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TRANSLATING NATURE INTO RISK

Preliminary Insights and Further Questions

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1. RESEARCH HIGHLIGHTS

Data gaps: Interviews suggest persistent gaps in data quality, especially beyond first-tier suppliers. Traceability and geolocation are the central bottlenecks; some interviewees consider the Locate step in the LEAP approach the hardest due to unknown or inconsistent asset level positions and supplier pathways.

Data solutions: The field offers practical ways to close data gaps and inconsistencies, combining asset level geolocation platforms, supply chain mapping and GenAI–led extraction of governance data from unstructured disclosures. Yet many challenges remain. For example, shared metadata, taxonomies, licensing terms, and standard measurement protocols are still needed to make analytics comparable and auditable across providers.

Measurement and prioritization: Biodiversity-related metrics are locally and spatially bounded, making the exercise of their aggregation from site level to group level difficult to achieve. Materiality frameworks help prioritize work, yet require pragmatic solutions to make them practically useful.

Integration in decision-making: Interview participants highlighted a fundamental trade-off between providing decision-makers with straightforward indicators and maintaining the scientific complexity required by biodiversity data. Financial institutions need stronger links between portfolio-level screening tools and granular, location-specific assessments, while corporate organizations lack consistent methodologies to translate risk assessment findings into operational changes.

2. THE RESEARCH PROBLEM

Consider *Pro Natura*, a consumer goods company under pressure to reduce its carbon footprint. After months of research, the sustainability team proposes replacing petroleum-based plastics in one of their main products with a natural alternative: wood from fast-growing species. The shift promises substantial greenhouse-gas reductions and positions the company as a leader in eco-conscious design. The marketing team celebrates. The numbers look good. Carbon metrics drop, and the company launches a "nature-friendly" collection. Yet, as production scales, an uncomfortable truth emerges. The wood supply chain relies on plantations in regions where biodiversity is fragile. Clearing land for monoculture disrupts habitats, threatens pollinators, and accelerates soil degradation. What begins as a climate win carries a hidden cost: growing harm to nature.

> *What to do? Is the "real" risk about carbon, biodiversity, or both? About environmental harm or legal and reputational consequences? Who is truly at risk—the ecosystem, the company, future generations? What kind of data and measures would help?*

2.1. The research project

Nature risks are a central challenge for companies and society (Dasgupta, 2021; TNFD, 2024; World Economic Forum, 2025), and a compelling area of study for scholars interested in measurement and quantification (Mennicken and Salais, 2022), in the construction of "risk objects" (Hilgartner, 1992) and their translation into risk management action (Hardy et al., 2020). As the (fictional) vignette shows, it is difficult, often impossible, to capture the full set of trade-offs arising from well-intentioned decisions. What is at stake is sound data sources and measures, as well as clarity about value-based judgment on which risks, and how much risk, companies are willing to take.

This report presents preliminary findings from a study funded by the LSE Global School of Sustainability (webpage). The report explores these themes and how data availability, measurement and risk considerations can construct new objects of concern—even something as complex and multifaceted as nature—and make them amenable to management.

As described in Appendix A, this report is based on exploratory interviews spanning the full process of nature-risk identification and management—from standard-setting bodies and

framework developers, to data providers and tool creators, to companies and investors implementing these approaches, as well as independent scientific and advisory perspectives. Recognizing the limitations of a small sample, this range of interviews nonetheless provides a balanced foundation for understanding how nature-related risks are identified, measured, and acted upon.

2.2. Do you want to be involved?

If you would like to share your insights on the identification, management, and disclosure of nature-related risks, please indicate your willingness to participate in further rounds of interviews for this study by using this link. We are particularly interested in hearing from individuals in the following roles:

- Preparers of nature-related risk disclosures, including adopters of the Taskforce on Nature-related Financial Disclosures (TNFD) framework.
- Practitioners with experience in translating nature-related data into metrics for external reporting and internal decision-making.
- Practitioners involved in ecological data collection, dataset management, and data integration within organizations.
- Practitioners engaged in the development and application of nature-risk scenarios.

