



Dati e strumenti per l'integrazione dei rischi climatici nei requisiti prudenziali dell'EBA Pillar II

Amanda Giorgi
Climate Solutions Specialist

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Agenda →

Supporting the Implementation of the EBA Guidelines on the Management of ESG Risks

→ 01 **Materiality Assessment**

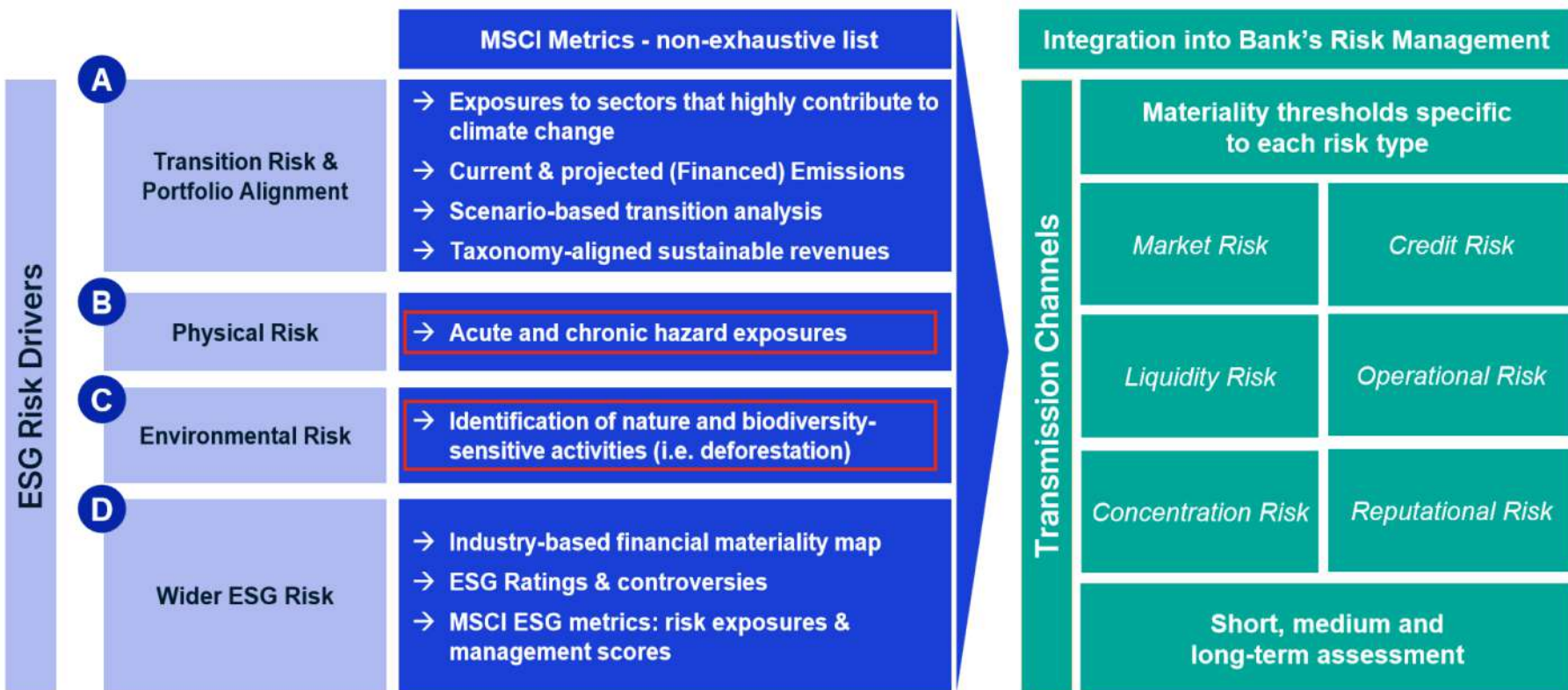
→ 02 **Exposure-based Methods**

→ 03 **Portfolio-based Methods**

→ 04 **Scenario-based Methods**

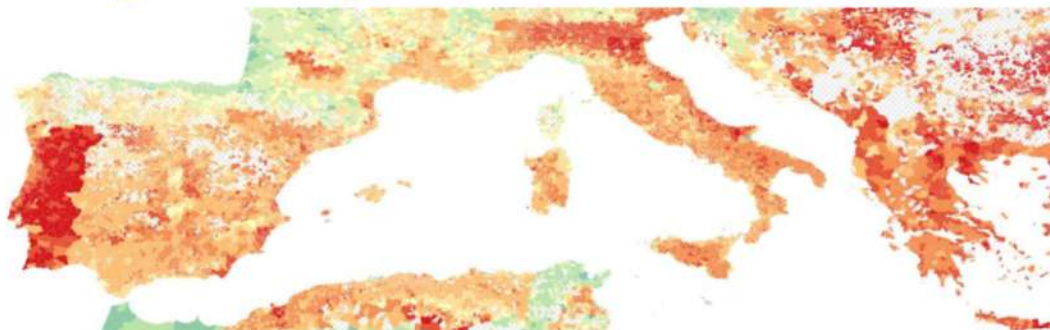
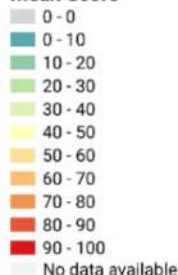
Materiality Assessment

Materiality Assessment →



Physical Risk: Example Heat Maps to Explore Regional Physical Risk Exposure

Mean Score



Wildfires across Southern Europe (expected in 2050)

