

Introduction to nature-related risks: Implications for the financial system

European Banking Authority

2 December 2025

Agenda

- **Definitions**
- **Why nature matters**
 - ❖ Ecological, economic and financial perspectives
 - ❖ Transmission channels
- **Why does this matter for the EU**
- **Extending beyond climate**
 - ❖ Similarities and difference
 - ❖ Climate-nature nexus
 - ❖ Gaps in climate-only analysis
- **Key takeaways**



Definitions

- Climate, environment and nature
- Conceptualisation of these terms in the EU context



Defining environment, climate and nature

EU definitions

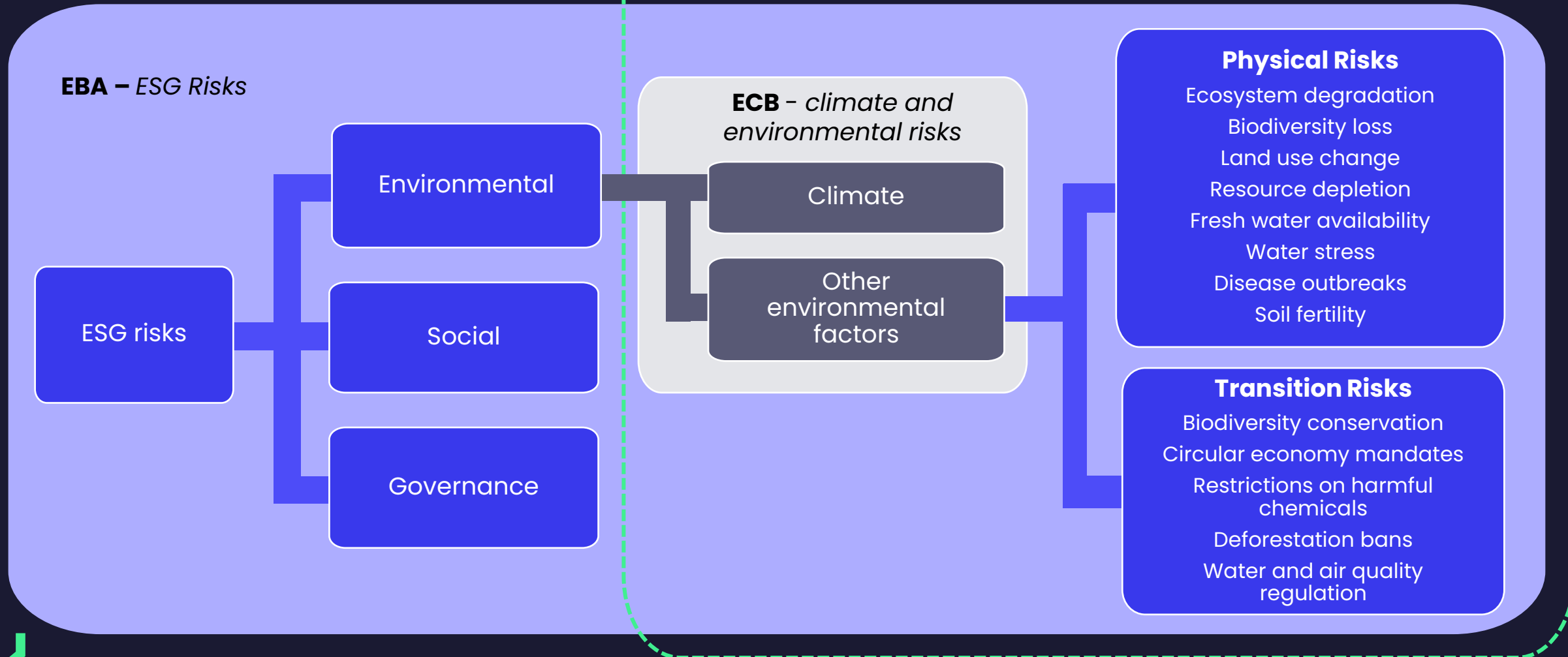
- CRR (EU): Environmental risk is the risk of losses from current or prospective effects of environmental factors on counterparties or assets. It comprises physical and transition risks and covers climate and non-climate objectives: climate change mitigation, climate change adaptation, **water & marine resources, circular economy/resource use, pollution**, and **biodiversity & ecosystems**. (2022, Annex II)
- EU banking supervision: typically refer to climate-related and environmental risks (C&E risks)
 - ECB: formally “climate and environmental risks”, but also “nature-related risks” in speeches
 - EBA: sticks to “other environmental risks” or “non-climate environmental risks”

Other definitions

- NGFS / OECD: Use “nature-related financial risks” as an overarching concept covering physical risks from ecosystem-service loss and transition risks from measures to protect/restore nature. It captures “both the biotic (living) and abiotic (non-living) elements of our planet, including biodiversity but also climate.” (NGFS, 2022)



Definitions (EU)



Source: **Goumet et al (forthcoming)**, based on ECB Guide on Climate and Environmental Risks, EBA ESG Risks Guide, EBA Guidelines on Environmental Scenario Analysis, OECD Supervisory Framework for Nature and Biodiversity, NGFS Nature Conceptual Framework

Defining environment, climate and nature

Key takeaway

- EU prudential usage typically separates climate from other environmental risks
 - NGFS/OECD integrate both under 'nature'.
- Our focus today is the non-climate environmental risks, where supervisory practice is less mature.