3. INTERVIEW FINDINGS

Participants in the study repeatedly point to gaps in data quality and auditability. Beyond first-tier suppliers and outside corporate perimeters, information is partial, inconsistent, and difficult to verify, which limits assurance and leaves organizations wary of opaque, estimation-heavy methods. Geolocation and supply chain traceability sit at the center of this challenge. Locating facilities is only the beginning; mapping upstream origins of raw materials and dynamic sourcing patterns can become a bottleneck. Some consider the "Locate" step of LEAP (see Box 1) the hardest to implement because reliable asset-level positions and supplier pathways are often unknown or differ across data providers and corporate records.

Box 1: The LEAP Approach

The LEAP approach, developed by the TNFD, is a structured framework for assessing nature-related risks and opportunities. It consists of four steps: *Locate, Evaluate, Assess, and Prepare*. Organizations begin by locating priority areas where their activities interact with nature—such as sensitive ecosystems or resource-dependent regions. Next, they evaluate dependencies and impacts on nature at these locations, considering factors like biodiversity, water, and soil health. The third step is to assess how these dependencies and impacts translate into risks (physical, transition, systemic) and opportunities that could affect financial performance or strategy. Finally, organizations prepare responses through governance, risk management, and disclosure aligned with TNFD recommendations.

The field offers practical ways to close these gaps. At one end sit screening tools that give institutions a shared language and a first pass at exposure. A system such as ENCORE maps economic activities to ecosystem service dependencies and pressures[1], offering a standardized way to scope nature risks and to prioritize where deeper analysis is needed; its recent upgrade increased value-chain granularity and refined production process classifications, which improves relevance but complicates comparability over time. Further along are integrated data platforms that seek to translate "ecological complexity" (see Box 2) into decision-useful outputs for investors and corporates. Some data-analytics platforms now use

Box 2: Ecological Complexity

By "ecological complexity," we mean the challenge of converting scientific biodiversity data—which includes information about species populations, habitat conditions, ecosystem health indicators, and threat dynamics—into metrics that businesses and investors can interpret and act upon. These providers combine various data types: asset-level geolocation (coordinates of facilities, agricultural operations, project sites), sector classifications (identifying what economic activities occur at each location), and biodiversity layers (spatial datasets showing where threatened species are found, ecological stress indicators, where protected areas are located, and aggregate ecosystem intactness scores like the Biodiversity Intactness Index). By overlaying these datasets, data providers produce geospatial exposure scores, materiality matrices that distinguish impacts and dependencies, governance indicators, and scenario-based estimates of financial materiality.

[1] ENCORE defines 'pressures' as the direct human activities that cause environmental change. They are not the impacts themselves, but the drivers that lead to those impacts. ENCORE recognizes that some initiatives, such as the TNFD refer to pressures as 'impact drivers' (see https://encorenature.org/en/data-and-methodology/impact-drivers).

large language models to read unstructured disclosures and earnings calls for governance and policy signals, while structured geospatial overlays carry the weight of risk quantification. Multi-regional input-output models (e.g. EXIOBASE) extend sightlines upstream and downstream when supply-chain linkage specificity is missing. In some cases, the product philosophy is modular and transparent, deliberately avoiding single "nature scores" that collapse multiple dimensions into a single metric. However, some users question the extent to which this product development philosophy is translated into actual products (see below).

At the same time, many challenges remain—particularly around comparability and assurance. Without shared metadata, taxonomies, licensing terms, and standard measurement protocols, users cannot reliably compare analytics across providers or verify their credibility. TNFD's workstream on developing a Public Nature Data Facility addresses this by focusing on semantic and operational standards that enable verification and comparison without prescribing a single measurement method. In practice, many corporates still struggle to maintain spatially enabled asset registers and trace supply chains. Despite explicit claims by some interviewees that product development is transparent and modular, and that it avoids conflating multiple dimensions, others suggest that nature-data products nonetheless tend to bundle multiple data layers in ways that may obscure how results are derived, complicating output comparability and independent assurance.

