to ensure it is robust and aligned with the TNFD LEAP approach.⁶

To account for the full scope of dependency-related risks and opportunities, measurement of business dependencies on nature at a location should cover the following components:

1. Reliance on the ecosystem service
2. Impact drivers resulting from the business's own activities
3. External drivers of change
4. State of nature supporting the ecosystem service
5. Ecosystem service

Given the complexity of the measurement, it is recommended that this is conducted first and foremost for the nature-related dependencies that are most significantly material to the business's direct operations and value chain. Prior to conducting the measurement, it is necessary to compile data on the locations of the business assets and operations and specify the locations where the business interfaces with nature. This will help identify which of the locations should be prioritised based on their proximity to high integrity ecosystems, areas of rapid decline in integrity, areas of high biodiversity importance, areas of water stress or where the company is likely to have significant dependencies and/or impacts on nature (this is the Locate phase of the LEAP approach). After selecting the priority locations, businesses can also identify those ecosystem

⁶ Our approach builds on a number of leading initiatives: The Natural Capital Protocol (Further information available at: capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement), Align (Further information available at: capitalscoalition.scribhub.com/documents/14), and Climate Disclosure standards board Application guidance for biodiversity-related disclosures (Further information available at: cdsb.net/sites/default/files/biodiversity-application-guidance-single-disclaimer.pdf)

services that are significantly material to their direct operations and value chain.

To capture future trends, measurement of each of the five components and subsequent analysis and identification of dependency-related risks and opportunities should reflect insights from nature scenarios adopted by the company.⁷ Nature scenarios will help businesses and financial institutions consider connections between different stakeholders in a landscape, predict changes in natural processes and behaviours of different stakeholders, and estimate potential thresholds or tipping points. Information gathered through measurement of dependencies and impacts can in turn feed into the nature scenarios and improve their accuracy.