Why nature matters

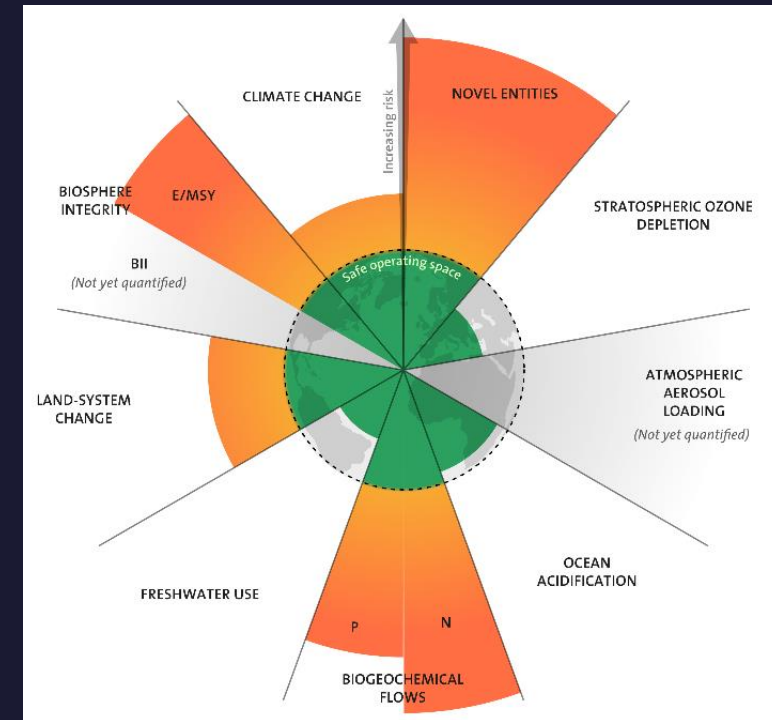
- Ecological perspective
- Economic perspective
- Prudential perspective
- Bringing it all together



From an ecological perspective

- Nature underpins all economic activity through ecosystem services (pollination, water regulation, soil fertility, carbon storage).
- Biodiversity loss is accelerating at unprecedented rates – 6th mass extinction
- Degraded ecosystems shift from being buffers to amplifiers of shocks (e.g., floods, droughts, wildfires).
- Multiple ecological systems are approaching irreversible tipping points (coral reef collapse, Amazon dieback, topsoil erosion).
- Ecological decline is non-linear, systemic, and often irreversible – generating abrupt shocks.

Planetary Boundaries Framework



Source: Stockholm Resilience Centre



From an economic perspective

- Nature loss undermines productivity in sectors such as agriculture, fisheries, forestry, tourism, hydropower
- Global GDP exposure: >50% of global GDP moderately or highly dependent on nature (WEF).
- **Physical risks:** nature degradation leads to volatility (e.g., water scarcity disrupts manufacturing; soil erosion causes declines in crop yields).
- **Transition risks:** emerging regulations (EUDR, due diligence laws, subsidy reform) reshape markets and trade flows.
- Macro impacts: lower GDP, inflationary pressures, FX
- Supply chain disruptions: commodity shocks, food price inflation, trade volatility linked to nature degradation.



Economic impact of nature-related physical risks

- Physical risks result from the degradation of ecosystem services on which economic activities depend.
- Banks that lend to and invest in these activities are also exposed to these risks



US\$423 billion global annual costs of biological invasions which cause damage to ecosystems and people's quality of life (IPBES, 2023)



US\$235–577 billion of global crop production depend on animal pollination (IPBES, 2016)



US\$425 billion business value at risk from water insecurity (CDP, 2020)



Economic impact of nature-related transition risks

- Transition risks result from the misalignment between a firm's impacts on biodiversity and developments aimed toward achieving a nature-positive economy.
- Banks that lend to and invest in these activities are also exposed to these risks

GOVERNMENT POLICY

Global Biodiversity Framework: The DNB estimated that a 30% increase in protected land and sea areas would almost double the exposure of Dutch financial institutions to €28 billion (DNB, 2020)

CONSUMER PREFERENCES

In the US, consumer preferences for a plant-based diet resulted in a 36% rise in sales of plant-based milk and a 12% decline in sales of dairy milk

LITIGATION

28 cases filed in 2023 to prevent financial flows towards harmful activities, including a case brought against a bank for financing agriculture companies contributing to deforestation (Notre Affaire à Tous v. BNP Paribas) (see Columbia Law case summary [here](#))



