



BiROFin

From water risk to financial resilience

CBD COP17 – Netherlands Pavilion – Blue Zone - Thursday 22 October 2026 | 13:00 - 14:00 |



From understanding nature-related risks to protecting and recovering the value of nature



Goal: Protect and recover the value of ecosystem services



BiROFin
today's focus

Starting point: Biodiversity loss and climate change are eroding the ecosystem services that economies and financial stability depend on

- **Public-private partnership (2024–2027)** bringing together WUR, the Foundation for Sustainable Development and financial-sector partners.
- **Objective:** Quantify the macroeconomic consequences of biodiversity and ecosystem-service loss and identify opportunities to mitigate them.
- **Applications:** Support financial-risk assessment, portfolio stress testing and investable solutions

Connecting biodiversity science, economic modelling and finance to understand risks and identify opportunities for action



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NL Netherlands



COP17
YEREVAN ARMENIA

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Water-related insights for portfolio stress testing

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Climate-biodiversity integrated, future, global, nature scenarios

1

Biodiversity pressure

Human modification, the Pesticide Application Rate Index, GLOBIO model MSA projections

2

Climate+biodiversity scenarios

Ecosystem services level

3

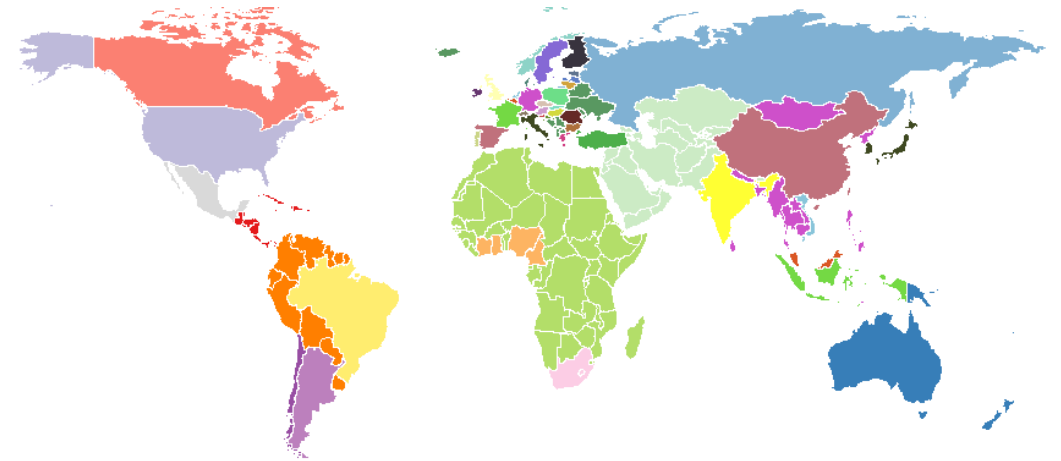
Global economic model: MAGNET

Damage functions

4

Economic impact per country-sector

Lost production and value added, price changes compared to reference scenario



59

countries
and regions

39

economic
sectors

2050

time
horizon

19

scenarios



Next....



- Global scenarios: Where water stress hits hardest
- Material risks: What water services loss may cost
- Integrated scenarios: The added economic effect of biodiversity loss
- Global economic model: Importance of supply chains and market adjustment matter

By 2050, water quality and quantity stress is highest in China, India, the Middle East and North Africa

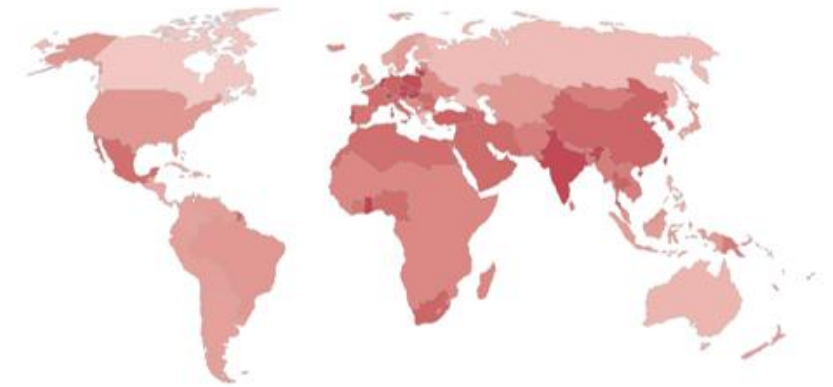
Highest stress

China, India, Middle East and North Africa; in Europe: NL, CZ, SK, HU

Lowest stress

Russia, Canada and Norway

Quality 2050 SSP5



Quantity 2050 SSP5



Darker red = more stress

Scenarios Water_RCP2.6 (SSP2) and Water_RCP8.5 (SSP5). Water-basin results aggregated to countries and regions using population weights, [wang et al. \(2024\)](#)

Water services loss: Material risk for global economy through both **price increases and economic activity loss**

2050, and vs. a the reference (SSP2) scenario

Global prices for agricultural prod. & manufac. food products.