Growth of wildfire exposure may pose further risk to **home owners, lenders, and insurance** companies and impact summer **travel** to these locations

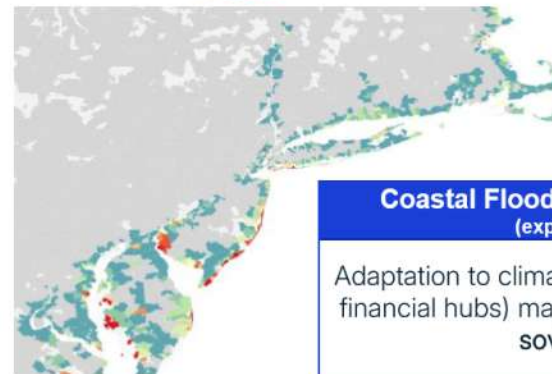
Tropical Cyclones in Eastern Asia (expected in 2050)

Public and private companies may be forced to halt operations in preparation for tropical cyclones making landfall



Coastal Flooding in Northeast USA (expected in 2050)

Adaptation to climate change (e.g., protecting financial hubs) may have a positive effect on **sovereign risk**



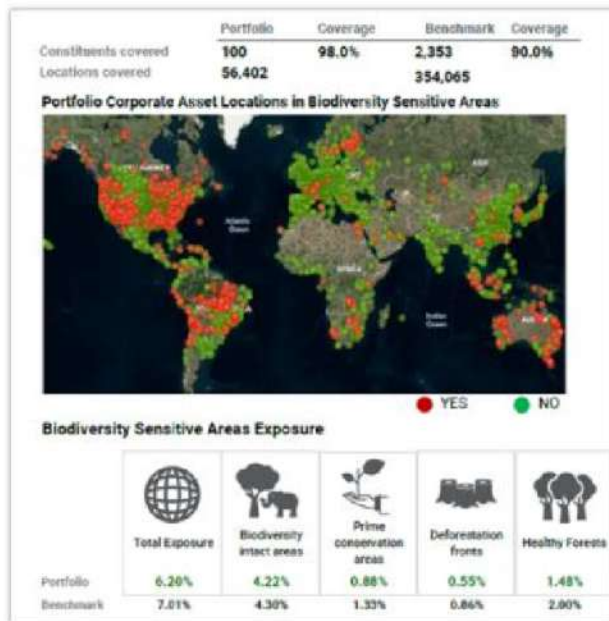
Source: Regional Physical Hazard Metrics dataset, MSCI ESG Research. Data as of June 2024. Percentiles show hazard exposure relative to a global reference dataset. This hazard data reflects assumptions associated with 5°C IPCC SSP 5.85 climate scenario in 2050.