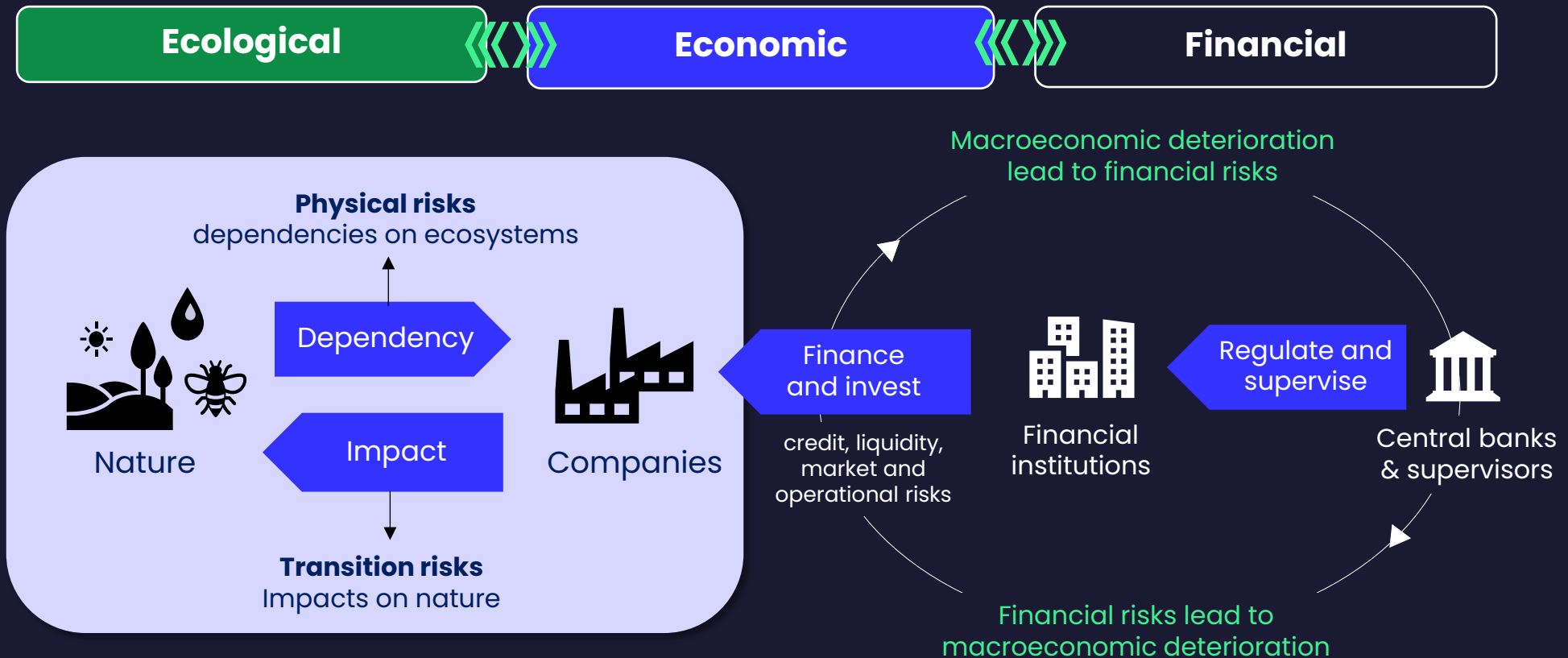
Financial impact of nature-related risks

- Nature-related physical and transition risks transmit to the financial system by weakening borrower's cash flows, asset quality and collateral values.
- These effects map directly onto prudential risk categories for credit institutions

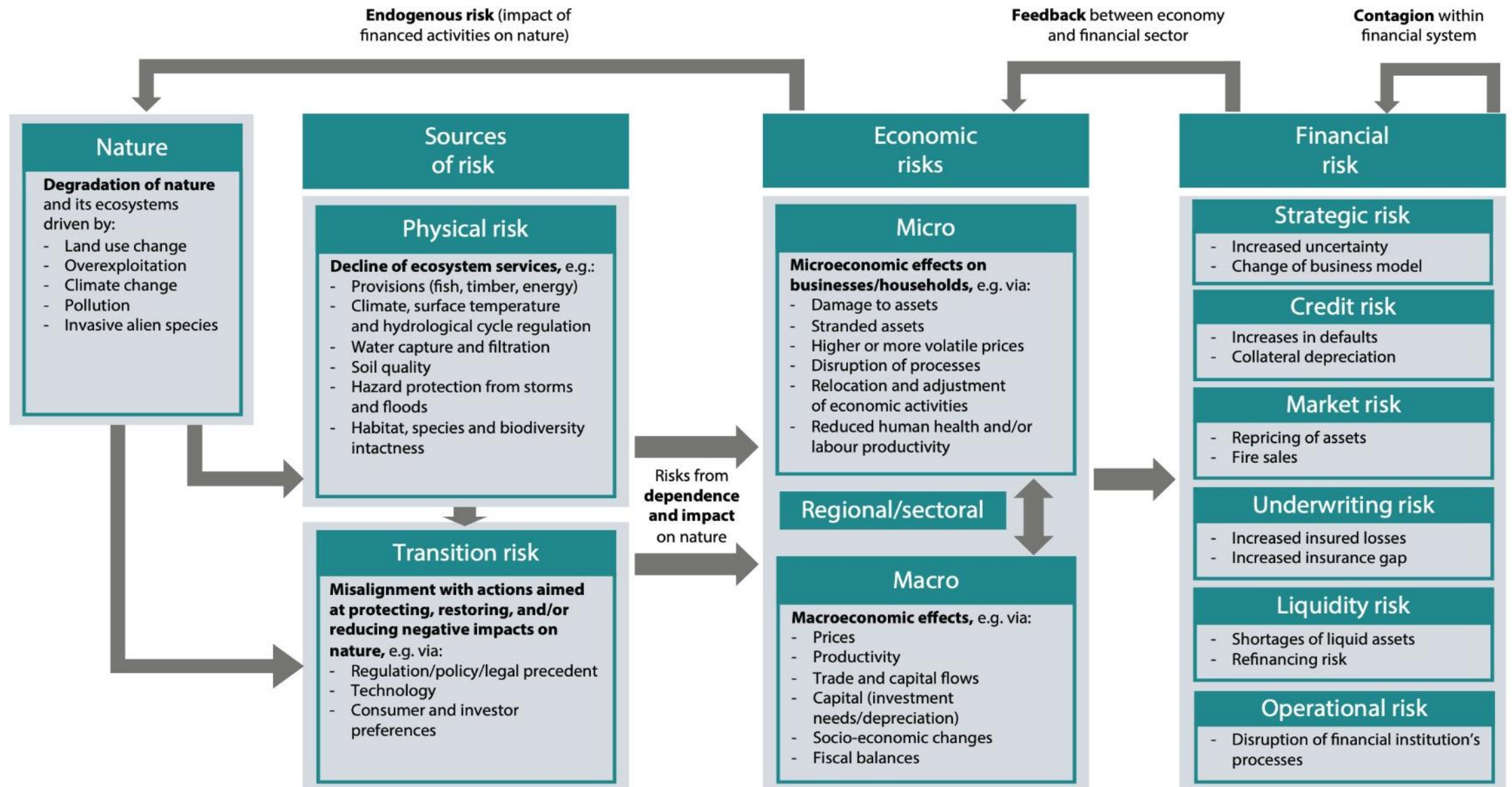
Credit risk	Ecosystem service loss raises costs/volatility and hits revenues (e.g. water scarcity disrupts production); collateral weakens where erosion/subsidence risk rises or insurance is withdrawn.
Market risk	Securities of exposed borrowers and asset-backed products reprice as cash flows/collateral are questioned; spreads widen along water- and land-sensitive value chains.
Operational/legal risk	Client disruption plus compliance, conduct and litigation over nature harms or disclosures drive incidents and provisions.
Liquidity risk	Affected assets become ineligible or more heavily haircut; funding premia rise for banks with concentrated regional/sector exposures.
Strategic risk	Permitting, land-/water-use rules and market preferences make activities costlier or non-viable, shifting product mix and capital.



