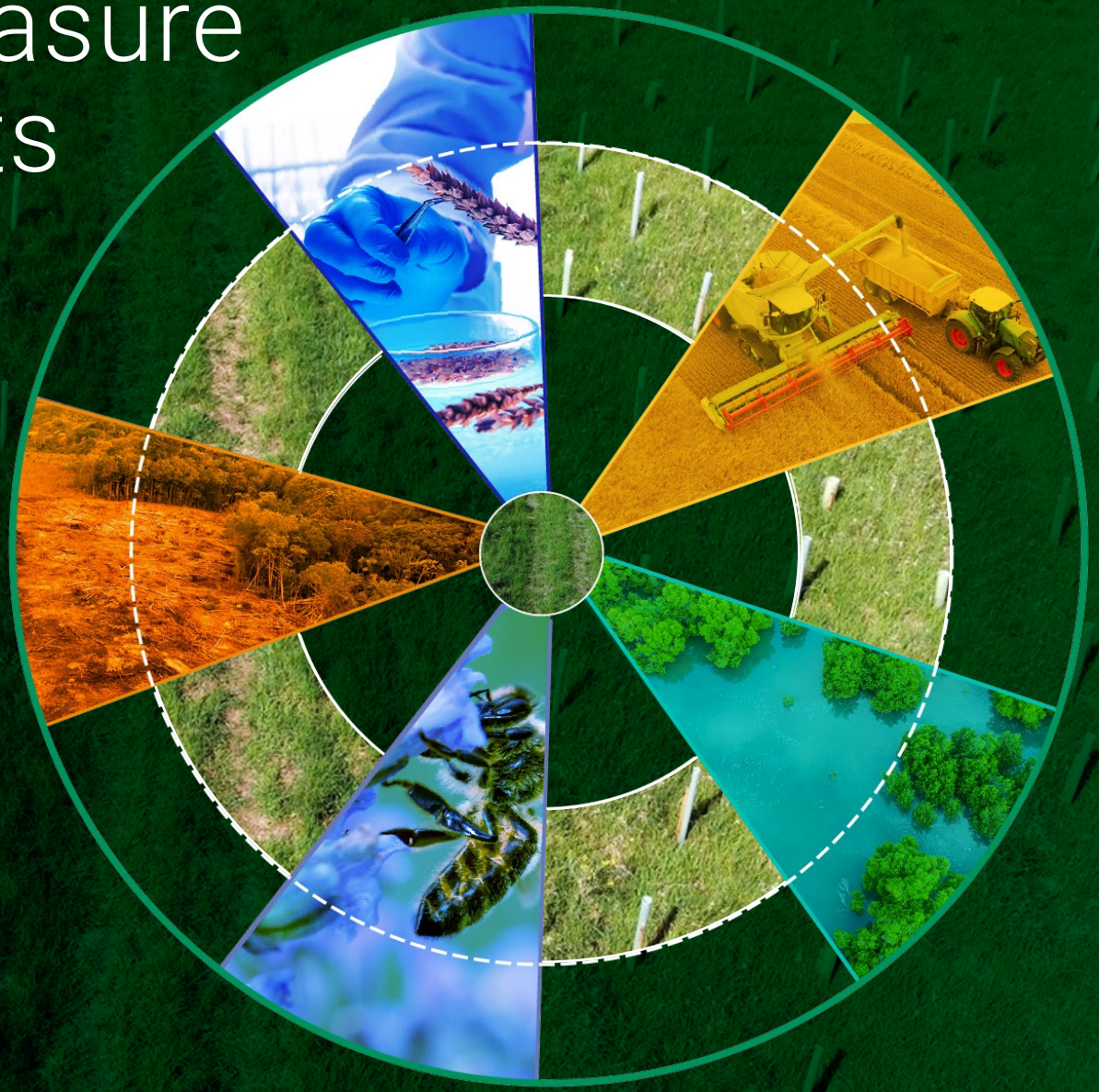
MSCI

Nature and Biodiversity Solutions

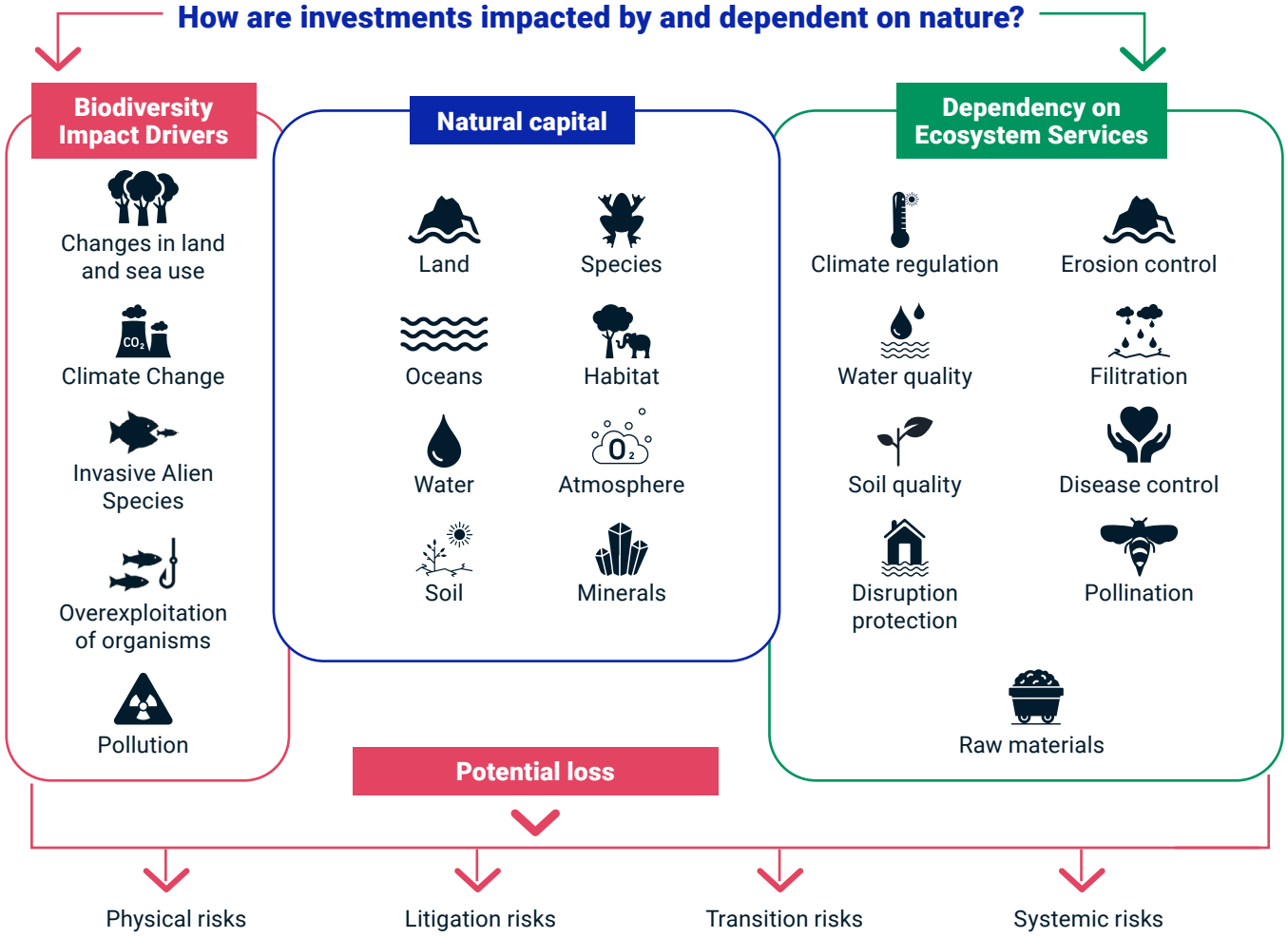
Identify and measure portfolio impacts and risks



Biological diversity is rapidly declining — and becoming a material risk to investors. That means they need advanced tools to measure impact and manage risk.

Biodiversity, the foundation of life itself, is declining at an alarming rate due to human activity. From habitat destruction and overexploitation of natural resources to pollution and the emission of greenhouse gases resulting in climate change, biodiversity loss poses an existential threat to ecosystems, the global economy and, in turn, to investors.

