Methodological framework and assessment of potential financial risks associated with biodiversity loss and ecosystem degradation

EIOPA Conference

Online
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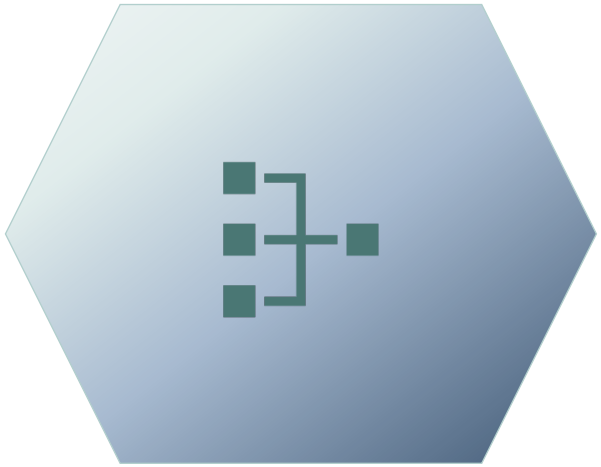
Objectives

The aim is to understand the adverse impacts of biodiversity loss and ecosystem degradation on financial systems, the current state of nature risk identification, and develop a methodological framework for assessing financial risks

Current state analysis: Summarize the existing status of biodiversity and ecosystem risk identification, assessment, and management approaches by financial institutions and stakeholders, evaluating the advantages and drawbacks

Sectoral impacts: Examine and map adverse economic impacts of biodiversity loss and ecosystem degradation on the economy, their transmission channels and determine which EU sectors will face the most significant financial risk



Methodological framework development: Build a comprehensive methodological framework to assess financial risks stemming from biodiversity loss and ecosystem degradation for the financial entities and the broader financial sector

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Overview of current best practices

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Part 1

Overview of current best practice

- Terminology
- Assessments – exposure and materiality
- Mitigation approaches

Sectoral exposure in the EU

- Rationale and identification of exposed sectors
- Prioritization considering EU economic relevance
- Case studies

Risk categorisation

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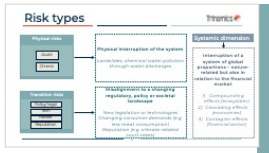
Risk Drivers

- Land use change
- Climate change
- Resource use
- Pollution
- Invasive alien species



Risk Types

Physical risks

- Acute
- Chronic

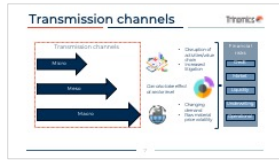
Transition risks

- Policy/ legal
- Tech
- Market
- Reputation

Systemic dimension of risk propagation

Transmission channels

- Micro
- Meso
- Macro



Financial risks

- Credit
- Market
- Liquidity
- Underwriting
- Operational

Risk types

Physical risks

- Acute
- Chronic

Transition risks

- Policy/ legal
- Tech
- Market
- Reputation

Physical interruption of the system

Landslides, chemical water pollution through water discharges

Misalignment to a changing regulatory, policy or societal landscape

New legislation or technologies
Changing consumer demands (e.g. less meat consumption)
Reputation (e.g. climate-related court cases)

Systemic dimension

Interruption of a system of global proportions – nature-related but also in relation to the financial market

1) *Compounding effects (ecosystem)*
2) *Cascading effects (economies)*
3) *Contagion effects (financial sector)*

Transmission channels

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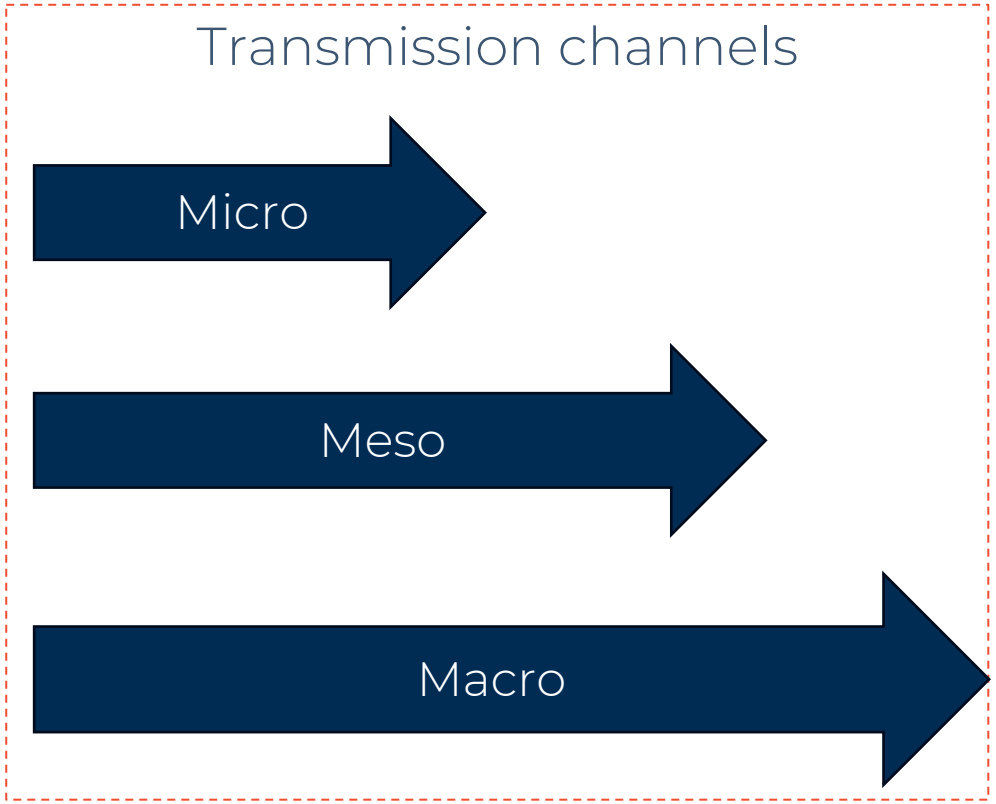