Left unchecked, nature degradation could affect financial stability



Transmission Channels in the NGFS Framework



Bringing the perspectives together

Ecological foundations → changing risk profiles

- Soil degradation, biodiversity loss and water stress directly affect the productivity and resilience of real-economy sectors.
- As ecosystems degrade, clients in agriculture, forestry, manufacturing and utilities face higher volatility, more frequent shocks, and loss of natural capital assets

Economic consequences → Greater exposures

- Nature-dependent sectors experience yield losses, input cost spikes, supply-chain instability, and export disruptions
- These dynamics translate into lower revenues, higher default risks, asset devaluation, and inflationary pressures which can feed into banks' portfolio risk

Prudential implications → Bank adjusting practices

- EU credit institutions are increasingly integrating soil, water, biodiversity, land-use change and ecosystem health into risk assessments.
- Several banks are beginning to support the ecological transition in high-exposure sectors (especially agriculture)
- These actions reflect a prudential logic: helping clients transition improves their financial resilience, reducing lenders' exposure to nature-related physical and transition risks

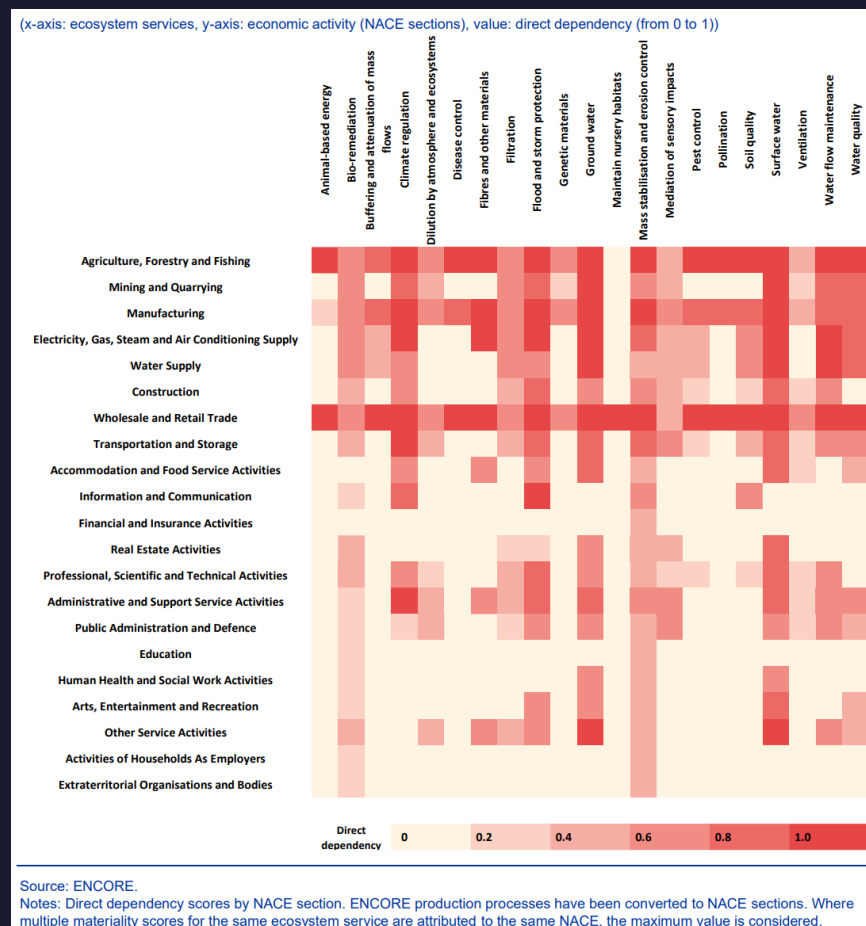


Why does it matter for the EU?



Materiality analysis shows key EU sectors exposed

ENCORE direct dependency scores aggregated at sectoral level



- Sectors particularly dependent on ecosystem services provided by nature are agriculture, forestry and fishing, mining and quarrying and manufacturing
- The most relevant ecosystem services for economic production in the EU include surface water, mass stabilization and erosion control, ground water, climate regulation and flood and storm protection
- However, it is important to note that the ecological system is interconnected, thus isolating specific ecosystem services may not necessarily mitigate risks.