The need for advanced tools to measure impact and manage risk has never been greater. We can no longer ignore how companies are impacting, and being impacted by, biodiversity loss. Business behavior is increasingly under scrutiny: New regulations on biodiversity are emerging, investors are taking action, and the Task Force on Nature-related Financial Disclosures (TNFD) has launched a risk management and disclosure framework so organizations can report and act on evolving nature-related risk.



Source: MSCI ESG Research, December 2021, based on ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) 2021; IPBES. 2019. "Global assessment report on biodiversity and ecosystem services."

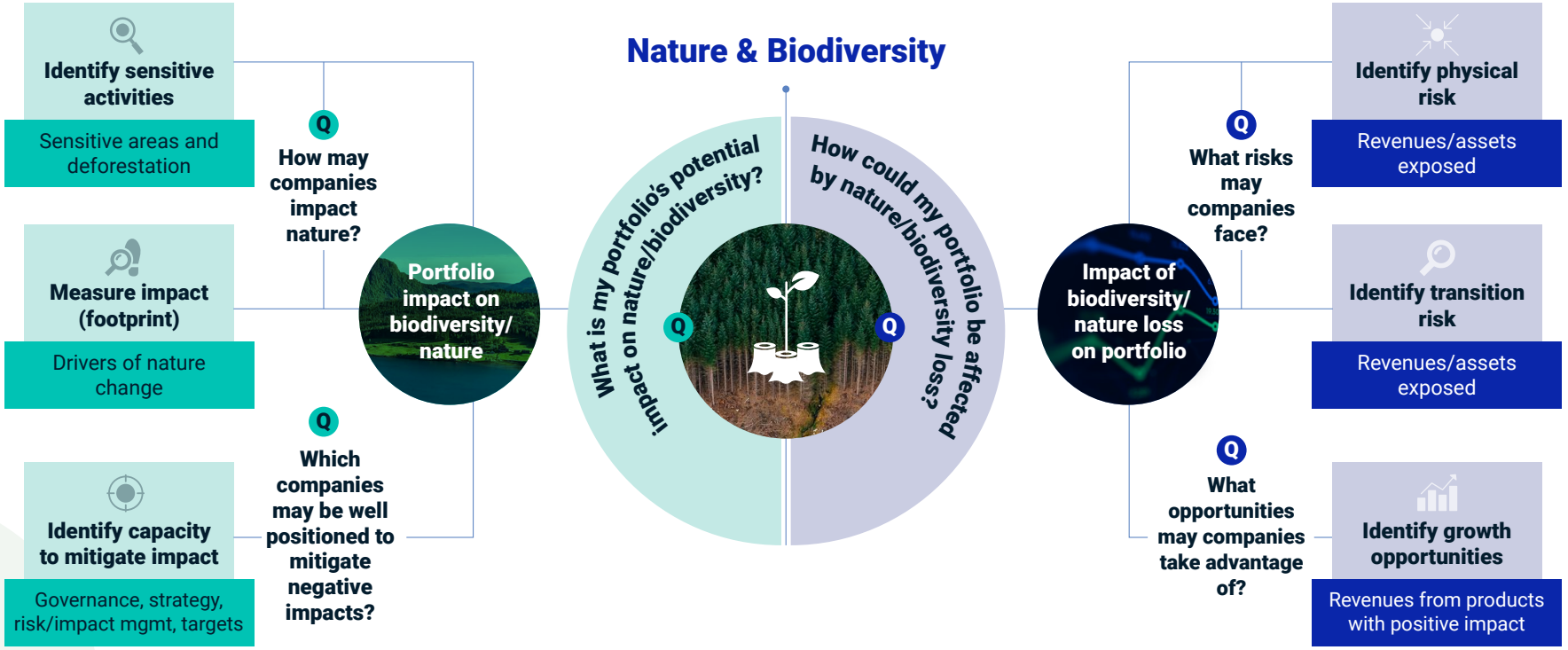
A framework to help you manage **nature and biodiversity risks and opportunities**

Investors can start integrating nature and biodiversity into investment decisions by choosing metrics to assess nature and biodiversity risks and opportunities. Selecting the appropriate set of metrics is relevant to adequately assess risks and impacts since criteria can differ significantly in scope, objectives and applicability. Generally, investors can start by choosing metrics based on two overarching questions:

1. What is my portfolio's potential impact on nature and biodiversity?
2. How could my portfolio be affected by nature and biodiversity loss?