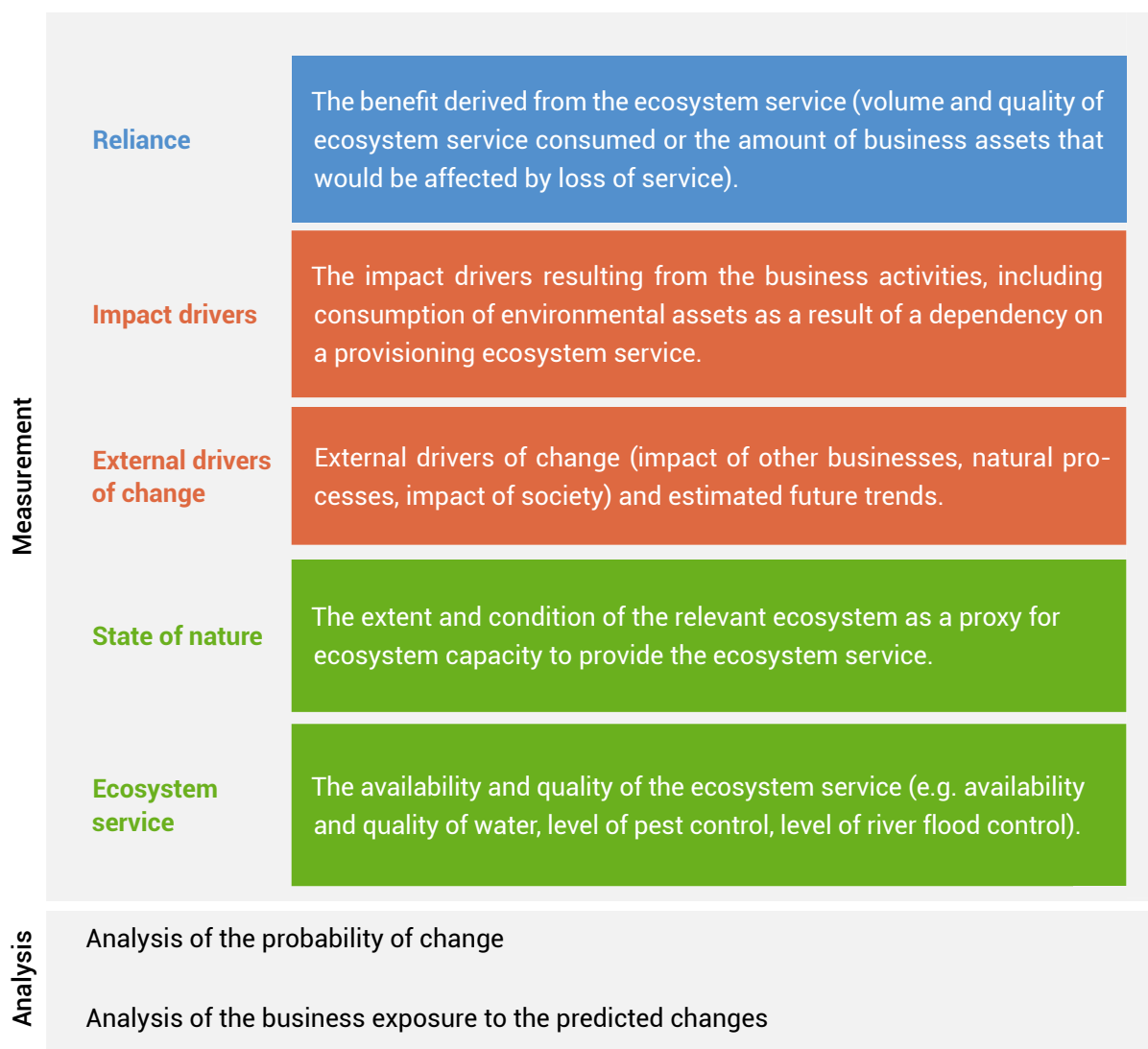


Figure 2: Components of measurement of business dependencies on nature

⁷ Nature scenarios are descriptions of a plausible future that allow companies to conduct scenario analysis and explore the uncertainties and possible consequences of nature loss, and the implications of these for business strategy and financial planning. More information on the TNFD approach to nature scenarios is available at: [framework.tnfd.global/disclosure-recommendations/approach-to-scenarios/](https://www.tnfd.org/global/disclosure-recommendations/approach-to-scenarios/)

4.1 Reliance

The first component that should be measured is the benefit to business activities derived from the ecosystem service upon which the business depends.

- For provisioning ecosystem services, the level of consumption of the ecosystem asset that is required for the business activities should be assessed. For inputs directly used in production processes (e.g. timber, water, medicinal plants) businesses may already be collecting these data as part of their input monitoring or procurement.
- For regulating and maintenance ecosystem services and cultural ecosystem services, the benefit that the business derives from these services can be measured based on the amount or value of business assets that would be affected by the loss of these services.⁸

4.2 Impact drivers

The second component that should be measured encompasses the impact drivers resulting from the business activities.

- Businesses alter the stock of ecosystem assets, the state of nature and the availability and quality of ecosystem services through their activities. This includes reductions in the stock of ecosystem assets as a result of businesses' dependence on provisioning ecosystem services (see Section 3 of this report).
- While impact drivers can be both positive or negative, negative business impacts on nature currently far outweigh the positive ones (IPBES 2019; International Resource Panel [IRP] 2019). Negative impact drivers,⁹ including extraction and processing of materials, fuels and food, cause more than 90 per cent of global biodiversity loss and water stress and half of global greenhouse gas emissions (IRP 2019).
- Some impact drivers can lead to indirect impacts on other ecosystem services. For example, excessive consumption of water by a company at a given location can result in reduced availability of water. This can increase the risk of droughts and weaken the condition of a forest that is protecting the same company's assets from land erosion impacts.

4.3 External drivers of change

Next, external drivers of change need to be measured. As illustrated in Figure 1, this includes measuring:

- activities of other businesses in the locations, which are associated with impacts and dependencies on nature;

8 Further information on valuing changes in ecosystem service provision can be found in the Align project recommendations. Available at: capitalscoalition.scribhub.com/documents/14

9 In the Drivers-pressures-state-impacts-response (DPSIR) framework, negative impact drivers are referred to as 'pressures'. They link economic activities (the drivers) and changes in the state of the environment, which in turn result in impacts. More information on the DPSIR framework can be found in EEA, 1999: eea.europa.eu/publications/TEC25

- nature-related impacts and dependencies of local communities and other stakeholders in the locations;
- natural trends and processes that have the potential to change the state of nature, including climate change.

4.4 State of nature

The fourth component that should be measured is the state of nature providing the ecosystem services upon which the business depends.