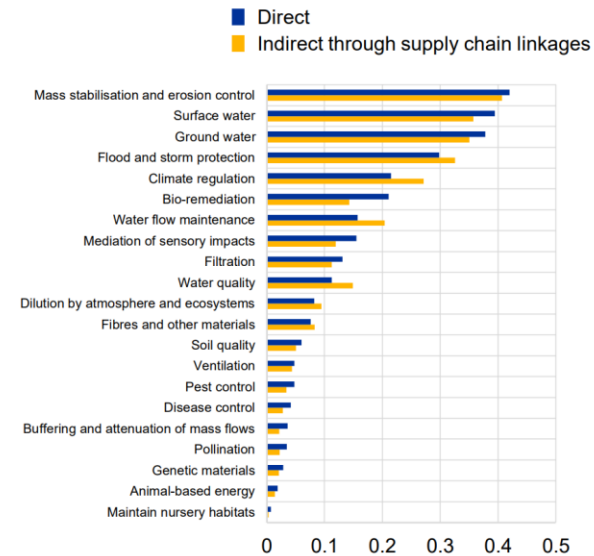
EU firms are highly nature-dependent

Average dependency of euro area NFCs on ecosystem services

Average dependency of euro area NFCs on ecosystem services

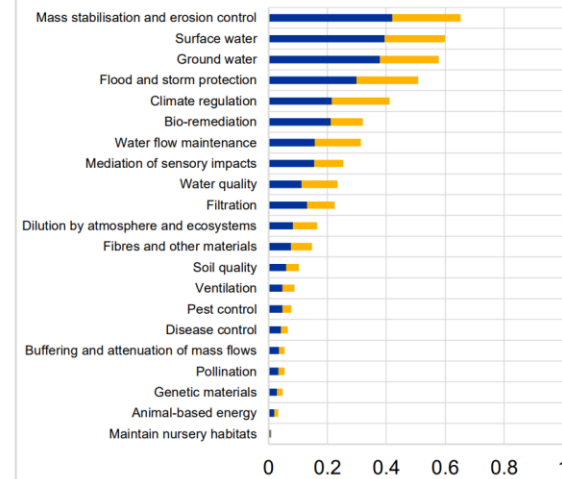
a) Direct and indirect dependency scores

(Dec. 2021, y-axis: ecosystem services, x-axis, dependency scores)



b) Total dependency scores

(Dec. 2021, y-axis: ecosystem services, x-axis, dependency scores)



Sources: ENCORE, EXIOBASE and AnaCredit.

Notes: The euro area dependency score is computed as the average of the dependency scores of euro area NFCs and distinguishes between direct dependency and indirect dependency. The total dependency scores (panel b) are calculated by combining direct and indirect dependencies in a single metric.

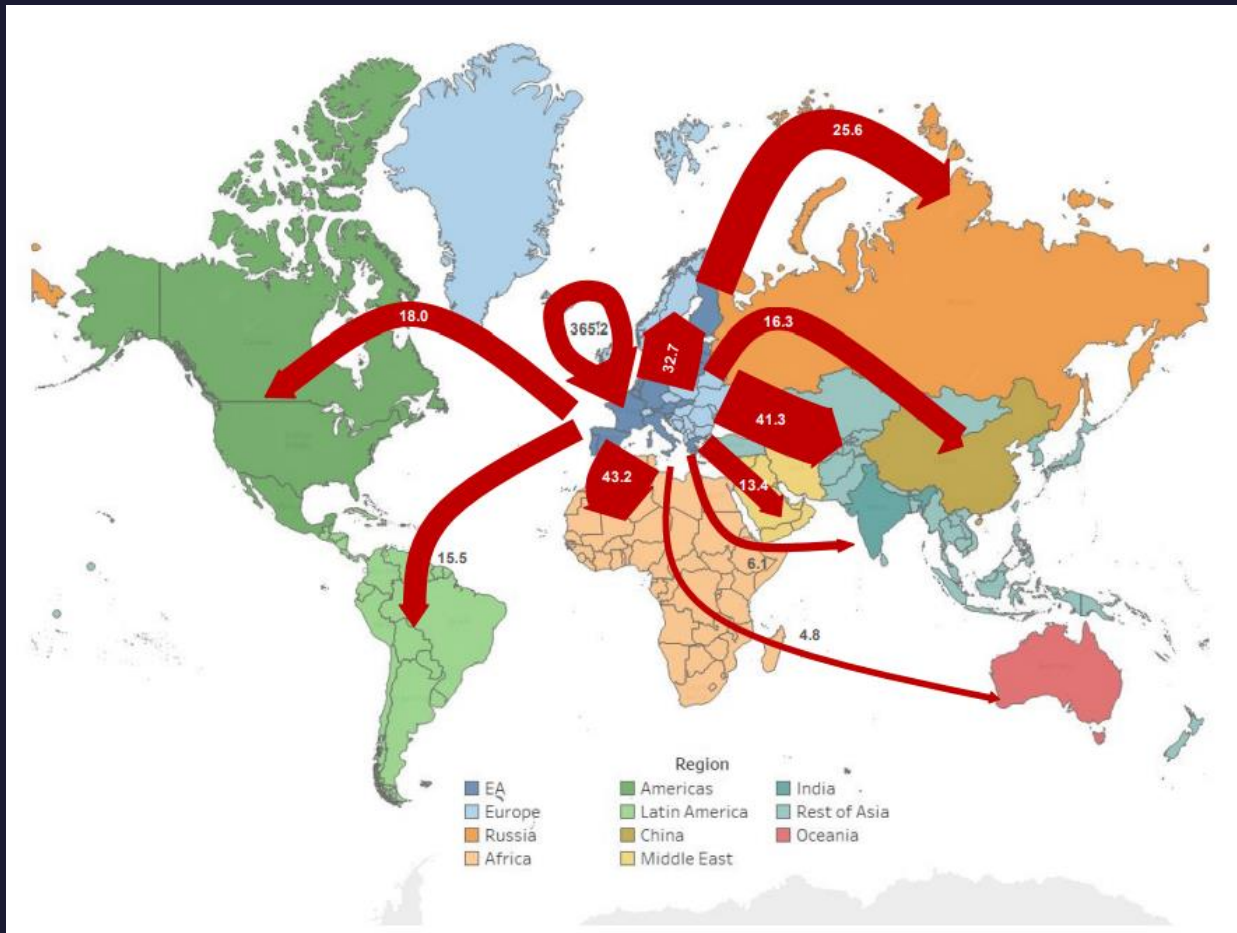
- 72% of euro-area companies rely on at least one critical ecosystem service (soil, water, pollination).
- Makes nature loss an economic and operational risk.