Biodiversity measurement adds another layer of complexity. Carbon and water indicators are comparatively mature, but biodiversity remains fragmented, context specific, and difficult to aggregate from site to group level. Some interviewees argue that companies should not just report aggregate ecological metrics (e.g. STAR, Biodiversity Intactness Index (BII)). Instead, organization should focus on specific ecosystem services like water filtration, pollination or flood protection (see Box 3) and use metrics that directly shows causal relationships, following a logic like "if we engage with X business activity, X affects Y ecosystem service, which creates Z financial risk or impact." This approach should make nature-related information more

Box 3: Ecosystem Services Explained

Ecosystem services are the benefits that humans derive from nature—the specific functions that ecosystems perform which support human wellbeing and economic activity. These include provisioning services (water, food, raw materials), regulating services (flood control, water purification, pollination, climate regulation), and cultural services (recreation, spiritual value). In this context, abstract aggregate biodiversity indices do not capture such relations while ecosystem services related metrics better capture such pathways: they link ecological processes to business operations and financial outcomes: degrading a watershed's water filtration capacity creates measurable costs for water treatment. This service-based framing makes biodiversity loss financially legible to corporate decision-makers.

actionable for managers and more meaningful for financial and non-financial stakeholders, as it ties ecological impacts directly to operational decisions and financial exposures. Materiality frameworks help to structure this work. Preparers and users (e.g., financial institutions) rely on double and financial materiality mapping to prioritize topics, set thresholds, and identify dependencies and impacts that warrant deeper analysis.

Interviews surface a persistent tension between simplifying outputs for decision makers and preserving scientific rigor. Executives and portfolio managers want concise signals; scientists and data providers caution against collapsing distinct dimensions into single scores that obscure assumptions. Most participants favour transparent, modular indicators that can be combined as needed without netting off positives and negatives. Field actors continue to wrestle with how to bridge portfolio-level screening and site-level decision making. High-level tools are valuable for scoping and prioritization, but they must be followed by granular, location-specific assessments if organizations are to move from disclosure to operational change.

4. CONNECTING EMERGING THEMES

Bearing in mind the limitations of an exploratory set of interviews, the four core themes that emerged during the first round of interviews indicate that the complexity organizations face arises not only from addressing individual problems in isolation (i.e., data quality, measurement, and integration of nature and biodiversity into decision-making) but also from managing the challenges created by their interdependencies. Figure 1 below aims to illustrate the relationship between data, measurement, and perceived usefulness for decision making. While we observed the dynamics illustrated in points A, B, and C, we also hypothesize a potential interdependency between the last two phases, whereby the lack of perceived decision usefulness may weaken efforts to invest in data models and infrastructure, thereby further creating problems along the cycle described in Figure 1.