As illustrated below, the data is organized along two unique paths that facilitate the investor's research based on the above questions.

MSCI Nature and Biodiversity Metrics Framework



Source: MSCI ESG Research, November 2023

MSCI's Nature and Biodiversity Metrics

MSCI's Nature and Biodiversity Metrics package and supporting guidance framework is designed to provide our clients with multifaceted Nature and Biodiversity Solutions:

- **Evaluate company and portfolio impact on nature and biodiversity:** MSCI provides metrics that encompass activities in sensitive areas, the drivers of nature change, such as resource/water use, greenhouse gas emissions, and pollution, as well as indicators that help identify a company's capacity to mitigate impact.
  - Drill down to better understand a company's involvement in activities that contribute to deforestation
  - Analyze revenues generated from products that could negatively impact nature, or nature-related controversies, such as the production/use of palm oil, soybeans, beef or timber
  - Measure their biodiversity footprint
  - Find out whether companies have established nature-related governance, strategy or targets
- **Assess impacts of nature and biodiversity loss on companies and portfolios:** MSCI data helps you identify physical risks, such as assets dependent on ecosystem services or revenues derived from regions with high water risk. You also can also explore and identify transition risks, including company revenues or assets exposed to regulatory, legal or reputational risks based on actual or alleged involvement in adverse impact activities.
- Discover nature-related investment opportunities in companies with revenues from products with positive impacts on nature.

Measuring impact with **Biodiversity Footprinting**

Investors striving to quantify the impacts of their investments on biodiversity across sectors or portfolios increasingly rely on biodiversity footprinting. This approach generally starts by identifying the various direct drivers of biodiversity loss, known as pressures, caused by a company. Now, the Mean Species Abundance (MSA) and the Potentially Disappeared Fraction of Species (PDF) metrics are integrated into our Nature and Biodiversity Solutions.

MSCI Biodiversity Footprint Metrics: Potentially Disappeared Fraction of Species (PDF)

The PDF metric is used within life cycle assessment (LCA) methodologies. It indicates a company's potential contribution to global species extinction due to pressures which may be caused by the company. These pressures could be associated with land use, GHG emissions, water consumption and toxic emissions released into the soil, water or air. Once identified, these pressures can be modelled via LCAs into potential impacts that alter the state of nature and conditions across terrestrial, freshwater or marine ecosystems. These end impacts are then aggregated and attributed to companies.

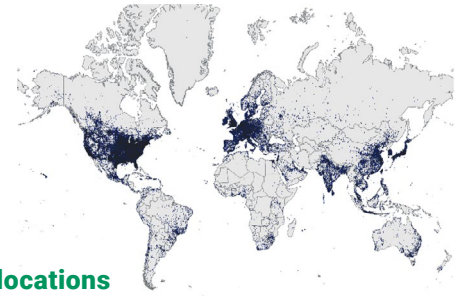
Objective:

Quantify company's potential contribution to species extinction risk at a global level.

Output:

- **Absolute:** PDF: unitless fraction from 0 (lowest contribution) to 1 (highest).
- **Relative:** PDF Intensity metric, Total PDF normalized by company's revenues (USD million).
- **Benchmark:** PDF percentile ranking relative to global peers (MSCI ACWI IMI constituents).

Company assets



Asset locations

+

Company pressures

GHG emissions, water consumption, land use

MSCI Biodiversity Footprint Metrics: Mean Species Abundance (MSA)

The MSA is an indicator for measuring local biodiversity intactness developed by the PBL Netherlands Environmental Assessment Agency. It measures the abundance of species relative to their abundance in 19 an undisturbed ecosystem and understands any reduction through six drivers including climate change, land use, fragmentation and road disturbance. One way of measuring a company's contribution to the MSA is through land it uses, expressed by the MSA.km2 metric.