Source: ECB working papers



The EU economy has a large biodiversity footprint

Map of Euro area NFCs total biodiversity footprint



- The EU economy drives a global biodiversity loss equivalent to 582 million hectares of pristine nature, with high impacts in Asia and Africa.
- Supply-chain risks transmit back into EU financial (and economic) stability.

Source: ECB working papers



Why does it matter for the EU?

- **In the EU, key sectors are exposed to nature loss:** Sectors particularly dependent on ecosystem services provided by nature are agriculture, forestry and fishing, mining and quarrying and manufacturing
- **EU firms are highly nature-dependent:** ~72% of euro-area companies rely on at least one critical ecosystem service (soil, water, pollination).
→ Makes nature loss an economic and operational risk.
- **Banks are directly exposed:** ~75% of euro-area corporate loans go to firms highly dependent on ecosystem services.
→ Nature degradation = credit risk.
- **Large biodiversity footprint:** The EU economy drives a global biodiversity loss equivalent to 582 million hectares of pristine nature, with high impacts in Asia and Africa.
→ Supply-chain risks transmit back into EU financial (and economic) stability.
- **Regulatory relevance:** ECB and EBA highlight that biodiversity and ecosystem-service risks can undermine bank resilience and should be assessed within prudential frameworks.
→ Nature loss is recognised as a financial stability issue.



But we already look at climate risks!

- Similarities and differences between climate and nature
- The climate-nature nexus
- Gaps in climate-only analysis



Nature loss and climate change: Similarities and differences

	Climate change	Nature loss
Permanence	Mostly irreversible and subject to tipping points	
Impact	Direct and indirect; far-reaching	
Prediction	Foreseeable, but time horizons, magnitude and future pathways uncertain	
Transmission of risk	Chronic and acute	
Metric used	CO2	Multiple: No one metric
Location	Global	Local and global
Legally binding targets	Paris agreement (1.5°)	None

Important to note that nature degradation often precedes climate-related physical impacts