- Disruption of activities/value chain
- Increased litigation

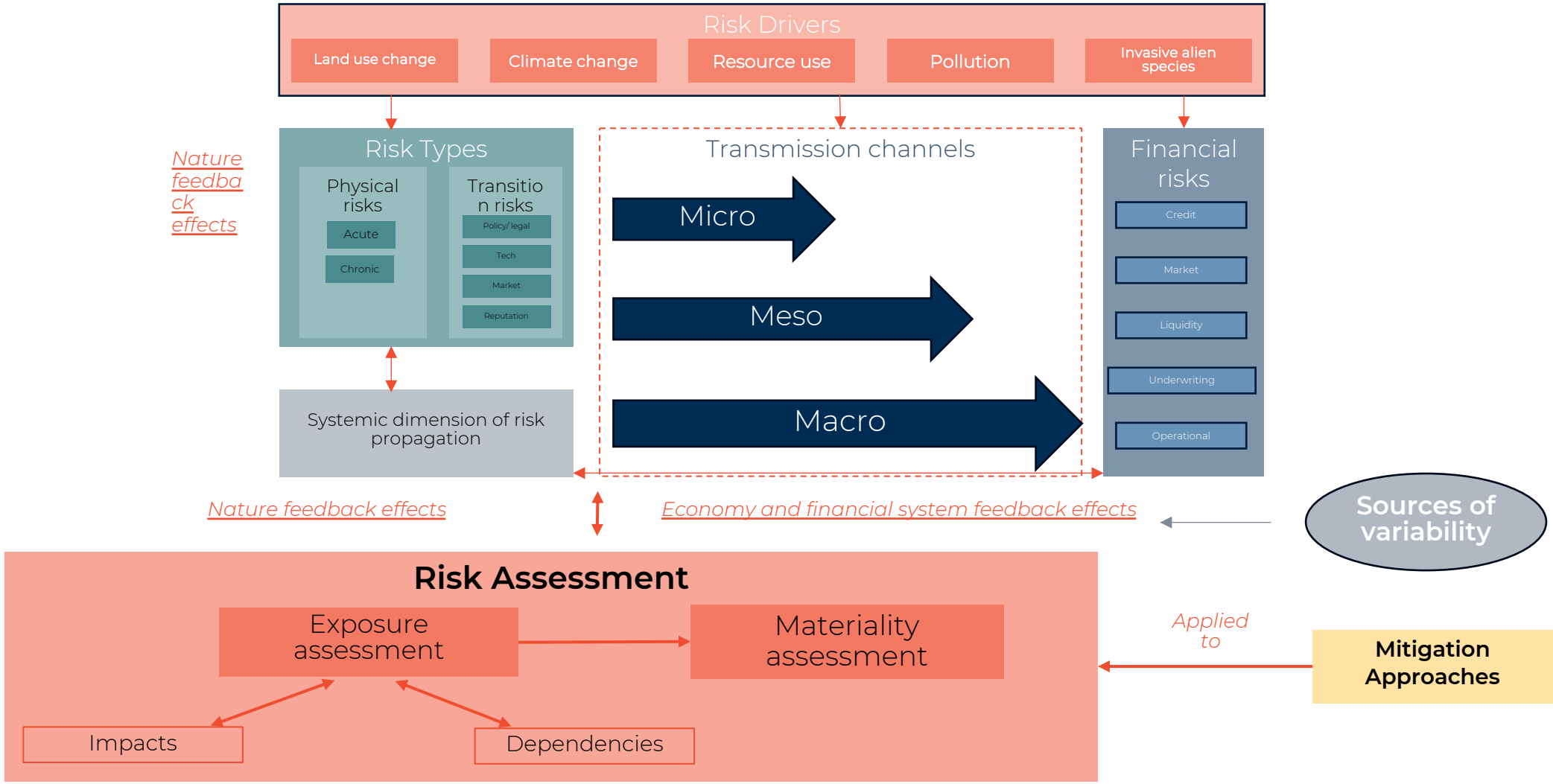
Can also take effect at sector level

- Changing demand
- Raw material price volatility

Financial risks

- Credit
- Market
- Liquidity
- Underwriting
- Operational

Risk Assessment



Risk assessment

1 Exposure assessment

What are a financial institution's impact and dependencies?

Transition risk

Physical risk

Tools aid in the assessment, i.a.:

- Impacts (**ENCORE, BFFI**)
- Dependencies (**ENCORE, BFFI**)
- Temporal (GLOBIO, PDF)
- Spatial (**IBAT**, **GBSFI**, GLOBIO)
- Intersectorality (**IBAT**, **WWF Risk Filter**, EXIOBASE)

2 Materiality assessment

How severe and what magnitude is the financial risk?

Mitigation: Be Proactive

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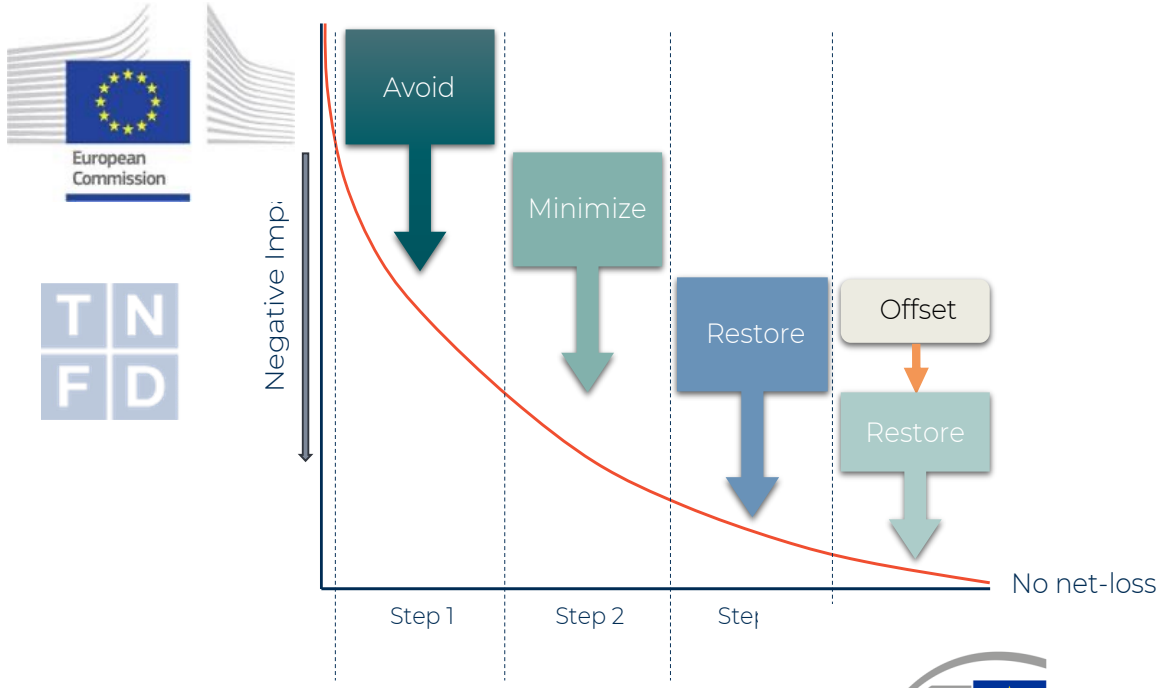
1 At project/programme level

Mitigation hierarchy as general guideline



European Bank for Reconstruction and Development

European Investment Bank

Engagement programmes

Financial institutions need to understand actions of their investees to demand appropriate actions, i.a.

- Due diligence and environmental impact assessments
- Biodiversity Action Plans
- ESG integration, data disclosure and enhanced reporting requirements
- Incentives and rewards
- Formalise and integrate new strategies and policies

Mitigation: Be Proactive

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The Nature Conservancy

The Encore Partnership (former Natural Capital Finance Alliance)

2 **At institutional level**

Three main approaches:

1) **Finance-focused mitigation**, e.g. funds for activities that benefit ecosystems – protect and restore

2) **Operational transformation**, e.g. CSR

3) **Risk assessments** and their integration into decision-making as the fundamental step to enable all of the above

BANQUE DE FRANCE EUROSYSTÈME

DeNederlandscheBank EUROSYSTEEM

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Assessing sectoral exposure in the EU

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Sectoral exposure in the EU

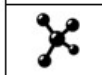
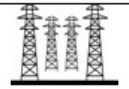
Rationale:

- Illustrate and examine exposure to nature-related risk
- Understand the elements required to develop sector-specific guidelines to assess and report on nature related risk
- Develop detailed sector-specific assessment of most exposed sectors