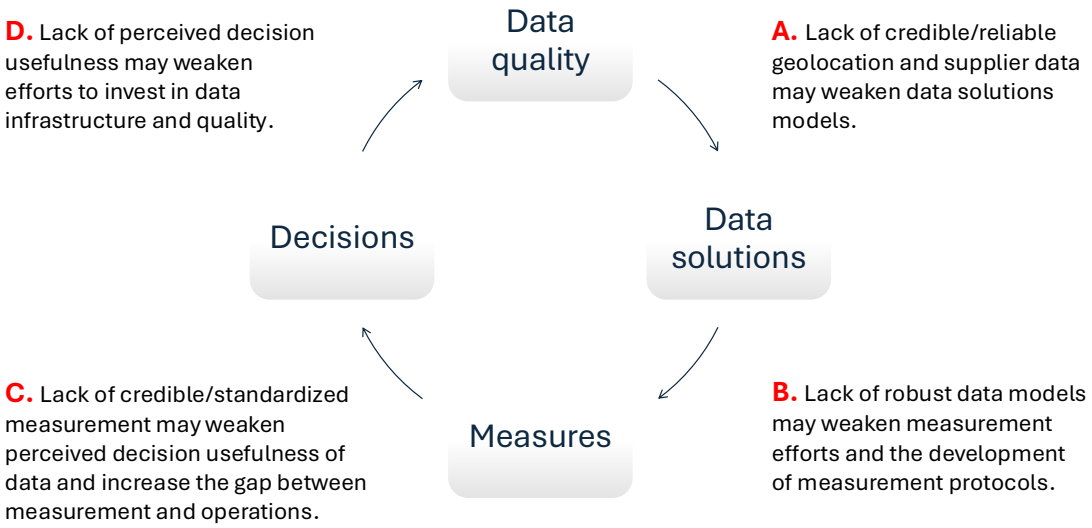

Figure 1: Data-measurement-decisions – Negative feedback loop.

Figure 1 provides a schematic view of key issues faced in the field. The cycle, inductively derived from the (limited) available interview material, suggests that at least some participants in the study operate with an "accounting worldview" in several respects—most notably, a belief that information precedes action in some way, a premise that studies of accounting as social practice have long problematized (e.g., Power, 2004; Chapman et al., 2009). This raises questions for further exploration about how alternative worldviews might challenge the cycle and the assumed relationship between data, modelling, and measurement. For example, if one were to start from action—as activists may do—what difference might this make to Figure 1's dynamics? Would "accounting for nature" become a rationalization of action rather than its precursor? Under what conditions could a symbiosis emerge between action and accounting for nature over time?

Bearing in mind that the cycle depicted in Figure 1 may reflect a narrow view of the challenges posed by nature-related risks, it nevertheless helps to foreground the following interdependencies:

a) **From data quality to data solutions:** Without credible and reliable data about geolocation and supplier paths, data solutions may risk producing sophisticated but fragile and inconsistent models.

b) **From data solutions to measures:** In the absence of robust and standardized data solutions—or when data solutions rely on heterogenous models and assumptions—measurement efforts may remain non-comparable, thus limiting the usefulness of measures repeated over time and across organizations and settings.

c) **From measures to decisions:** The lack of standardized measures and shared measurement protocols may weaken the perceived usefulness of nature-related data and integration in decision making; measures may also remain loosely connected to operations, thus limiting their usefulness for portfolio oversight by financial institutions.

d) **From decisions to data quality:** Finally, we hypothesize that a perceived lack of usefulness of nature-related measures may decrease investments in data infrastructure, quality assurance and organizational capabilities to interpret and make use of available data, thus potentially further amplifying the limitations noted in the figure's cycle.

5. EMERGING CHALLENGES AND FURTHER QUESTIONS

5.1. Data and decisions

Data providers, corporate preparers, and financial institutions frame the purpose and use of nature-related data through different lenses. Data specialists see themselves as translators—turning ecological complexity into analytics that enable decision-making. Some suggest that companies require a degree of "handholding" to use data beyond box-ticking and for more consequential use cases, such as portfolio construction and screening. They emphasise interoperability, geospatial overlays, and modular indicators aligned with the LEAP framework, aiming to support screening, benchmarking, and prioritisation without collapsing distinct dimensions into a single rating. Corporate preparers, in contrast, focus on embedding nature into operations and governance. They use LEAP to raise internal awareness of the business relevance of nature and to develop investment cases for mitigation and innovation projects. Their priorities centre on site-level baselines, commodity traceability, and decision support for procurement, design, and risk processes within enterprise risk management. Financial institutions seek portfolio-level signals that can inform stewardship levers—engagement priorities, voting, and occasionally divestment. They favour transparent, verifiable data and resist opaque, estimation-heavy products.

This divergence raises questions about what notion of "decision-usefulness" applies to nature-related data for different stakeholders in the field. Financial institutions and senior executives ask for concise signals, while data providers and consultants warn that oversimplification can erode credibility. Corporate preparers need operational indicators to guide decisions, yet they may resist single composite scores that obscure underlying assumptions. The result is a balancing act: the demand for clarity and comparability collides with the complexity of ecological realities, leaving the field to navigate between actionable simplicity and scientific integrity. Table 1 provides examples of key questions that reflect these challenges.