- For all ecosystems in priority locations that are identified as integral to providing the ecosystem services upon which the business depends, it is necessary to measure their extent (i.e. size) and condition (i.e. quality) as a proxy for the ecosystem capacity.
- Measurement of ecosystem condition involves measuring the ecosystem composition, structure and functioning. Various national and international indices and indicators capture all or selected aspects of ecosystem condition.¹⁰ For example, the Ecosystem Integrity Index (EII) currently in development by UNEP-WCMC will allow large-scale assessment of the condition of ecosystems.¹¹
- To avoid double counting, it is useful to note that some state of nature indicators include data on external drivers of change (e.g. EII includes data on certain environmental threats to ecosystems). However, businesses and financial institutions will likely identify additional external drivers of change specific to the assessed locations.

4.5 Ecosystem service

The fifth and final component that should be measured is the ecosystem service upon which the business depends.

- For all ecosystem services that the business depends on and that are significantly material to the business, it is necessary to measure their availability and quality.
- While the measurement of the state of nature focuses on the extent and condition of the whole ecosystem, this measurement component focuses on the specific ecosystem service or services provided by that ecosystem.
- The state of all ecosystem services is related to the capacity of the relevant ecosystem (state of nature), whereby a higher level of ecosystem integrity often leads to an increase in availability and/or quality of the service (e.g. abundance of wild fish, variety of medicinal plants, quality of wild pollinated fruits, level of flood defence).
- Measurement of ecosystem services should capture the availability and quality of the service and not the environmental assets providing the service (i.e. capture the service flow and not the stock of the assets). It is worth noting that the measurement should capture the contribution or benefit that the ecosystem service provides to all stakeholders, not just the assessed company.

10 Further guidance on measuring the state of nature can be found in the Align project recommendations. Available at: capitalscoalition.scribhub.com/documents/14

11 UNEP-WCMC (2022). The Ecosystem Integrity Index: a Novel Measure of Terrestrial Ecosystem Integrity with Global Coverage. Preprint. bioRxiv 2022.08.21.504707; doi: doi.org/10.1101/2022.08.21.504707

4.6 Resulting analysis

The measurement of the five components outlined above will allow companies to analyse the likelihood and extent of changes in ecosystem service provision, and subsequently enable an assessment of dependency-related risks to the business.

- Based on the impact drivers, external drivers of change, state of nature in the location and state of the given ecosystem service, it is possible to estimate the probability of change to the quality and availability of each ecosystem service that businesses are dependent on in a given location. This involves estimating the likelihood of change (i.e. What is the likelihood that the driver will lead to a change in the quantity or quality of an ecosystem service?) and estimating the extent of change (i.e. How big is the change likely to be?).
- Based on the measured level of reliance and the probability of change to the ecosystem service, it is possible to estimate the consequence of any change to ecosystem services for the business. In other words, how will the change to the ecosystem service affect business operations.

After completing the measurement and the resulting analysis, businesses and financial institutions will gain an understanding of the full scope of their nature-related dependencies. This will facilitate a comprehensive assessment of dependency-related risks and opportunities.¹² Dependency-related risks and opportunities to the assessed business could lead to financial risks and opportunities to related businesses, investors, lenders, insurers and governments.¹³

12 The TNFD beta framework provides draft guidance on assessing nature-related risks and opportunities based on an evaluation of both dependencies and impacts. Available at: [framework.tnfd.org/global/the-leap-nature-risk-assessment-process/assess/](https://www.tnfd.org/global/the-leap-nature-risk-assessment-process/assess/)

13 More information on how dependency-related risk translates to financial risk can be found in case studies developed by the Cambridge Institute for Sustainability Leadership. Available at: [cisl.cam.ac.uk/resources/publications/integrating-nature-case-action-nature-related-financial-risks](https://www.cisl.cam.ac.uk/resources/publications/integrating-nature-case-action-nature-related-financial-risks)

Example 1: Measuring an energy company's dependency on coastal hazard protection

An energy company has undertaken an **initial materiality assessment** and identified that due to the volume of physical infrastructure assets within their operations (e.g. power plants) located in coastal areas, they have **high exposure to disruption should this infrastructure be impacted by natural hazards**. Data on location of the company's assets in comparison with spatially resolved data on ecosystem integrity and biodiversity allow the company to identify **coastal areas in Indonesia as priority locations** because the local mangrove forests are experiencing declining ecosystem integrity in recent years. The company therefore needs to measure its dependency on hazard protection ecosystem services in Indonesian coastlines.