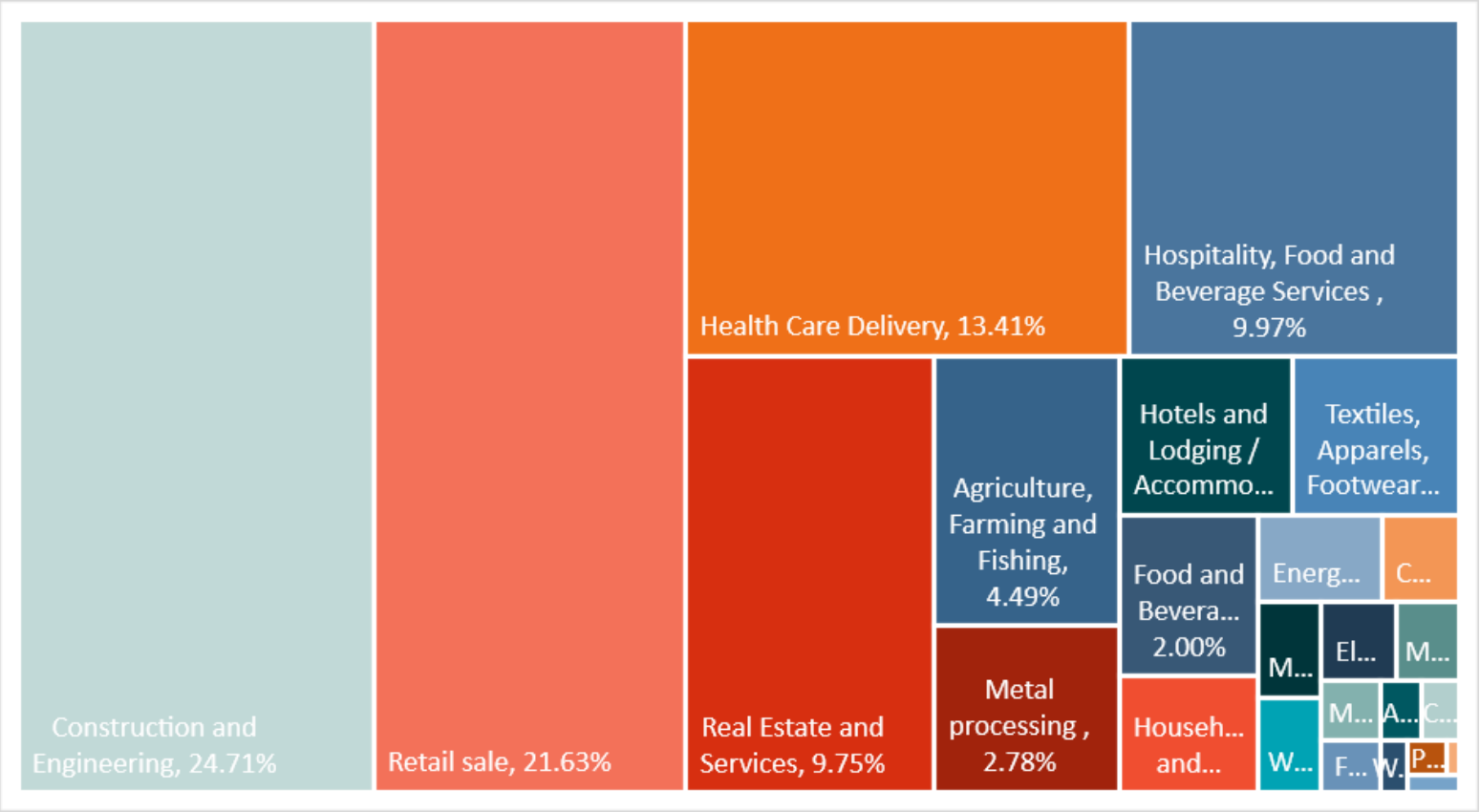
Assessment of exposure based on:

- Review of relevant studies and reports
- Stakeholder consultation and engagement
- Reliance on specific tools, models and databases

Sectors exposed

Industries Exposed to Biodiversity Loss and Ecosystem Degradation Risk					
	Agriculture and Farming		Electronics		Water and Waste Services / Water Utilities
	Forestry		Food and Beverages		Construction and Engineering
	Fishing and Aquaculture		Machinery and Equipment		Retail Sale
	Metals and Mining		Medical Equipment and Supplies		Air Transportation
	Oil and Gas		Metals Processing		Water Transportation
	Automobile and Components		Oil and Gas - Mid and Downstream		Hospitality, Food and Beverage Services
	Biotechnology and Pharmaceuticals		Pulp and Paper Production		Hotels and Lodging / Accommodation
	Chemicals (and Biofuels)		Textiles, Apparels, Footwear and Accessories		Media and Communication / Digital Communication
	Household and Personal Products		Energy Production		Real Estate Services
	Construction Materials		Energy Transmission and Distribution		Health Care Delivery

EU companies in exposed sectors



Source: Eurostat Structural Business Statistics, 2021

- 15 million (49%) of EU companies active in the sectors exposed to nature related risks
- 7 million (22%) of EU companies applied for or consider applying for bank loans
- 2.3 million (7%) of EU companies relied on bank loans over the past six months

Source: European Commission and the European Central Banks's as part of their survey on access to finance of enterprises (SAFE) , 2022

Prioritization of exposed sectors

Figure 3-3 Assessment and prioritization of exposure to BES risk

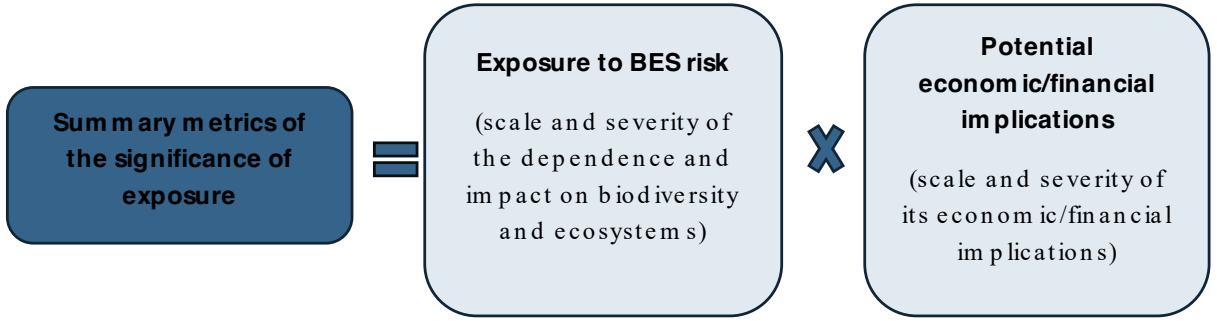


Figure 3-5: Subsector dependence and impact score

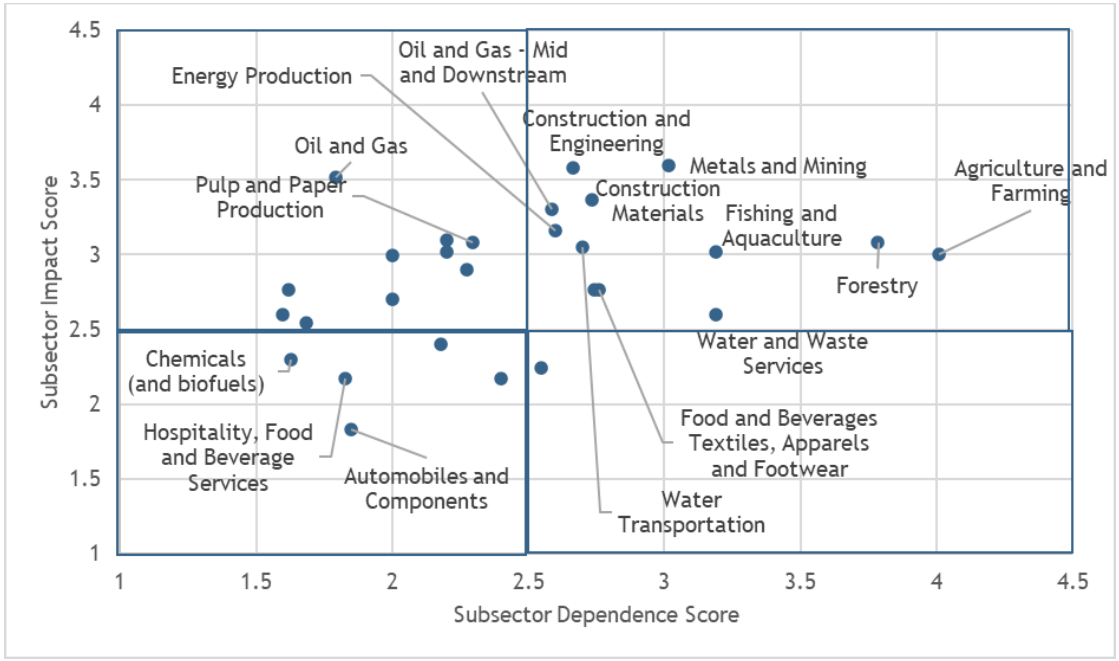
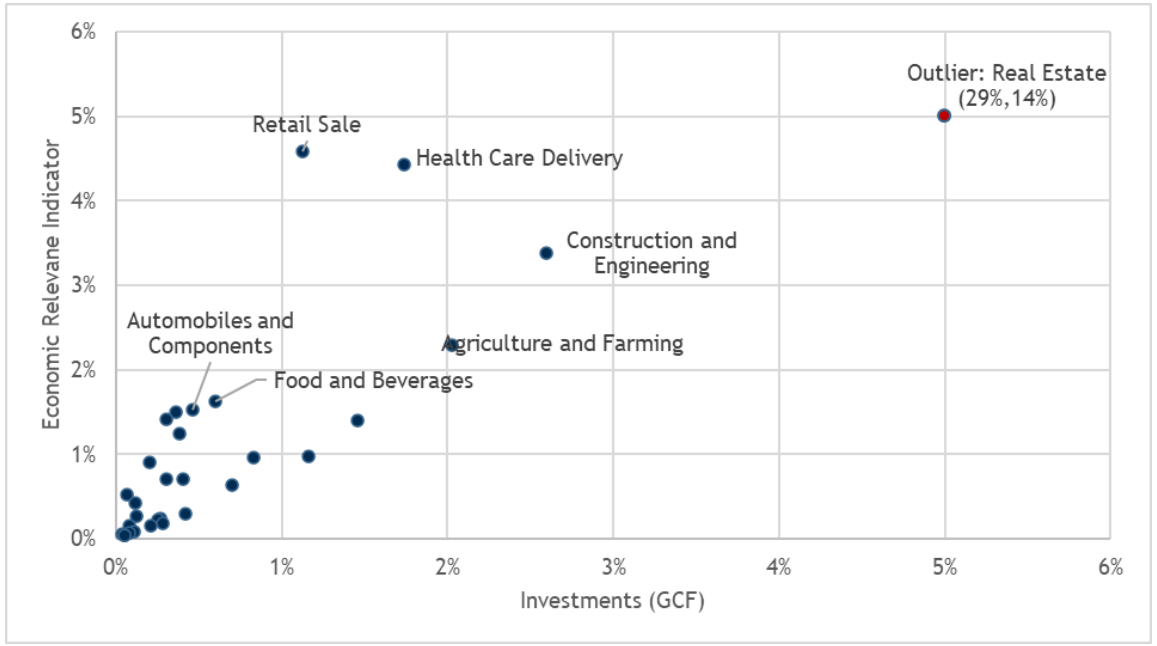