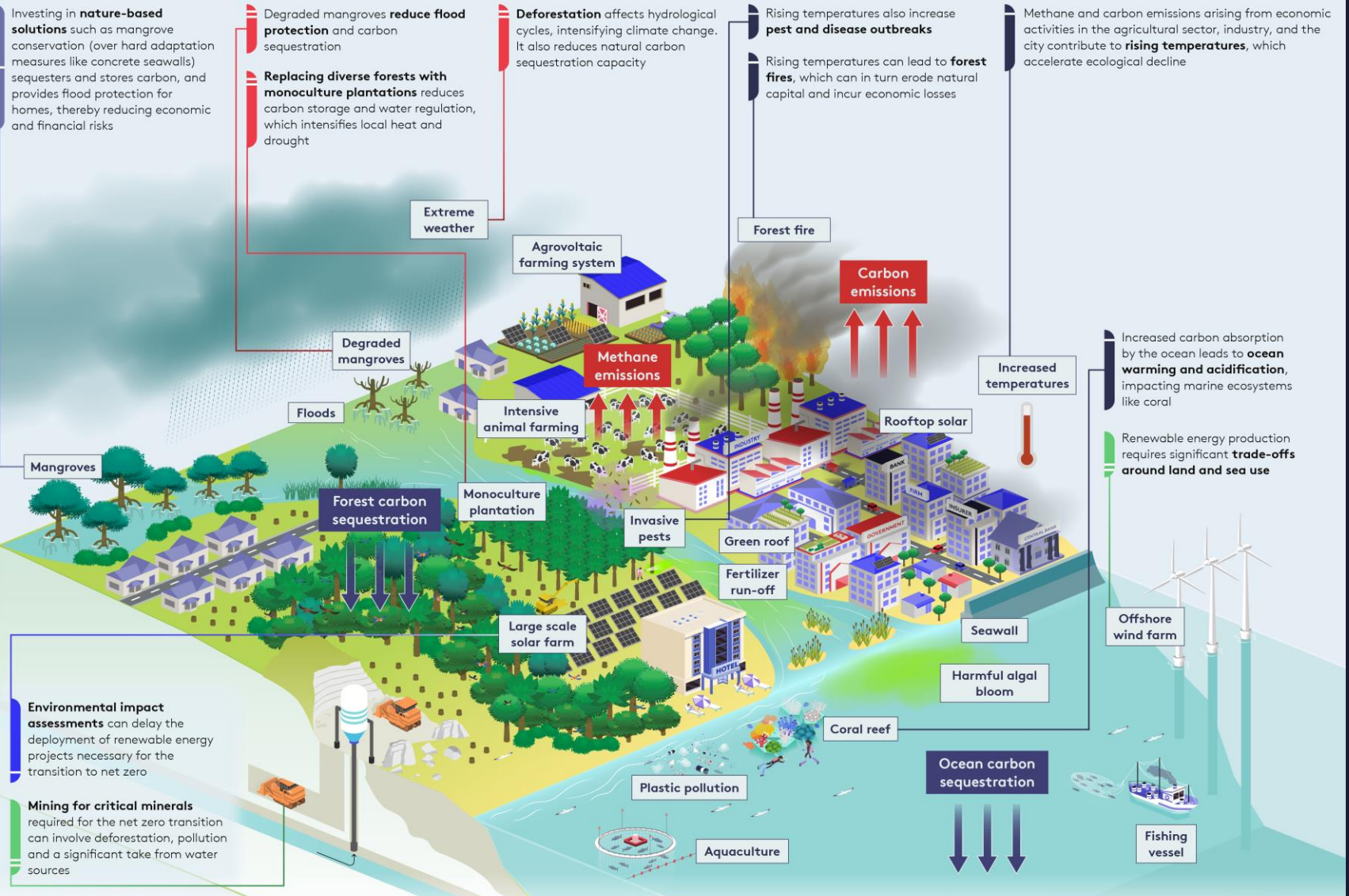


Climate-nature nexus: at least 5 interactions

Connection	Example
Climate change drives nature loss	Rising temperatures can lead to pest and disease outbreaks as well as forest fires, both of which can erode natural capital
Nature loss drives climate change	Deforestation affects hydrological cycles, intensifying climate change, reduces natural carbon sequestration capacity and reduces resilience against hazards such as storms and floods.
Climate change mitigation can drive nature loss	Mining for critical minerals required for the net zero transition can involve deforestation, pollution and significant water use.
Nature based solutions can help build resilience and mitigate against climate change	Ecosystems like rainforests and mangroves help increase resilience to climate impacts like floods, wildfires, landslides, storm surges
Environmental policy and legislation can delay the roll-out of climate mitigation projects	Environmental impact assessments can delay the deployment of renewable energy projects necessary for the transition to net zero

Source: NGFS (2023), Almeida, Goumet, Greenslade and Waaifoort (2025)





Interactions between nature and climate change components

1. Physical impacts of climate change heighten nature-related risks by accelerating the degradation of ecosystems
2. Physical impacts of nature degradation can also intensify climate-related risks
3. Climate mitigation and adaptation efforts can give rise to harmful trade-offs when ecological considerations are overlooked
4. Environmental policy and legislation can delay the roll-out of climate mitigation projects
5. Conserving nature can support climate adaptation, mitigation and resilience, with the potential to reduce economic and financial risks

Source: Almeida, Goumet, Greenslade and Waaifoort (2025) *Understanding the climate-nature nexus*



A climate-only lens misses key exposure

- **Mortgages/real estate:** Focusing only on flood or storm risk misses land-based drivers of value loss. Soil subsidence, erosion and groundwater decline can devalue and de-insure properties even without extreme weather.
- **Agriculture:** Looking only at drought ignores non-climate dependencies that can cut yields and raise defaults, such as freshwater availability and quality, soil fertility, pollination and biological pressures like pests/invasive species



Example of olive tree disease (Italy)

In the case of the olive tree disease, an **invasive species in the form of a bacteria**, exacerbated by **climate change and extreme weather**, devastated olive production in the Italian region of Puglia. This led to significant economic losses that was amplified by local vulnerabilities

Drivers

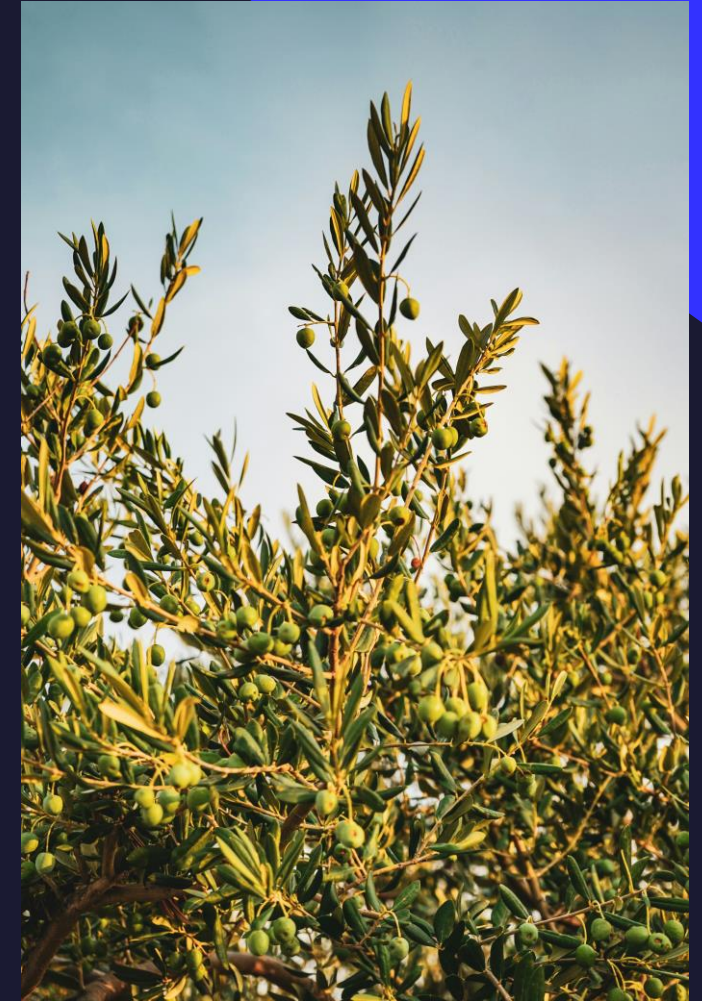
- Invasive species
- Climate change and extreme weather