Environmental Risk: Example of Biodiversity-Sensitive Area Exposure Analysis

Locate – Interface with Sensitive locations

Portfolio: Nature Action +100 Currency: USD

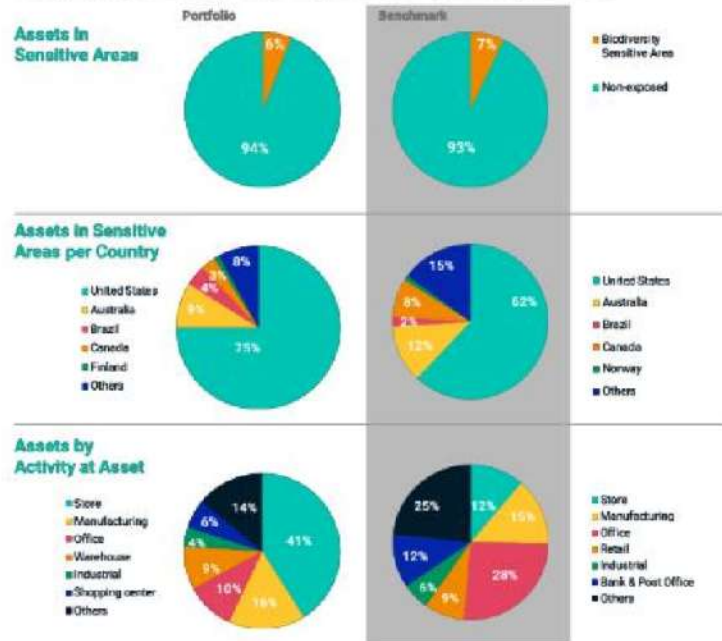
Benchmark: MSCI ACWI



Enabling nature-informed financial decisions



In alignment with the TNFD framework, the LEAP approach starts by 'Locating' economic activities in a portfolio and assessing their interface with nature. This step is essential because biodiversity impacts are inherently local, and understanding the geographical context of portfolio holdings is a crucial first step in evaluating nature-related risks and opportunities.



Exposure-based Methods

Exposure-based Methods →

Climate Asset Fact Sheet

→ Generate a 2-page climate risk summary report for any prospective asset globally, on the fly

CLIMATE RISK - DEFAULT SCENARIO AND ALL TIME HORIZONS

PHYSICAL RISK

Scenario: REMIND | 3°C | Current Policies. Aggressive outcome

HAZARD LEVEL

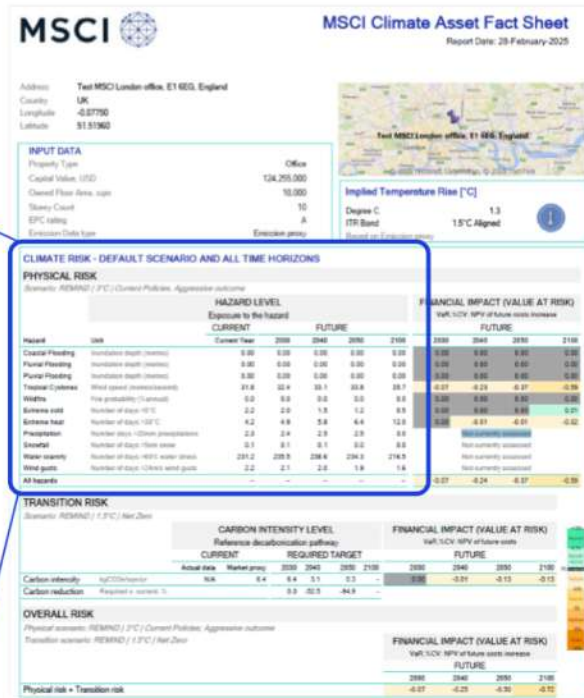
Exposure to the hazard

CURRENT

FUTURE

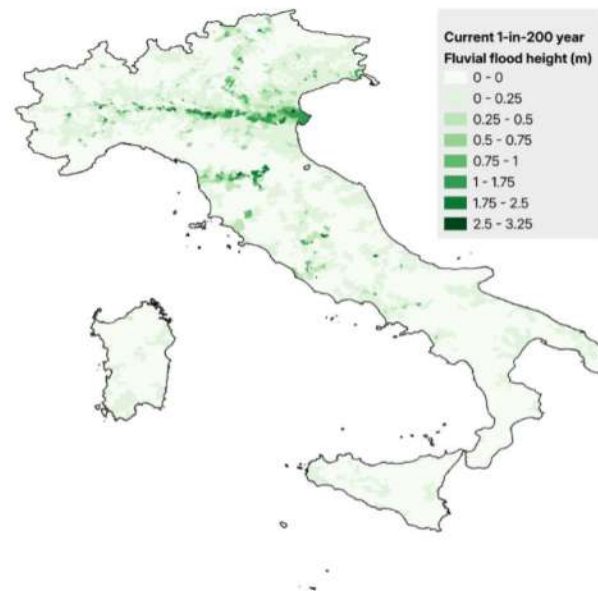
Hazard	Unit	Current Year	2030	2040	2050	2100
Coastal Flooding	Inundation depth (metres)	0.00	0.00	0.00	0.00	0.00
Fluvial Flooding	Inundation depth (metres)	0.00	0.00	0.00	0.00	0.00
Pluvial Flooding	Inundation depth (metres)	0.00	0.00	0.00	0.00	0.00
Tropical Cyclones	Wind speed (metres/second)	31.8	32.4	33.1	33.8	35.7
Wildfire	Fire probability (%annual)	0.0	0.0	0.0	0.0	0.0
Extreme cold	Number of days <0°C	2.2	2.0	1.5	1.2	0.5
Extreme heat	Number of days >30°C	4.2	4.9	5.8	6.4	12.0
Precipitation	Number days >20mm precipitations	2.3	2.4	2.5	2.5	3.0
Snowfall	Number of days >5cm snow	0.1	0.1	0.1	0.0	0.0
Water scarcity	Number of days >60% water stress	231.2	235.5	238.6	234.3	216.5
Wind gusts	Number of days >24m/s wind gusts	2.2	2.1	2.0	1.9	1.6
All hazards		--	--	--	--	--