Figure 3-7: Relative importance of investment and overall economic relevance



Prioritization of exposed sectors

Figure 3-10: Ranking of sub-sectors based on the significance of the exposure score

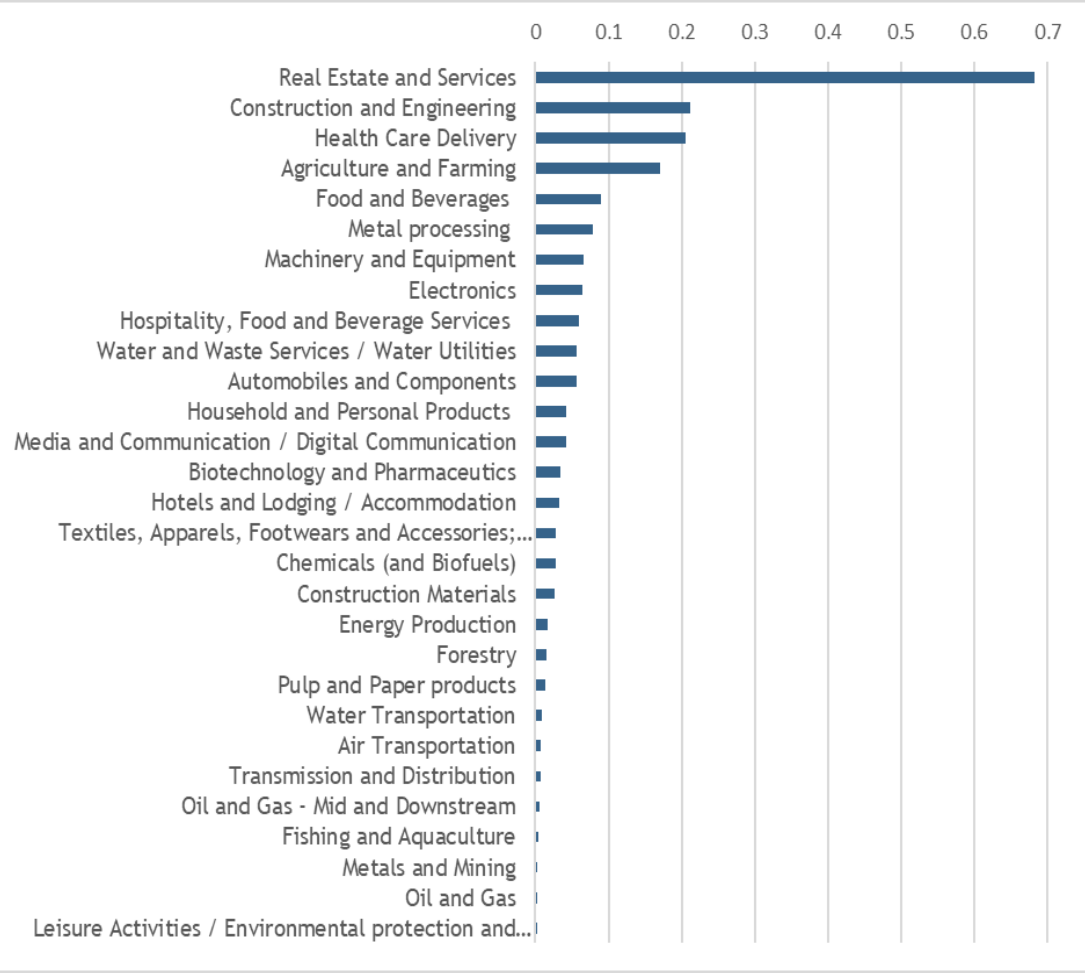


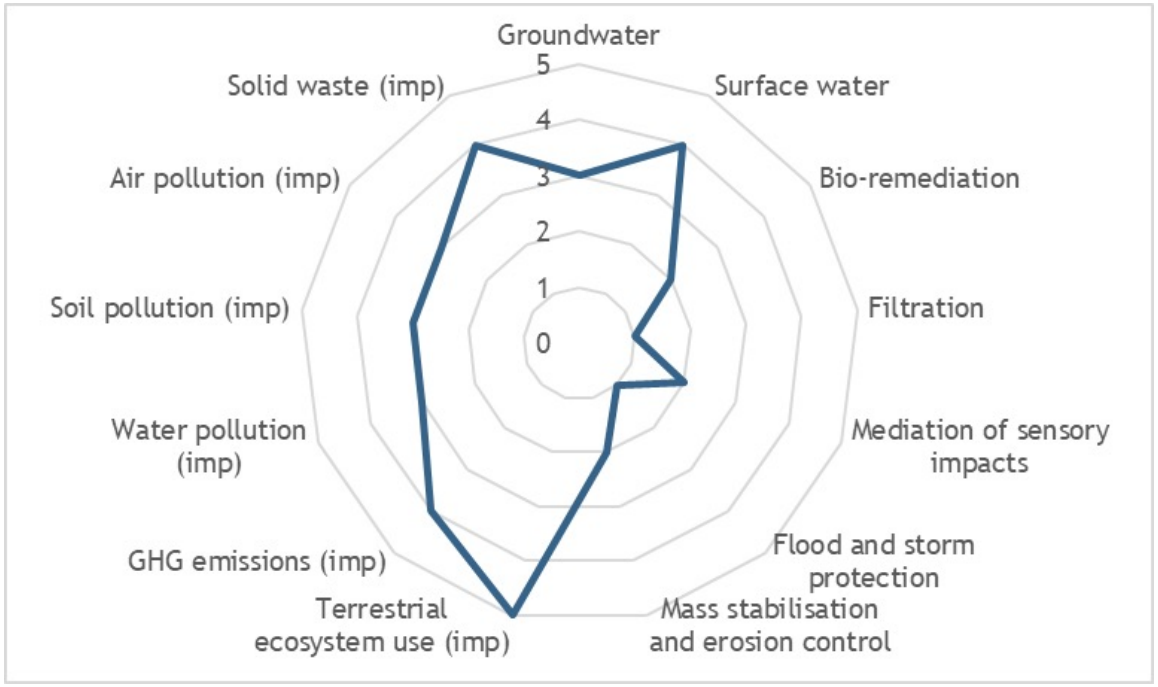
Table 3-5: Robustness check (sensitivity analysis) of ranking exposed sectors