Vulnerabilities

- Exposure to climate change and extreme weather
- High reliance on environmental quality
- High dependence on a natural resource
- Limited economic diversification

Economic impact

- Total factor productivity decline
- Natural capital destruction
- Labour supply reduction



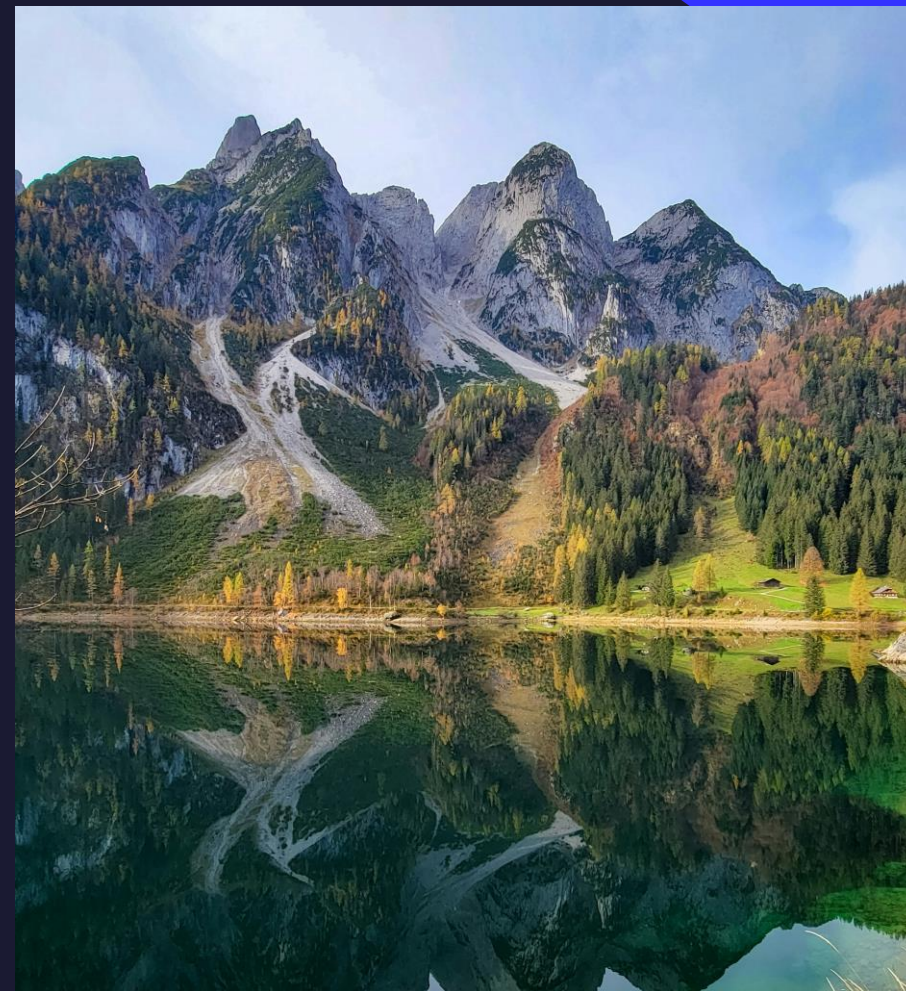
EU regulation extends beyond climate

- EU's prudential framework considers environmental risks beyond climate. EBA and ECB take this broader stance.
- EBA's ESG Pillar 3 standards requires disclosure of environmental risks (though quantitative metrics are climate-focused at the moment).
- EU corporate reporting (CSRD/ESRS) provides granular nature disclosures feeding banks' risk assessments.
- EU Taxonomy includes four environmental objectives beyond climate (water, circular economy, pollution, biodiversity).
- Emerging and existing environmental regulations: EUDR, EU Nature Restoration Strategy, Farm to Fork→ real transition risks for banks.
- ISSB is developing a global baseline that is likely to integrate nature-related topics, aligning with TNFD.



Key messages

- Nature-related risks transmit from degraded ecosystems to the real economy and then into banks' prudential risk types (credit, market, operational, liquidity and funding).
- ECB work already shows euro-area banks' loan books are materially exposed to ecosystem-service dependencies and related degradation, warranting supervisory attention.
- Risk management needs to extend beyond climate to capture full exposure to environmental risks
- Nature is embedded in the EU sustainable-finance architecture (Taxonomy, CSRD, CRR), and prudential frameworks should reflect this integration over time.
- EU credit institutions are already beginning to assess and disclose nature-related risks, and supervisors can build on this progress.



Source: Unsplash - Tanuj Sabharwal





Centre for Economic
Transition Expertise

Research and Policy at LSE ■

Thank you!

Contact:

e.k.almeida@lse.ac.uk