• Flooding and cyclones shown for a 100-year event



Fluvial Flood Risk to a Commercial Loan Book | Introduction

- **What is fluvial flooding?** Also known as riverine flooding, usually occurs after intense and/or prolonged rainfall or snowmelt when rivers and streams overflow into surrounding areas.
- **How does MSCI measure fluvial floods?** MSCI provides the hazard exposure (flood heights and percentile scores¹⁾ and financial impacts due to asset damage and business interruption from 100- and 200-year fluvial floods as well as the average annual loss.
- 100- and 200-year return periods are standard benchmarks in risk assessments because they present a very rare but still plausible event that if it were to occur, would have a significant impact on the asset.
- **How to assess impact of fluvial floods on a commercial loan book:**
 - Screen for assets currently exposed to fluvial flooding in your loan book
 - Identify flood heights at each location
 - Calculate expected losses from a given event
- Locations with higher flood heights may cause more damage and be related to a higher financial impact.



Source: MSCI ESG Research LLC, data as of June 3, 2025. (1) MSCI also offers percentile scores as a relative measure of a location's exposure

Fluvial Flood Risk to a Commercial Loan Book

Screen for assets
currently exposed to
fluvial flooding in
your loan book

Identify flood
heights at
each location

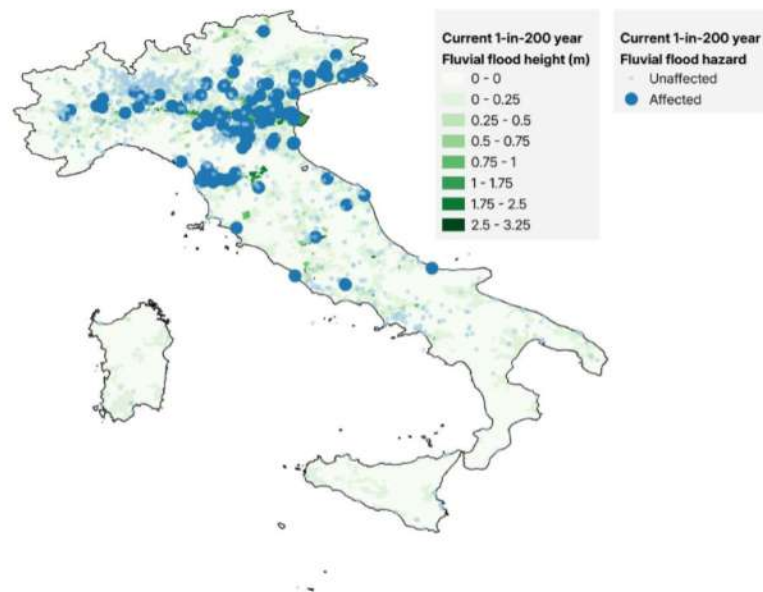
Calculate
expected losses
from a given event

STEP 1. Screen for assets currently exposed to fluvial flooding in the loan book (this step can be done for any hazard)

- Are any of the counterparties' assets exposed to fluvial flooding?
- **Exposure to fluvial flooding:** 200-year return periods are standard benchmarks in risk assessments because they represent a very rare but still plausible event that if it were to occur, would have a significant impact on the asset¹
- **FINDING from MSCI data:** 154 assets (~11%) in this example loan book are exposed to 1-in-200 year fluvial flood event and are considered **affected locations** (if unaffected, they have no exposure to an event of this magnitude)
- Examining the exposure to such events allows the measurement of the financial impact of a rare but plausible event to the loan book

Assets exposed to **fluvial** flooding

Illustrative Example



Source: MSCI ESG Research, data as of June 3, 2025. For a portfolio of 1,355 Production assets across Italy. (1) MSCI also offers 1-in-100 year event risks as part of the GeoSpatial AI offering