Significance of exposure score (α =0.7 and β =0.3, a = 1 and b =1)		Significance of exposure score (α = 0.5 and β =0.5, a = 1 and b =1)		Significance of exposure score (α = 0.7 and β =0.3, a = 6 and b =1)		Significance of exposure score (α = 0.7 and β =0.3, a = 6 and b =1)	
Industry	Score	Industry	Score	Industry	Score	Industry	Score
Real estate and services	0.682	Real estate and services	0.608	Agriculture and Farming	3,978	Agriculture and Farming	2,359
Construction and Engineering	0.211	Construction and Engineering	0.202	Real Estate and Services	2,121	Construction and Engineering	1,517
Health Care Delivery	0.205	Health Care Delivery	0.164	Construction and Engineering	2,015	Real Estate and Services	1,063
Agriculture and Farming	0.171	Agriculture and Farming	0.156	Food and Beverages	462	Food and Beverages	287
Food and Beverages	0.090	Food and Beverages	0.083	Health Care Delivery	435	Metal Processing	240
Metal Processing	0.078	Metal Processing	0.075	Water and Waste Services	369	Water and Waste Services	232
Machinery and Equipment	0.066	Machinery and Equipment	0.063	Metal Processing	303	Machinery and Equipment	205

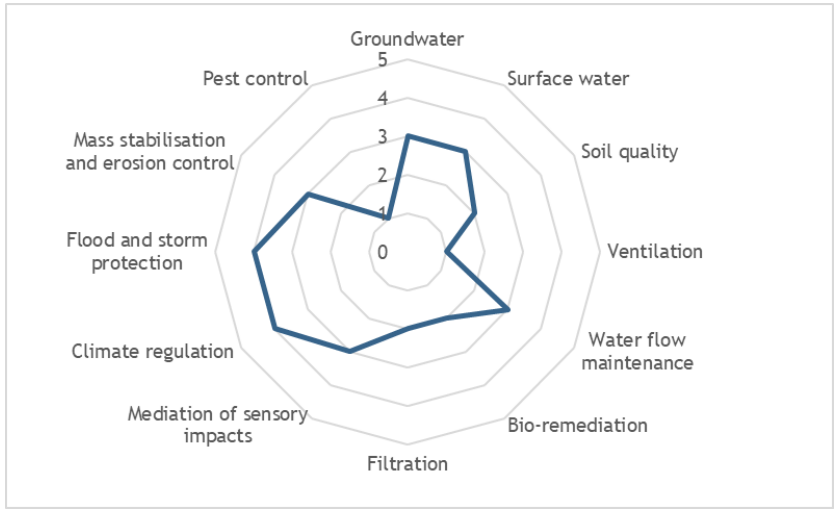
Case study

Inter-sectoral considerations

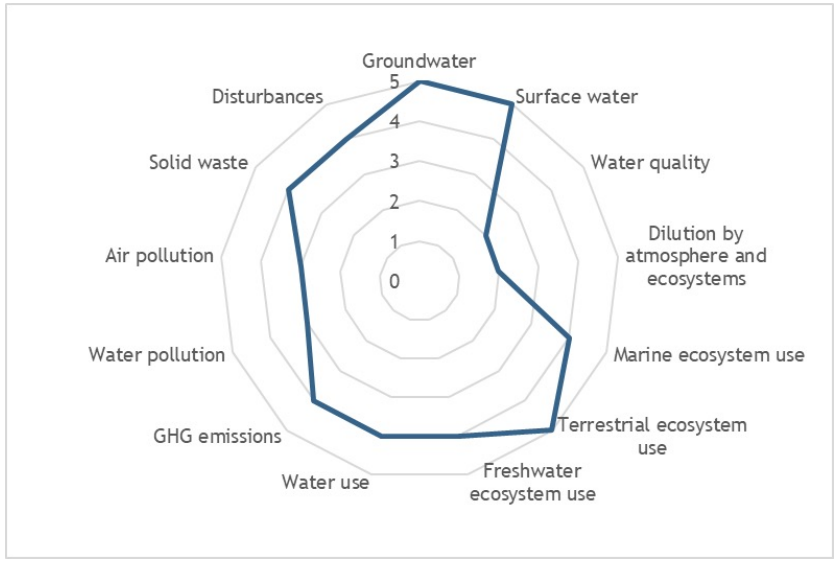
Figure 3-11: Exposure to physical and transition risk: Real Estate and Services



Source: Exploring Natural Capital Opportunities, Risks and Exposures (ENCORE)



Construction and Engineering



Construction Materials

Impact on insurers

Agriculture

Underwriting risks: Climate and nature risks amplify each other, and consequences are severe for the sector: biodiversity loss, pollinators decline, decreased water quantity and quality, soil salinisation, further spread of pests and diseases. These affect yield-loss insurance products, both in terms of number of potential claims and premiums.

Operational risks: When risks are not properly assessed, insurers can face significant losses. Nota bene – agricultural insurance in the EU is heavily supported by the public sector, consequently an underestimation of risks could transfer to national budgets.

Construction and real estate

Underwriting risks: Insurers face higher claims payouts due to environmental damages, which can exceed the premiums collected if risks are not accurately assessed. Insurers need to adjust premiums to reflect the heightened risks, potentially leading to higher costs for policyholders and reduced demand for insurance coverage.

Operational risks: Insurers must ensure that their operations and underwriting practices comply with evolving environmental regulations. This also increases liability risks and thus potential liability claims.

Health care and Pharmaceuticals

Underwriting risks: Increased frequency and severity of health issues due to environmental degradation (e.g., new zoonotic diseases, antimicrobial resistance) can lead to higher health insurance claims, potentially exceeding premiums collected if risks are not accurately assessed.

Market risk: Nature-related risks and supply chain dependencies can lead to volatility in the availability and pricing of medical supplies and pharmaceuticals, impacting the value of investments for insurers in healthcare and pharmaceutical companies.

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Overview of draft framework for assessing nature-related risk in the EU

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Several key design considerations are essential to shape the overall structure of the framework

Is this framework **mirroring existing climate and nature frameworks** or is it **distinct**?

This framework uses **key structural components, concepts and terminology developed by climate frameworks**, as it best reflects what FI already do and understand.

However, the content under risk and exposure components presents some **fundamental differences accounting due to specificities of nature related risks**.

Where other frameworks are directly relevant and can be used by Fis to complement this framework they are referred to directly

Is this a **prescriptive step by step guidance** or a **high-level conceptual guidance**?

This framework aims at providing **applicable and practical guidance** through a **step-by-step approach**

However, the **components of the framework can be considered as distinct building blocks** to understanding and assessing nature risks which **don't necessarily need to all be carried out**.

The framework aims to describe potential **best practice approaches for developing these building blocks** without prescribing a restrictive methodology.

How does the framework account for **evolving data and methodological improvements**?

The framework provides suggested approaches which are **applicable with different data and methodological capacities**, and therefore **adaptable to future developments**.

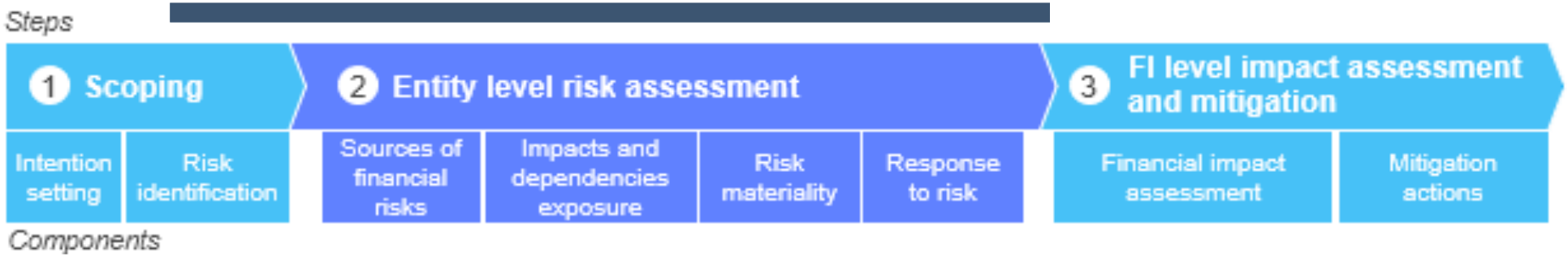
The practical guidance within each step **reflects best practice** while **building in different data and methodological options** – from most ambitious to current practice.