Reliance

Through overlaying data on location of their infrastructure assets with the **global coastal habitat map**, the company has identified which assets are likely benefiting from hazard protection ecosystem services provided by mangrove forests. They estimate their level of reliance on this ecosystem service by calculating the total financial value of these company assets.

Impact drivers

Although vegetation was cleared for the development of their infrastructure assets, an **analysis of the Area of Influence** of the company's operations suggests that the company is not currently creating impact drivers that would affect the state of mangrove forests or their ability to deliver hazard protection ecosystem services.

External drivers of change

Mapping of other key stakeholders in the assessed locations and their activities finds that recent expansion of the aquaculture sector in the region is likely to be affecting the state of mangroves forests and the state of hazard protection ecosystem services they provide. **Analysis of average expansion rates** of the aquaculture sector in Indonesia in recent years and information on local regulations enables estimation of the reduction in the size of mangrove forests in the next year and in the next five years.

State of nature

Through **remote sensing**, it is established that the extent of the mangrove ecosystem has been decreasing over the past five years, and a **fragmentation index** reveals that remaining patches are becoming increasingly fragmented. It is likely that this trend will continue due to continued expansion of the aquaculture sector in the area and absence of mitigation or restoration.

Ecosystem service

Publicly available data on hazard events in Indonesia reveals that there is a minor increase in the number of floods in the areas where mangrove forests are more fragmented. **Data from the company's environmental impact assessments** conducted in coastal regions of Indonesia in recent years also suggest that the company's infrastructure holdings as well as other critical infrastructure that the company relies on, which are located near degraded mangrove forests, are facing increasing flood risk.

The measurement of the latter four components allows the company to determine that the quality and availability of the hazard protection ecosystem service provided by the mangrove forests in the areas where the company holds infrastructure assets is likely to deteriorate in the future. They predict that there is a **very high probability of deterioration** in the long term as the hazard protection provided by the mangrove forests is predicted to rapidly decline or even cease once a certain level of fragmentation is reached.

Having an understanding of the probability of change and the level of reliance on the hazard protection ecosystem service allows the company to analyse its **business exposure to potential disruption in the hazard protection ecosystem service**. Based on this information, the company can estimate the full scope of risks and opportunities associated with their dependency on the hazard protection ecosystem service provided by the mangrove forests in Indonesia. One example of the dependency related risks could be significantly increasing cost of flood insurance for the company's infrastructure holdings located in coastal areas.

Example 2: Measuring an apparel company's dependency on water supply through its upstream value chain

An apparel brand has undertaken an initial **materiality assessment** and identified that their operations are likely to be highly dependent on nature through the sourcing of cotton for their products. Cotton is found in 80 % of their products and global studies have found that cotton production has a high dependency on water. The company has mapped out their supply chain to identify that the majority of their cotton is sourced from India. They are therefore focusing their measurement on their dependency on **water provisioning services through their cotton suppliers based in India**.

Reliance

Through Input-Output models, the company has obtained the volume of water required for the volume of cotton sourced from India, based on sector-average data.

Impact drivers

Cotton agriculture is the dominant land use within the landscapes where the company's cotton suppliers are located. Through a model-based footprinting approach, the company identify that their cotton suppliers have a potentially large impact on nature through land use change. They are also potentially contributing to water depletion through excessive use of water for irrigation of their cotton crops. Land use change and excessive use of water negatively impact both the state of nature and the state of the water provisioning ecosystem service at the assessed locations.

External drivers of change

In addition to the company's suppliers, other cotton producers in the sourcing regions also negatively impact nature through land use change and high consumption of water for irrigation. Based on **publicly available data**, it is also identified that the region of India that the company sources from is a climate change hotspot, which leads to increased water stress.

State of nature

Remote sensing data reveals a decline in the extent of wetland ecosystems in close proximity to the locations where cotton is being grown. A modeled approach based on land intensity data in the region also estimates a low level of ecosystem condition in the region that is likely to affect the condition of freshwater ecosystems.