Both PDF and MSA.km2 can also be normalized, for example, by revenue, and therefore converted into an intensity metric, which becomes more relevant for investors. PDF and MSA can further be combined, indicating a company's land-use contribution to potentially irreversible species extinction due to changing local biodiversity intactness.

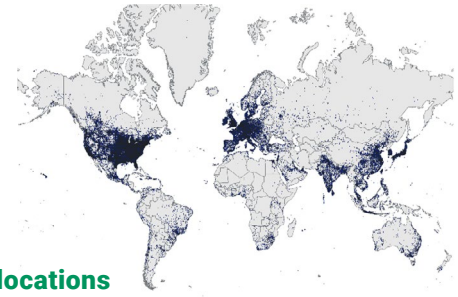
Objective:

- Quantify a company's potential spatial contribution to degradation of local ecosystem intactness
- Measured by Mean Species Abundance of original species relative to their abundance in undisturbed ecosystem (300 years ago): 0 (disturbed: all species lost) to 1 (fully intact)

Output:

Mean Species Abundance multiplied by square kilometer (MSA.km²)

Company assets



Asset locations

+

Company pressures

Land use
(asset type + size)

Meet developing reporting requirements

Asset managers are encouraged and may likely be required to integrate biodiversity loss into their portfolio decisions and reporting. MSCI's research-powered Nature and Biodiversity Solutions seek to enable investors to meet the TNFD/CSRD and French law, Article 29, reporting recommendations and requirements.

Easy to use framework helps you understand and access nature and biodiversity data

- Broad framework helps you navigate the complexity of nature and biodiversity reporting
  - See nature and biodiversity risks more clearly
  - Ensure the credibility of sustainability reports and facilitate data-driven decision-making
- Access relevant nature and biodiversity data for TNFD and CSRD reporting
  - Access datapoints from a double materiality perspective with MSCI's metrics framework

Portfolio impact on biodiversity/nature

How may companies impact nature?

- Identify sensitive activities
- Measure impact
- Identify capacity to mitigate impact

Impact of biodiversity/nature loss on portfolio

What risks may companies face?

- Identify physical risks
- Identify transitional risks
- Identify growth opportunities

Stay ahead of the regulatory reporting curve

- Meet evolving reporting requirements with confidence
- Stay up to date with emerging regulations and standards related to nature and biodiversity reporting
- Implement TNFD recommendations and start addressing reporting requirements for CSRD, SFDR and Article 29

Powerful screening metrics to assess **nature and biodiversity risks**

As part of our MSCI Nature and Biodiversity Metrics package, our screening metrics to identify operations in biodiversity-sensitive areas and assess deforestation risks capitalize on MSCI's broad coverage universe, vast data repositories and rigorous methodology. They are designed to enable you to address impacts on nature in your portfolios, identify companies with operations in ecologically sensitive areas, or assess exposure to potential direct and indirect involvement in deforestation.

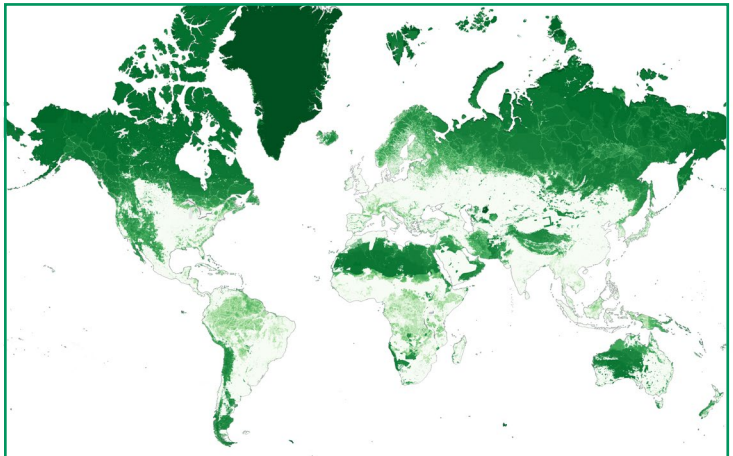
Screening exposure to biodiversity-sensitive areas

Identify companies with physical assets in areas of high biodiversity relevance, such as healthy forests, prime areas for conservation, deforestation fronts or species-rich areas.