Framework structure

Structure

The framework is structured around **three fundamental phases** which are aligned with climate risk assessment practices, and also reflects emerging best practices used in other nature frameworks

Each phase is broken down into several steps (eight in total) which have **each a set of actions that can guide FIs** on how to reach the targeted output of each component.



This framework will help financial institutions **work towards best practice in data challenged environment**, with the focus on being flexible in the context of improving data.

The eight framework components

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1 Scoping

1.1 Intention setting

1.1.1 Define the aim and ambition of the risk assessment

1.2.1 Define the unit of analysis

O1.1 Clear definition of the primary use and objective of the assessment and scope, including assessment level

1.2 Risk identification

1.2.1 Select and categorise most relevant **risk drivers**

1.2.2 Identify high risk **sectors** in FI's activity

O2.1 Short list of risk drivers relevant for scope and list of targeted sectors for the assessment

2 Entity level risk assessment

2.1 Sources of financial risks

2.1.1 Model **physical risks and their drivers** (state of nature and ecosystem services flows)

2.1.2 Model **transition risks and their drivers** (policy and markets trends)

2.1.3 Develop a **forward-looking analysis** of risks and drivers

2.1.4 Identify **systemic risks**

O2.1 Set of risk and driver variables measured quantitatively or qualitatively reflecting relevant aspects of state of nature, markets and policies in targeted sectors and locations, optionally including future pathways

2.2 Impacts and dependencies exposure

2.2.1 Estimate **direct physical impacts** of entity activity on nature

2.2.2 Estimate **direct physical dependencies** of entity activity on nature

2.2.3 Estimate **indirect exposure**

O2.2 Quantitative or qualitative measures of direct and indirect physical impacts and dependencies attributable to entity

2.3 Risk materiality

2.3.1 Define **transmission channels**

2.3.2 Determine **potential economic impact** of exposure and risks through transmission channels

2.3.3 **Quantify** financial impacts at entity level

O5. Quantitative or qualitative measures of financial impacts of exposure to risks on entity

2.4 Response to risk

2.4.1 Define and model entities' **potential responses to risks** to assess most likely financial outcomes

O6. Quantitative or qualitative measures of financial impacts on entity after most likely mitigation has taken place

3 FI level impact assessment and mitigation

3.1 Financial impacts assessment

3.1.1 **Quantify** financial impacts on FI activity (financial modelling)

3.1.2 **Classify** financial impacts into risks for FIs

O7. Quantitative or qualitiative measure of potential change in FI's financial performance resulting from nature risks financial impacts

3.2 Mitigation actions

3.2.1 **Integrate the assessment results** into FI risk management framework

3.2.2 **Prioritise and plan** mitigation actions

O8. Clear action plan for next steps on nature risk management, can include quantified risk mitigation targets and integration procedure

Step 1 - Scoping

1.1.1 Intention Setting: Define the aim and ambition of the risk assessment

Purpose

Define the main use cases and scope of this nature risk assessment to inform key design questions

Outputs

Clear definition of the main use case and scope of the nature risk assessment

Suggested approach

a. Establish the **main use case** of the nature risk assessment

b. Align with **key regulatory frameworks**

c. Define the **scope** of this assessment

1.1.2 Intention setting: Define the unit of analysis

Purpose

Define the unit of analysis required for the rest of this assessment. Nature risk assessments can be done at different levels of granularity, ranging from sector wide analysis to asset level assessment. The more specific the unit of analysis is, the higher potential understanding of heterogeneity in nature risk between units and locations. However, increasing the specificity of insights substantially increases the data and modelling challenges. It is therefore key for FI's to understand the different options and their implications to clearly define the scope and level of granularity early on in the assessment and align it with their use cases.

Unit of analysis	Description
Sectors or subsectors	Sectors defined by global framework
Companies	Individual companies operating within each sector
Asset level	Specific assets for the company of interest, e.g. buildings for a real estate company

Step 1 - Scoping

1.2. Select and categorise most relevant risk drivers, identifying the most relevant for sectors of FI's

Purpose

Identify a long list of relevant risk drivers and narrow them down to a shortlist that that are potentially relevant for FI's activities, associated with material risks, and are feasible to assess.

Outputs

Short list of nature risk drivers most relevant to the FI's activity in scope, that are material and feasible

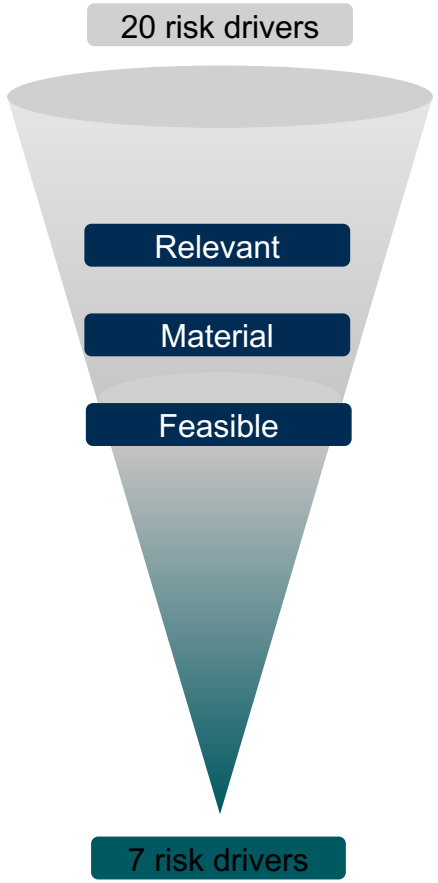
Suggested approach

a. Obtain a **long list of risk drivers** for transition and physical risks based on global frameworks

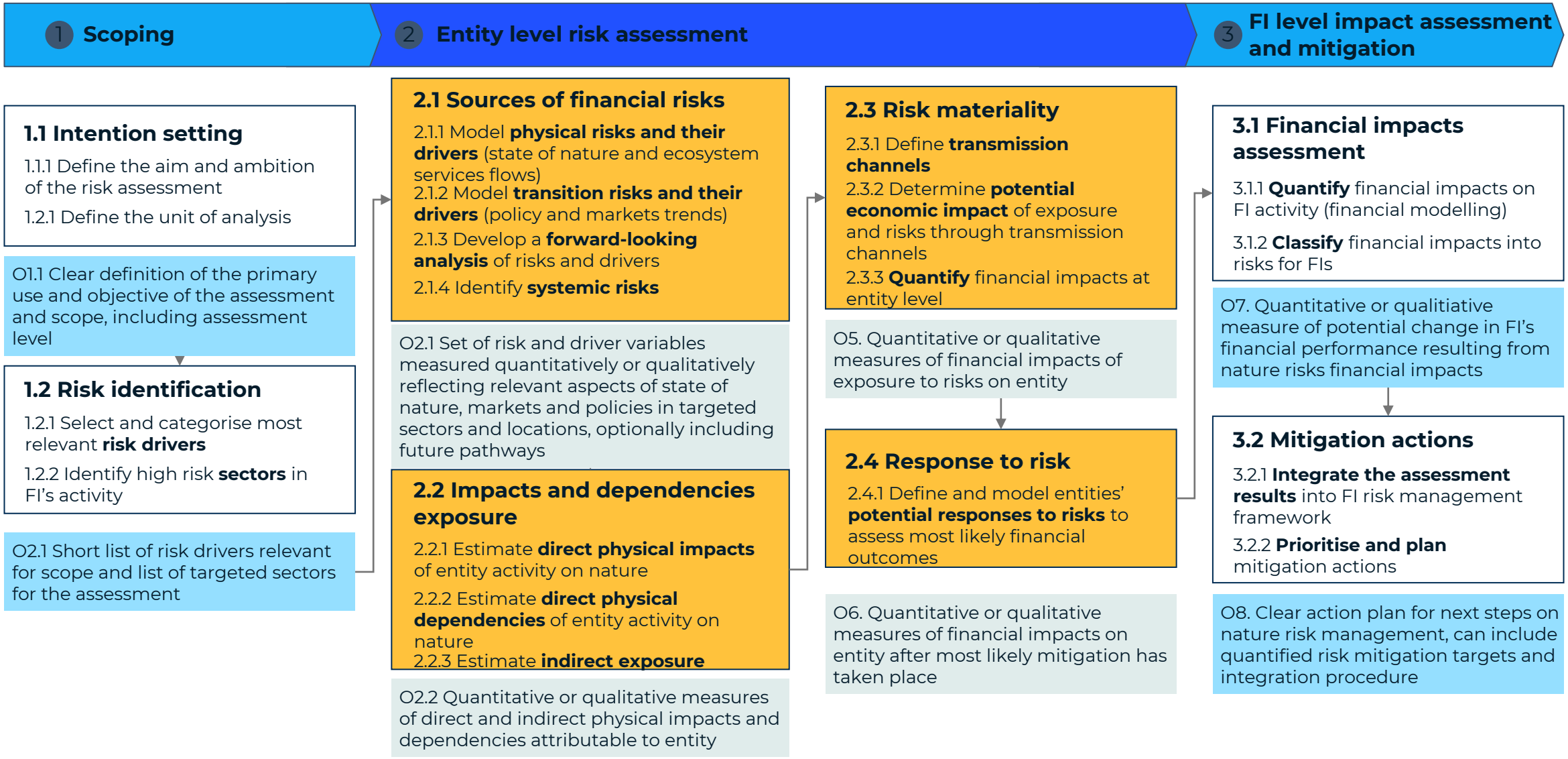
b. Select risk drivers that are most **relevant** to the **FI's activities**