Fluvial Flood Risk to a Commercial Loan Book

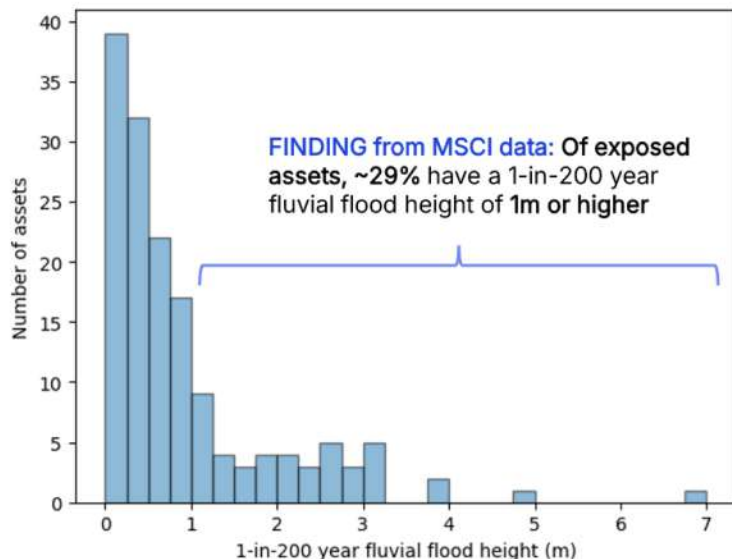
Screen for assets
currently exposed to
fluvial flooding in
your loan book

Identify flood
heights at
each location

Calculate
expected losses
from a given event

STEP 2. Identify flood heights at each location

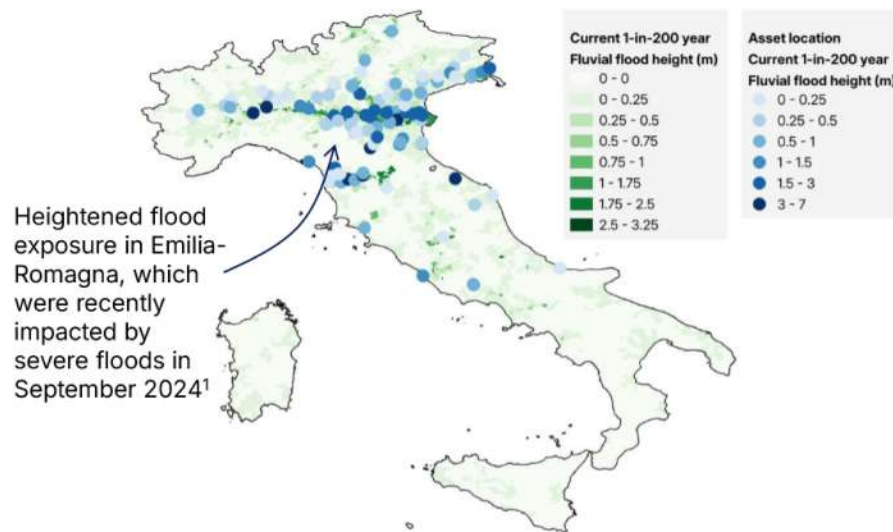
→ Given fluvial flood exposures, what are the flood heights at each location for a 1-in-200 year event?



Source: MSCI ESG Research, data as of June 3, 2025. For a portfolio of 1,355 Production assets across Italy.
1 - At least 1000 people evacuated as flooding hits northern Italy | AP News

Assets exposed to **fluvial** flooding

Illustrative Example



Fluvial Flood Risk to a Commercial Loan Book

Screen for assets
currently exposed to
fluvial flooding in
your loan book

Identify flood
heights at
each location

Calculate
expected losses
from a given event

STEP 3. Calculate expected losses from a given flood event

- How would a severe flood event impact asset values and revenue output?
- **Average annual losses** (AAL) represents the average expected loss per year, while the **1-in-200 year return period** loss reflects a rare, but plausible event with only a 0.5% chance of occurring in any given year.