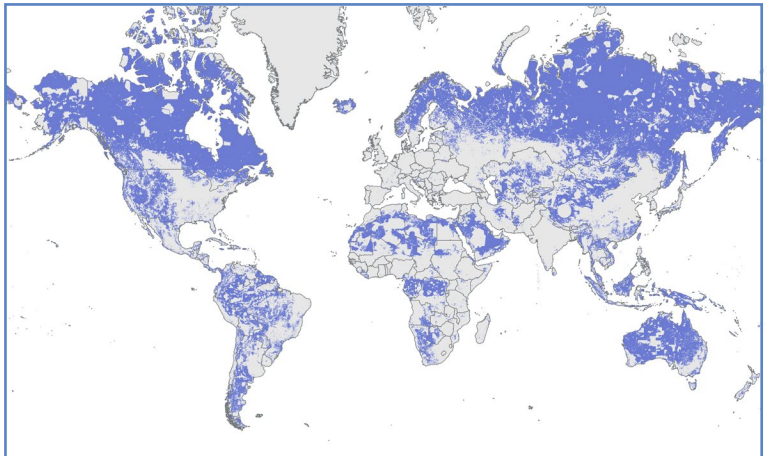
How it works

1. Identify companies from MSCI ACWI Investable Markets Index (IMI) at risk of contributing to nature loss.
2. Capture companies with operations in biodiversity-sensitive regions.
3. Flag for potential involvement in biodiversity-sensitive areas, including healthy forests, areas with intact biodiversity, prime areas for conservation, and deforestation fronts.

Biodiversity Sensitive Area Layers: Biodiversity Intactness, Prime Areas for Conservation



Biodiversity intactness
Mean species abundance: above average (>=0.56)



Prime areas for conservation
(Global safety net layers by Global Safety Net - One Earth)

Note: We use Global Safety Net (GSN)[1] data to identify prime areas for conservation. A select set of the GSN layers is used to represent Distinct Species Assemblages, Rare Phenomena, and Biodiversity Intactness.

Source: Schipper, Aafke M., "Projecting terrestrial biodiversity intactness with GLOBIO 4", November 3, 2019, Dinerstein, E. et al., "A "Global Safety Net" to reverse biodiversity loss and stabilize Earth's climate", September 4, 2020.

1 Global Safety Net (GSN) is developed by the non-profit organization One Earth to support the goal to protect 30 percent of the Earth's lands and waters by 2030 and 50 percent by 2050. The six layers making up the GSN cover approximately 50 percent of the Earth's land and can act as a blueprint to address the twin crises of biodiversity loss and climate change.