c. Select risk drivers associated with most **material transitional or physical risks**

d. Finalise the **short list of risk drivers by reviewing the modelling feasibility**



The framework is categorized in 8 methodology components



Step 2 – Entity level assessment

2.1.3 Developing a forward-looking analysis of risks and drivers

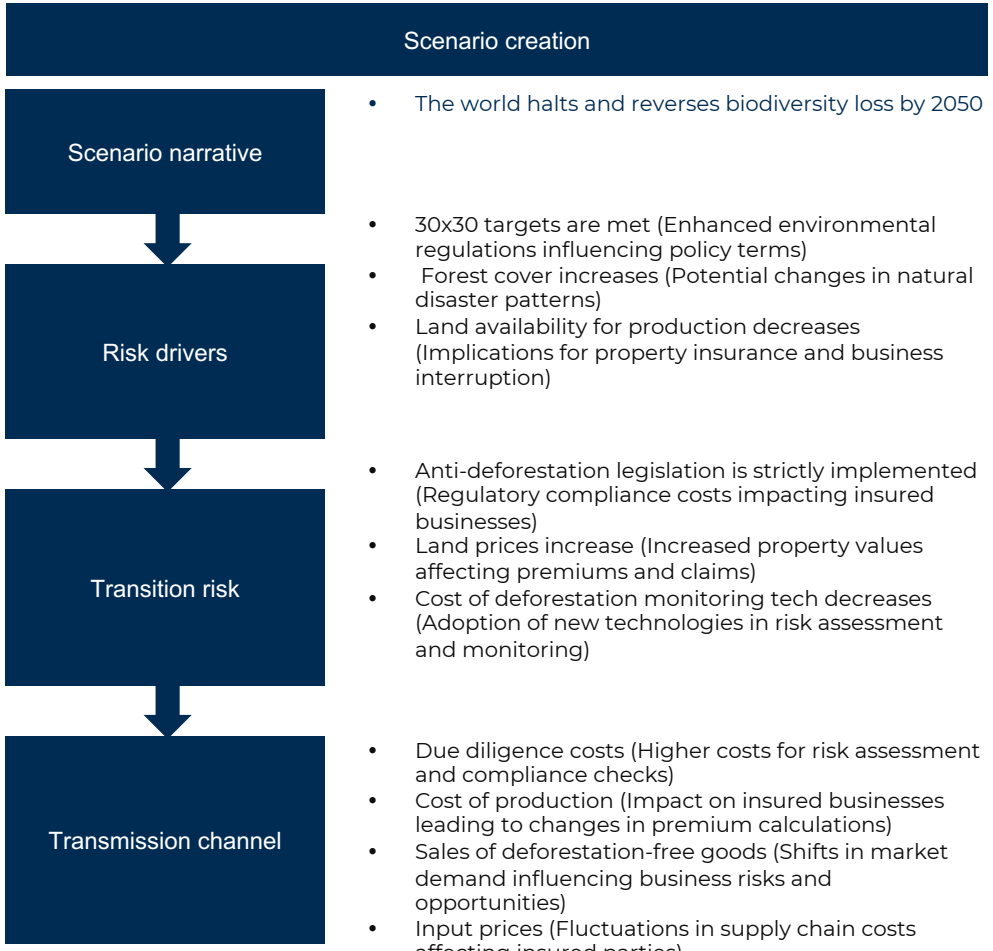
Purpose

Enhance the relevance of risk assessment by materiality and exposure analysis for different potential future pathways in a context of uncertainty

Outputs

Set of variables for risk drivers, transition and physical risks and transmission channels, quantitatively estimated for a set of future pathways with associated narrative.

Example – Scenario creation process



Step 2 – Entity level assessment

2.2.1 Estimate direct physical impacts of targeted activity on nature

Purpose

Quantify impacts on entities to assess FI's exposure to nature impacts and associated risks.

Outputs

Quantitative or qualitative measure of the targeted activity's direct footprint on nature using physical metrics, for a set of selected impacts most aligned with targeted risk drivers

2.3.1 Define transmission channels

Purpose

Establish realistic and quantifiable linkages between transition and physical risks and economic impacts

Outputs

Set of relevant transmission channels quantified in key metrics which link each risk to an economic impact at macro, meso or micro level

Examples of transmission channels for t-shirt producer

Physical risks

	Transmission
Drought events	Supply disruption : Increased claims for crop insurance, higher premiums for water-intensive businesses
Increased water scarcity	Productivity shock: Increased risk for businesses dependent on water, potential for higher claims and adjusted policy terms

Transition risks

	Transmission
Ban on nitrogen fertilizers	Change in production processes, input prices: Changes in agricultural practices, impact on crop yields, higher premiums for affected sectors

Step 2 – Entity level assessment

2.3.2 Determine potential economic impact of exposure and risks

Purpose

To **assess the magnitude of economic impact resulting from exposure to nature related risks** on companies or sectors, financial institutions will need to understand how and by how much different impacts and dependencies translate into economic impacts.

Outputs

Mapping of each impact/dependency to a potential economic impact that could result in a financial impact