Further questions	Why these questions matter
How do different actors define "decision-useful" data, and what trade-offs emerge between operational granularity and portfolio-level comparability?	Clarifying trade-offs helps design indicators that are credible for operations and usable for stewardship, avoiding approaches that satisfy neither.
What are the consequences of simplifying biodiversity data into composite scores for corporate governance and financial decision-making?	Composite scores can speed decisions but may hide assumptions and ecological nuance. Understanding their governance effects prevents misaligned incentives, false precision, and erosion of trust.

Table 1: Data and decisions – Further questions

5.2. Data and traceability

Data providers, corporate preparers, and financial institutions each grapple with the challenge of locating and tracing nature-related impacts in distinct ways. Data specialists construct geospatial asset maps, integrate multiple classification systems, and deploy multi-regional input-output models to approximate upstream and downstream effects. They underscore obstacles such as licensing restrictions, taxonomy gaps, and the inherent limitations of aggregated "data products" that lack clear provenance. Corporate preparers, meanwhile, invest in corporate GIS capabilities and rely on local protocols and internal facility data, supplementing these with global datasets and country-specific studies. Where feasible, they adopt traceability initiatives for commodities, from FSC certification to blockchain solutions for natural rubber. Financial institutions report mismatches between datasets and on-the-ground realities. They distinguish verified from estimated locations and depend on company engagement and disclosures to gain visibility into complex value chains.

This landscape produces a tension around the LEAP framework's "Locate" step. Data providers may approximate upstream[2] origins through modelling, while corporates possess partial knowledge of their supply chains but rarely full visibility at the sites where biodiversity impacts physically occur. Financial institutions, operating furthest downstream, hesitate to replicate deep supply-chain analyses, questioning both the practicality of such efforts and whether upstream regulation, applied at the source of ecological impact, might be more effective than downstream data and disclosure requirements. The result is an uneasy balance: granular traceability remains essential for credibility, yet the cost and complexity of achieving it leave actors navigating between upstream regulatory solutions and downstream informational proxies. Table 2 provides examples of key questions that reflect these challenges.

Further questions	Why these questions matter
What are the most effective strategies for improving traceability across complex supply chains without excessive cost?	Traceability is central to credibility, yet it remains costly and uneven across commodities. Identifying cost-effective strategies therefore may help clarify where investments are most warranted, for example, in data tools, certification schemes, or stakeholder engagement.
How do mismatches between modelled asset locations and verified data affect risk assessment and regulatory compliance for financial institutions?	Location errors propagate to impact assessments, stewardship priorities, and disclosures. Quantifying these effects helps improve portfolio signals, auditability, and compliance robustness.
To what extent can upstream regulation substitute for supply chain traceability in achieving credible biodiversity reporting?	If upstream regulation—that is, regulation focused on points where biodiversity impacts physically occur—can deliver credible outcomes, policymakers may reduce compliance burdens on downstream actors, such as companies and investors located far from the sites of impact, while concentrating enforcement capacity where ecological impacts actually arise.

Table 2: Data and traceability – Further questions

[2] The terms "upstream" and "downstream" are used here to describe regulatory distance from the site of ecological impact. Upstream regulation refers to regulation applied close to the physical source of biodiversity impact, such as land use change, extraction, or habitat disturbance. Downstream regulation refers to regulation applied to actors organizationally or geographically distant from the impact, such as multinational firms, investors, or financial intermediaries.

5.3. Measurement approaches for biodiversity

Data providers, corporate preparers, and financial institutions approach biodiversity metrics from markedly different angles. Some data specialists problematize the idea of a single "nature rating", recognizing that nature is multi-dimensional, favoring instead modular indicators with transparent assumptions. They see screening tools such as ENCORE as useful entry points that help standardize terminology, yet emphasize that these tools require follow-on, location-specific analysis to be meaningful. Corporate preparers stress that biodiversity metrics remain far less mature than those for carbon or water. They struggle to aggregate site-level baselines into coherent group-level indicators and to quantify positive impacts in ways that translate into economic value. Financial institutions adopt a pragmatic stance: they use sector-based metrics to enable action rather than as definitive measures of risk.