Ecosystem service

The use of a global water stress layer reveals the locations in India where the majority of cotton is sourced from face a high level of water stress, and that this water stress is increasing. It is likely therefore that availability of water for irrigation of cotton crops as well as for use by other stakeholders in the landscape may be restricted in the future.

The measurement of the impact drivers, external drivers of change, state of nature and ecosystem service in the locations from which the company is sourcing cotton enables the company to determine that the water provisioning service is decreasing in availability and will likely further deteriorate in the long term.

Understanding the probability of disruption in the water provisioning service as well as the company's reliance on water provisioning services through its suppliers of cotton allows the company to analyse its **business exposure to disruption in water supply** in the relevant regions of India. This information allows the company to identify significant nature-related risks and opportunities for this part of its supply chain. One of the potential opportunities is promoting more efficient irrigation systems among its cotton suppliers.



5. Action points to promote more robust measurement and management of business dependencies on nature

5.1 Actions for the TNFD

- Continue to provide clear recommendations on how financial institutions and businesses should be measuring the different components of business dependencies (i.e. reliance, impact drivers, external drivers of change, state of nature and ecosystem service) to account for the full scope of dependencies on nature and dependency-related risks and opportunities.
- Continue to demonstrate how robust measurement of business dependencies on nature in the 'Evaluate' phase of the LEAP Approach will provide the basis for a comprehensive assessment of dependency-related risks in the 'Assess' phase.
- Specify as best practice that financial institutions and businesses should manage their nature-related dependencies through nature positive actions (e.g. ecosystem restoration, nature-based solutions), rather than by replacing ecosystem assets and ecosystem services they are dependent on with human-made substitutes (e.g. artificial structures for flood defence, increased use of fertilizers) that would contribute to further nature loss.
- Continue to engage with standard setters (e.g. the ISSB) and voluntary disclosure initiatives (e.g. GRI and CDP) to promote nature-related reporting requirements that reflect rigorous measurement of nature-related impacts and dependencies.
- Continue to promote development and improvement of nature-related data and data tools to help fill any gaps in data needed to measure business dependencies on nature.

5.2 Actions for financial institutions

- Review which dependencies on nature they are already measuring. Conduct a high-level assessment of potential dependencies on nature and identify potentially material dependencies for more in-depth measurement. This could be done as part of a pilot of the TNFD beta framework.
- Develop processes for systematic measurement of all material nature-related dependencies. Identify metrics and KPIs that cover all five components of nature-related dependencies: reliance, impact drivers, external drivers of change, state of nature and ecosystem service.
- Set expectations for businesses in their portfolio to measure and report on nature-re-

lated dependencies and dependency-related risks, to base the reported data on robust measurements, and to tackle dependency-related risks through nature positive actions.

- Scrutinize and potentially supplement the business's own measurement of nature-related dependencies by sourcing additional data from public databases or third party data providers or by collecting their own data on the ground or remotely.
- Analyze data on nature-related dependencies across their portfolio to understand combined exposure to specific dependency-related risks or negative feedback loops between dependencies of some businesses and impacts of others. Analyze the data also to identify and prioritise dependency-related opportunities at the portfolio level.
- Use the measurements of nature-related dependencies to inform strategies for transforming portfolios into nature positive ones, which reduce nature-related risks and take advantage of nature-related opportunities. In this way, mobilize private sector finance to deliver upon the Kunming-Montreal Global Biodiversity Framework.
- Build capacity within their own organization and among businesses in their portfolio on linkages between nature and business activities and on understanding how these can lead to risks and opportunities. This will include capacity building across business functions beyond sustainability departments.

5.3 Actions for businesses

- Collect location-specific information about their direct operations and assets and value chain activities to prioritize locations for further assessment and enable identification of all material nature-related dependencies.
- Build on existing business operations data and data on nature from available databases and tools to strengthen the approach to measuring business dependencies on nature. Ensure the measurement covers all five components: reliance, impact drivers, external drivers of change, state of nature and ecosystem service. This could be done as part of a pilot of the TNFD beta framework.
- Analyze the data on measured nature-related dependencies to obtain a comprehensive assessment of dependency-related risks, allowing for early risk management response.
- Develop nature-positive strategies to respond to and reduce nature-related risks and take advantage of nature-related opportunities in business operations and strategic plans.
- Build capacity across business functions on linkages between nature and business activities, on how these can lead to risks and opportunities, and on the business case for taking action to address the nature crisis.



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