FINDING from MSCI data: Assets exposed to a 1-in-200 year fluvial flooding exhibit, on average:

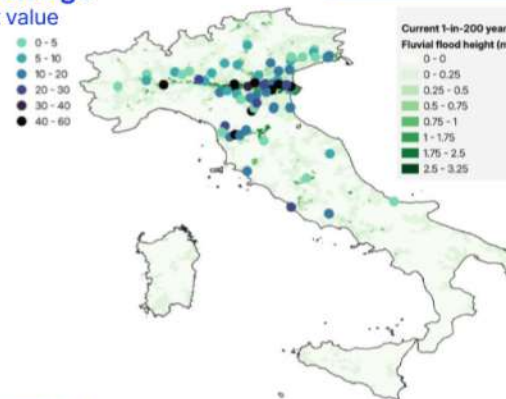
- Asset value loss of 15.2% or greater (AAL: 0.37%)
- Revenue loss of 8.7% or greater (AAL: 0.21%)
- The difference between the AAL and 1-in-200 year event indicates how impactful such an event could be on a loan book

FINDING from MSCI data: Assets with a fluvial flood height of 1m or higher for a 1-in-200 year event exhibit:

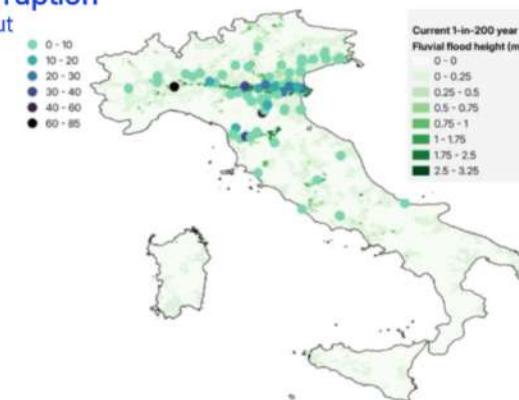
- Asset value loss of 18.2% or greater
- Revenue loss of 8.6% or greater

Source: MSCI ESG Research, data as of June 3, 2025. For a portfolio of 1,355 Production assets across Italy.

Asset Damage % of asset value



Business Interruption % of revenue output



Illustrative Example

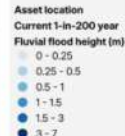
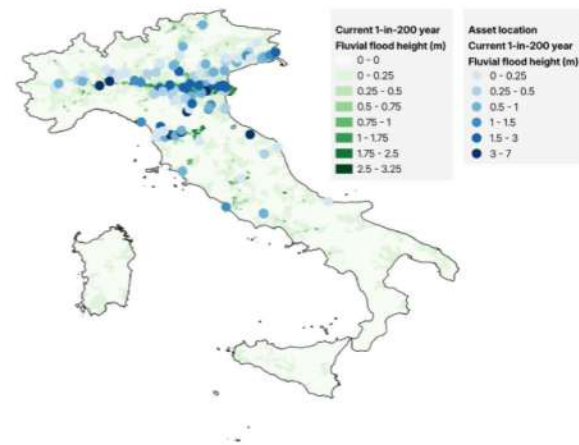
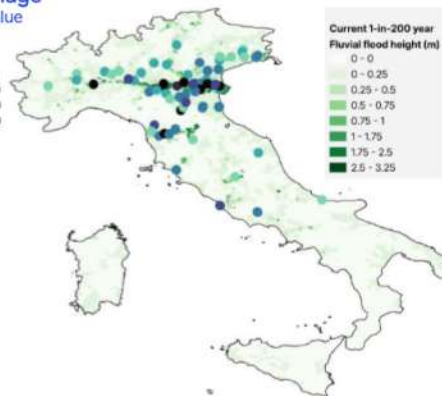
Summary | What can MSCI data be used for when it comes to exposure-based & scenario-based physical risk assessment

- Which **assets** are exposed to one or more types of flood risk?
- What **flood depths** may occur at asset locations?
- What are the **expected losses** from flood events of different likelihoods and magnitudes?
- What financial and operational risks can I face from these assets?

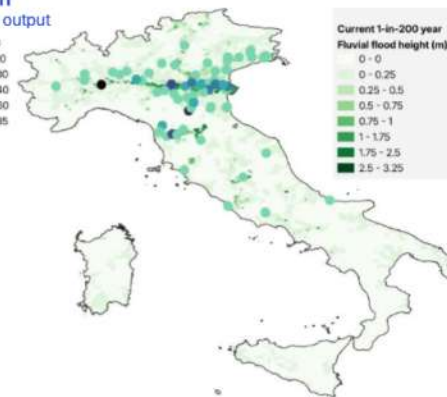
+ Scenario analysis capabilities

- 12 chronic and acute hazards, expanding with Swiss Re
- 11 climate scenarios
- 4 time horizons

Asset Damage
% of asset value



Business
Interruption
% of revenue output



Sector- and Portfolio-based Methods

Impacts and dependencies on ecosystem services

Double materiality at the example of water use:

Water consumption represents both a...

- **Dependency** on ecosystem services, i.e., availability of (clean) water, and an
- **Impact** on ecosystem services, i.e., further enhancing water stress for the environment.