On this basis, the available interview evidence shows that biodiversity assessment, on the one hand, demands site-specific, cause-and-effect metrics tied to ecosystem services and, on the other hand, consistent, portfolio-level signals that allow investors to compare performance across holdings. Corporates may therefore favour granular, locally grounded data that reflect operational realities at specific sites, whereas financial actors may prioritise comparability, aggregation, and simplicity. Data providers sit between these competing demands, attempting to bridge the gap by keeping indicators modular and assumptions transparent. Table 3 provides examples of key questions that reflect these challenges.

Further questions	Why these questions matter
What methods can corporates use to aggregate site-level baselines into meaningful group measures without losing context?	Any method for aggregating site-level biodiversity baselines into group-level indicators must support governance, capital allocation, and accountability while preserving ecological context. This may imply approaches that retain location-specific qualifiers and allow users to trace portfolio-level signals back to underlying site-level patterns.
How do financial institutions balance comparability needs with the scientific limitations of sector-based biodiversity metrics?	Sector metrics can mobilize action but risk oversimplification and adverse incentives. Understanding this balance helps refine stewardship levers and improve portfolio analytics.

Table 3: Measurement approaches – Further questions

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APPENDIX A: RESEARCH METHODS

This report builds on an initial set of interviews conducted for the research project, "Translating Nature Into Risk: The Role of Financial Disclosure Frameworks in Shaping Nature-Related Risks" (research project webpage), between October and December 2025. The dataset spans five actor groups:

- **Standard-setting participants** provide insights on the design of nature-related governance and reporting frameworks design, including the development of nature related metrics, standardization of data sources and the process through which scientific expertise is considered.

- **Data experts** comprise teams that build geospatial overlays, asset-level maps, screening tools, and input–output-based value-chain models.

- **Corporate preparers**—including sustainability leaders and environmental specialists—describe practice across nature reporting: integration of double materiality with enterprise risk management; use of LEAP-style assessments to build internal awareness and shape investment cases; development of corporate GIS; and commodity traceability pilots.

- **Staff at financial institutions** explain how portfolios are prioritized using expectation and management scores, how geolocation claims are verified, and how stewardship levers such as engagement, voting, and divestment are deployed where appropriate.

- **Independent experts and consultants** bring domain perspectives from biodiversity integration, ecosystem-service accounting, sustainable finance, and advisory practice.

APPENDIX B: RESEARCH TEAM

Tommaso Palermo is Associate Professor of Accounting at the London School of Economics and Political Science, and Co-Director at the Centre for Analysis of Risk and Regulation (CARR). His main research interests include the design and use of enterprise risk management systems, risk culture in financial sector organizations, risk regulation in new markets for contested commodities such as cannabis, and, more recently, how organizations manage nature-related risks. Tommaso's work on risk culture in financial institutions has been used as a research impact case study in the national assessment of the quality of UK higher education research in all disciplines (2021 Research Excellence Framework). Tommaso is a founding member of the "Organizing Risk Group" (ORG), which is an international and interdisciplinary academic network of researchers in management and other social sciences interested in risk and risk management.

Lorenzo Pirozzi

Lorenzo is a PhD student in the Department of Accounting at the London School of Economics. His research examines how nature and biodiversity are translated into economic and financial risks. He studies how market-led standardization initiatives such as the Task Force on Nature-related Financial Disclosures attempt to measure something as complex as biodiversity. With a theoretical focus on the political and material possibilities of quantification and calculation, he analyses how these initiatives produce indicators and targets that organizations and financial markets can understand and manage. He investigates this transformation and its implications through qualitative methods, including interviews, document analysis, and observation.

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