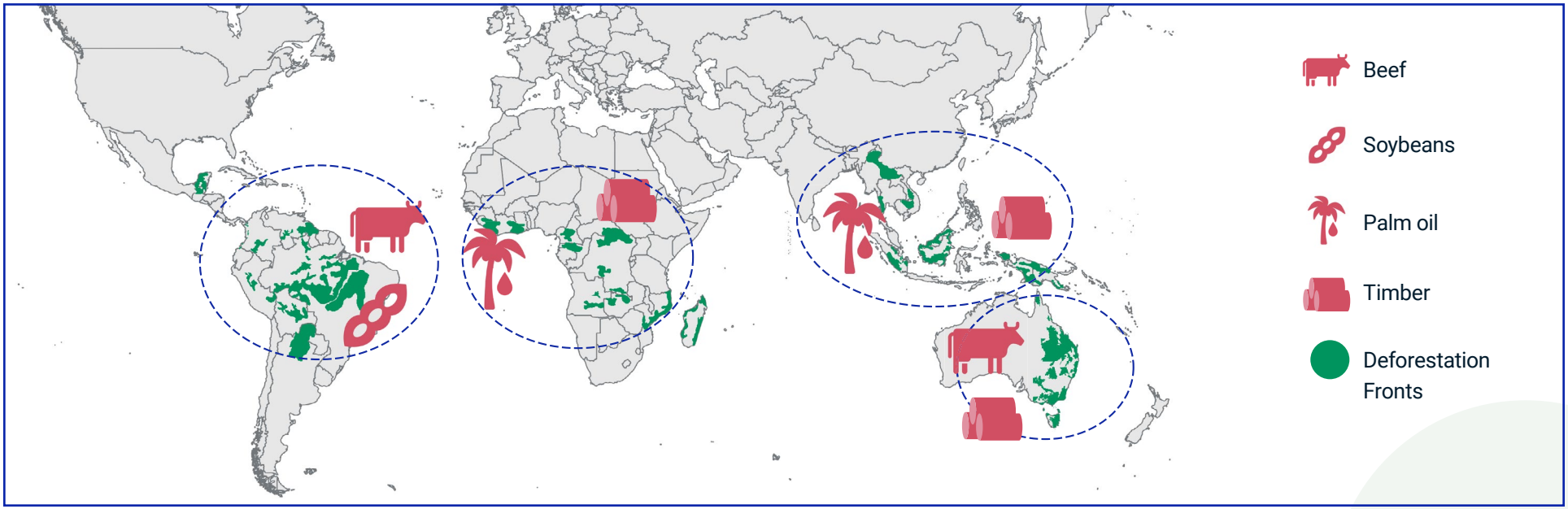
Identifying exposure to deforestation risks

Pinpoint companies exposed to deforestation-related risks, including those that may directly or indirectly contribute to deforestation. This could be a result of direct operations in areas of risk, such as the tropics, or by the production or reliance on commodities considered key drivers of deforestation, such as palm oil, soybeans, beef or timber.

How it works

1. Identify companies in the MSCI ACWI that are at risk of contributing to deforestation.
2. Capture companies involved in controversial commodities, high-risk industries operating in deforestation fronts and deforestation-related controversies.
3. Flag for potential direct or indirect contribution to deforestation.

Main production locations for deforestation prone commodities and deforestation fronts

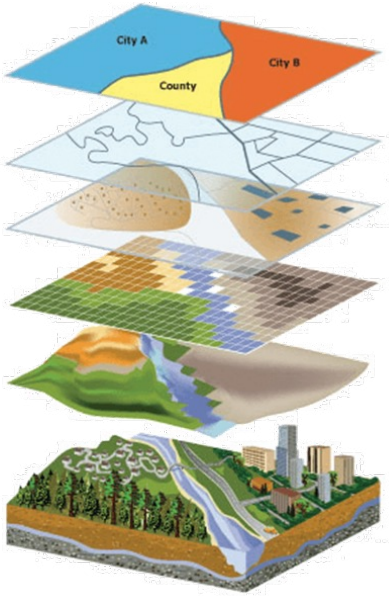


Sources: "Deforestation fronts: Drivers and responses in a changing world report". World Wide Fund For Nature (WWF). 2021. "Global assessment report on biodiversity and ecosystem services." IPBES. 2019.

Capitalize on geospatial science to derive site-level metrics

- Using **MSCI's asset location database**, we can combine asset characteristics and geographic exposure
- **Biodiversity is** inherently site-based lending itself to geospatial analysis
- Geospatial analysis allows for easy use of multiple data layers which is applicable to the complexity and multi-faceted nature of biodiversity
- **Site-level metrics** are aggregated to the issuer, portfolio, and fund level

Use Geospatial Science to Derive Site-level Metrics



Stacked layers containing different data that are all georeferenced to true geographic space is the foundational concept of spatial analysis

Source: Image and summary from Harder, Christian and Brown, Clint, The ArcGIS Book, Second Edition: 10 Big Ideas about Appling the Science of Where. "Redwood, CA: ESRI Press, 2017.

About MSCI ESG Research products and services

MSCI ESG Research products and services are provided by MSCI ESG Research LLC, and are designed to provide in-depth research, ratings and analysis of environmental, social and governance-related business practices to companies worldwide. ESG ratings, data and analysis from MSCI ESG Research LLC. are also used in the construction of the MSCI ESG Indexes. MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc.

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MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.