Example of high-risk sector:

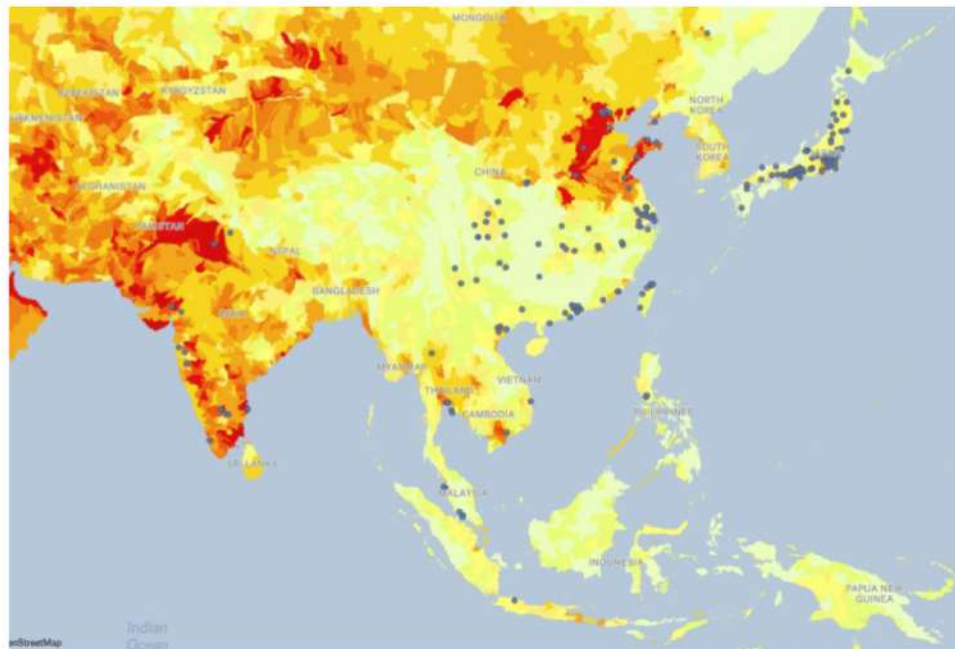
- High water consumption for portfolio constituents in the Global Industry Classification Standard (GICS®)¹ sector *Information Technology*
- Location matters: only ~10% of operated assets are in areas of low water availability

MSCI ESG research, May 2025

1. GICS is the global industry classification standard jointly developed by MSCI and S&P Dow Jones Indices.

2. Risk score reflects the WWF Biodiversity Risk Filter Water Availability Risk Map

WWF Biodiversity Footprint (WWF BRF) Water Availability Risk Map



Analysis (As of April 2, 2025):

- ~400 issuers in *Information Technology* GICS sector
- Operating ~2100 *Electronics & semiconductor manufacturing sites* in South-East Asia
- Identify ~200 assets located in areas of low water availability (risk score >3.4)

Sector- and Portfolio-based Methods →

From asset-level to portfolio

Aggregation:

- Asset-level
- Company-level
- Portfolio-level

Portfolio report:

- Overview of nature-related risks
- Identification of most relevant risks (impacts and dependencies)
- Benchmarking with industry standards or other portfolio

Evaluate – Dependency and Impact Measurement

Portfolio: Nature Action +100

Currency: USD

Benchmark: MSCI ACWI

Climate Change

Indicator	MSCI Metric		Portfolio	Benchmark	Active
GHG Emissions	Financed carbon emissions tons CO2e/M invested	Scope 1+2	38.679	42.602	-9.2%
		Scope 3	380.069	253.699	49.8%

Land-use change

Indicator	MSCI Metric		Portfolio	Benchmark	Active
Land Use	Financed spatial footprint km2/M invested		0.047	0.005	796.3%

Pollution

Indicator	MSCI Metric		Portfolio	Benchmark	Active
Waste generation and disposal	Financed hazardous waste mt/M invested		14.5319	1.5955	810.8%
	Financed non-recycled waste mt/M invested		239.1066	24.1900	888.5%
	Financed water emissions mt/M invested		0.0148	0.0008	1780.5%
Non-GHG air pollutants	Financed NOx emissions mt/M invested		0.0404	3.6362	-98.9%
	Financed SOx emissions mt/M invested		0.0504	6.5320	-99.2%
	Financed VOC emissions mt/M invested		0.0035	0.0528	-93.4%

For the Evaluate step of the LEAP approach, MSCI provides key metrics that help assess an organization's dependencies and impacts on nature. These metrics offer insights into the extent to which portfolio companies rely on natural resources, and how their activities might negatively impact biodiversity.