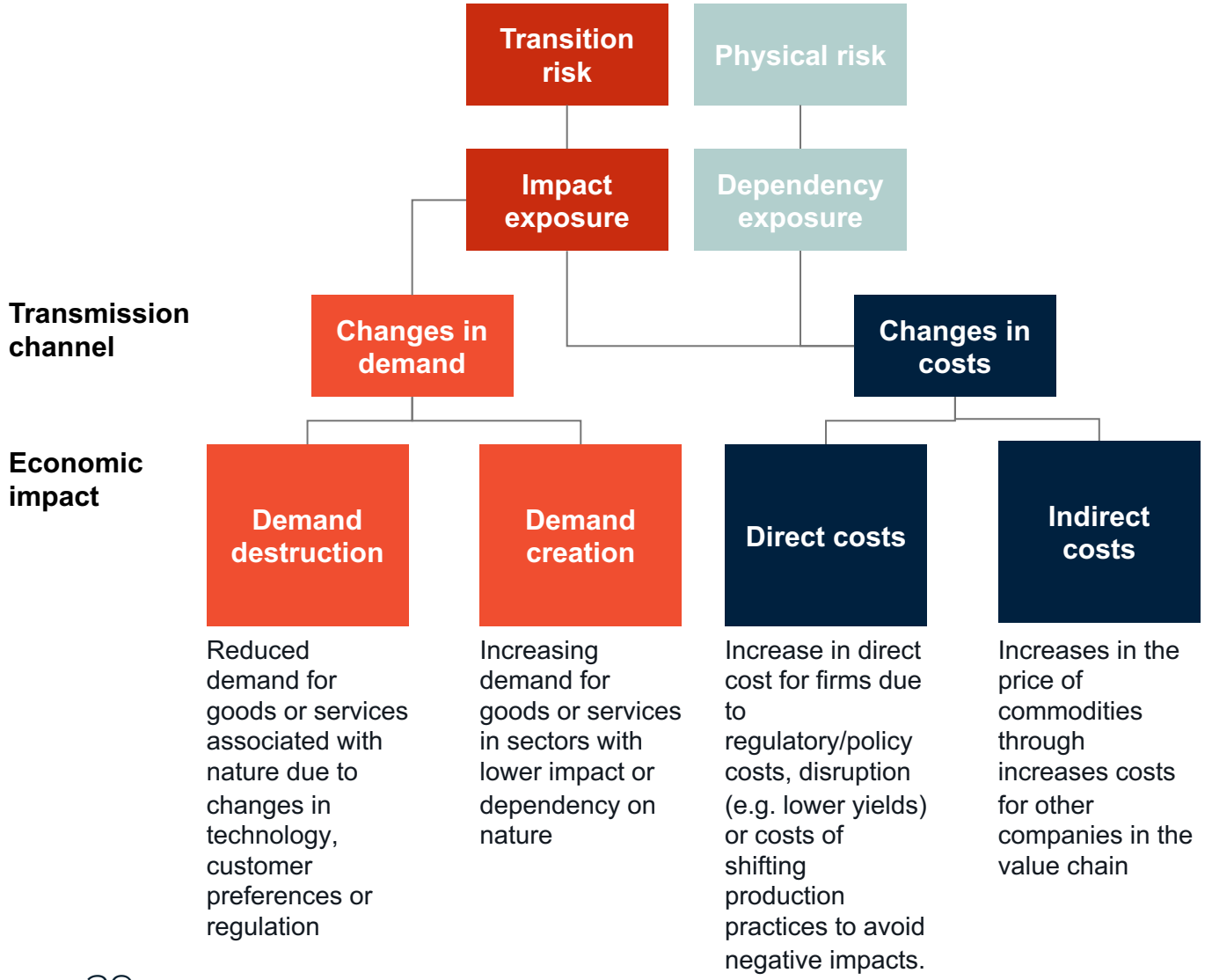
2.4 Define and assess economic actors' responses to risks to assess financial outcomes

Purpose

Quantify the financial impacts after taking into account the ability of firms to mitigate those impacts

Outputs

Quantitative measures of financial impacts on targeted entity after expected operational, market, strategic response



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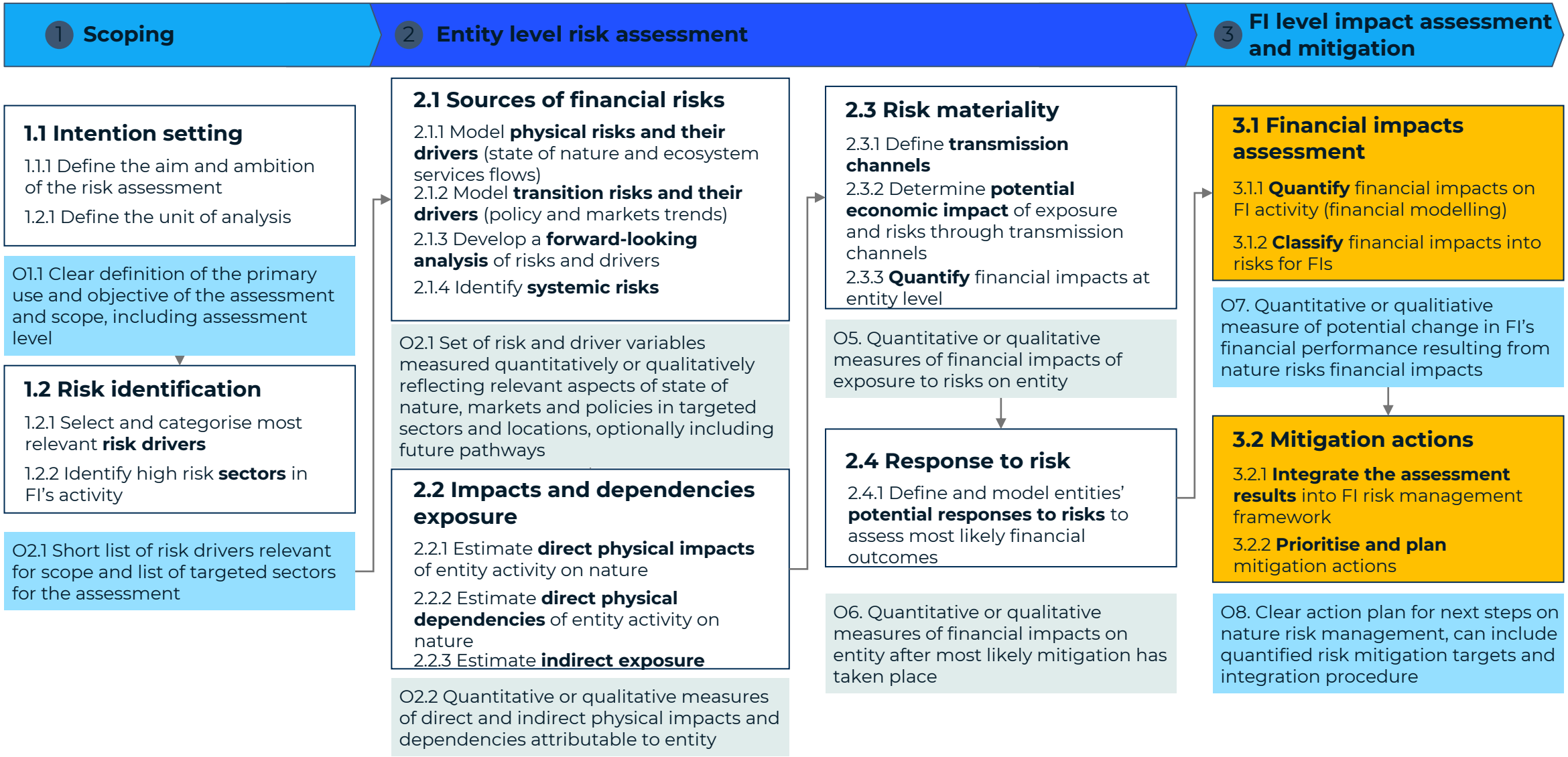

Step 3 – FI level impact assessment

3.1 Quantify financial impacts on FI's activity (financial modelling) and classify these into risk

Purpose

Quantify the financial impact on FI's from changes in entities' financial metrics and market responses and translate these into financial risks for institutions

Outputs

Quantitative measure of risks to FI's financial performance caused by entities' nature risks

3.2 Integrate the assessment results into management frameworks and create prioritized action plans

Purpose

Embedding nature considerations into risk management framework to be more resilient against nature risks

Outputs

Appropriate entry points, capacity and organisational needs have been identified to ensure integration of nature risks into risk management procedures and processes

Illustration – Example of actions needed

Potential entry points	Required actions
Risk appetite framework	Include financed deforest
Credit policies	Sustainable supply chain sourcing policy
Capital allocation	Max % exposure to uncertified ag.
Rating	Incorporate nature risk exposure into credit models
Underwriting	Revenue and profit impairments
Pricing	Existing risk pricing schedule
Stress testing	Expected credit losses
Capital estimation	Nature risk-weighted assets

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O7. Quantitative or qualitiative measure of potential change in FI's financial performance resulting from nature risks financial impacts

3.2 Mitigation actions

3.2.1 **Integrate the assessment results** into FI risk management framework

3.2.2 **Prioritise and plan** mitigation actions

O8. Clear action plan for next steps on nature risk management, can include quantified risk mitigation targets and integration procedure

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