Resource Use / Replenishment

Indicator	MSCI Metric	Portfolio	Benchmark	Active
Water Consumption	Financed estimated water consumption mt/M invested	314.53	99.11	217.3%
Deforestation	Companies with potential direct contribution to deforestation (%)	35.90%	5.19%	30.7%
	Companies with potential indirect contribution to deforestation (%)	61.81%	7.75%	54.1%
	High risk industry for deforestation (%)	25.54%	3.52%	22.0%
	Production of Commodities that Contribute to Deforestation (%)	3.19%	0.46%	2.7%

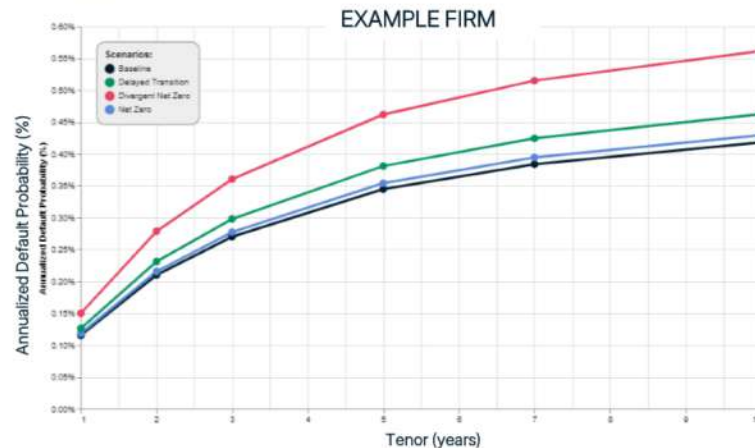
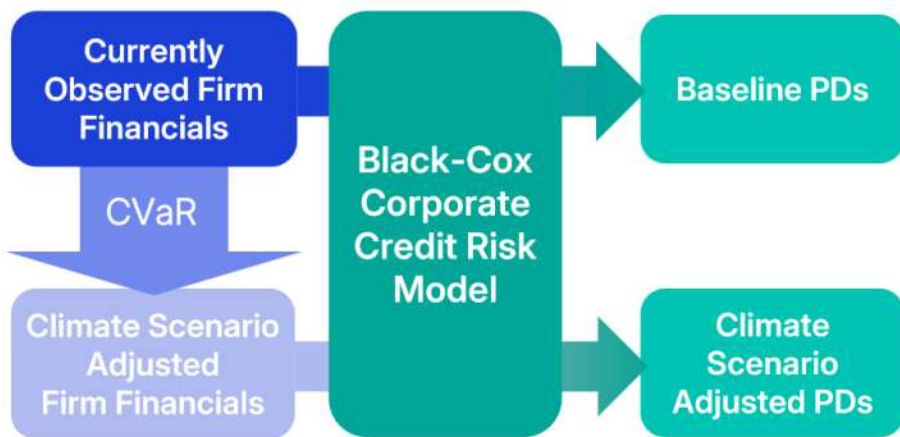
Commodity Exposure	Production		Usage	
	Portfolio	Benchmark	Portfolio	Benchmark
Timber	1.28%	0.16%	38.53%	3.83%
Beef	1.14%	0.09%	42.63%	4.52%
Palm Oil	0.95%	0.19%	52.99%	5.96%
Soybean	0.89%	0.45%	8.61%	1.38%

Drivers of Biodiversity Loss

Indicator	MSCI Metric	Portfolio	Benchmark	Active
Mean Species Abundance	Financed extent of local ecosystem degradation MSA km2/M invested	0.0100	0.0012	717.5%
	Financed global potential species extinction PDF /M invested	0.0581	0.0229	153.4%
Potentially Disappeared Fraction of Species	... related to GHG emissions PDF/M invested	0.0087	0.0098	-10.8%
	... related to water consumption PDF/M invested	0.0375	0.0120	213.5%
	... related to spatial footprint PDF/M invested	0.0118	0.0012	908.1%

Scenario-based Methods

Climate-Adjusted Probability of Default for Credit risk Management Processes for Short- Medium & Long-term Horizons



The ultimate output is a climate credit adjustment $= \frac{\text{Climate Adjusted PD}}{\text{Baseline PD}}$, which projects the relative increase in firm and instrument credit risk over multiple scenarios, horizons, and climate risk types.

The relative PD increase serves as an adjustment scalar for internal baseline PD estimates:

$$\text{Counterparty Climate Adjusted PD} = \text{MSCI Scenario Climate Credit Adjustment} * \text{Counterparty Baseline PD}$$

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<https://www.msci.com/index-regulation>.

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China
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