5%-15%
relative to other
sectors

Global economic activity (GDP)

-5% to -8%
compared to
reference scenario

Accounting for **biodiversity loss** adds 1–3 points to the GDP hit from water stress



What we tested

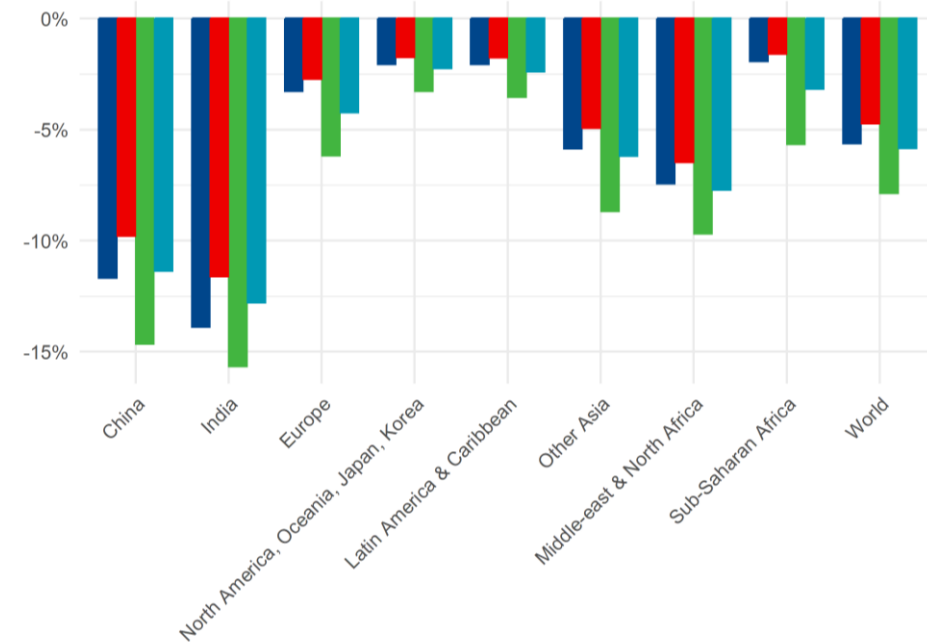
Biodiversity loss makes water systems less resilient. Here we switch on and off that effect.

High-emission path

SSP5-RCP8.5: biodiversity plays
a bigger resilience role

+3 pts
extra GDP loss
out of 8 pts

GDP change (%) by region vs. reference, 2050



■ RCP2.6, with effect

■ RCP2.6, without

■ RCP8.5, with effect

■ RCP8.5, without



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Supply-chain and market adjustment effects are critical to include in sectoral financial risk analysis



Global production loss by 2050 vs. reference

Direct
productivity loss Total
loss

Agriculture

Resources shift to food

~3.7% → ~1.8%

Food services

Rely on farm inputs

~0.8% → >6%

Manufacturing & mining

Fewer resources left

1.7% → >5%

Services

Indirect economic effects

0.5% → ~4.5%

Investable solutions for water related stress

Nico Polman

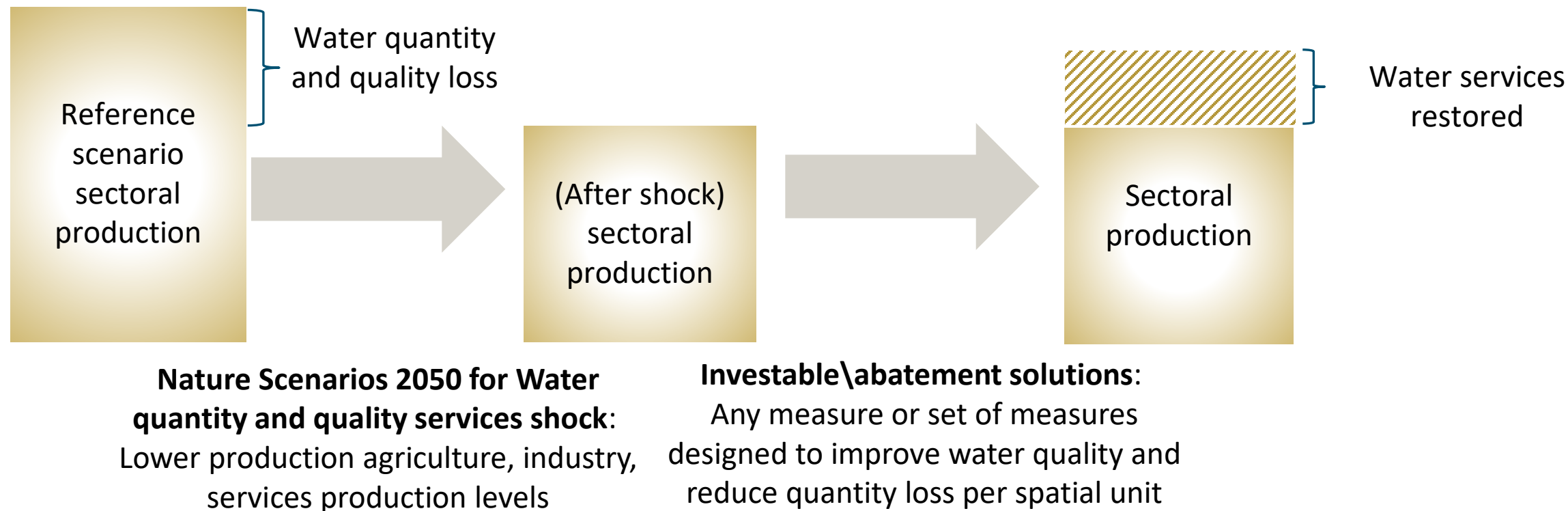
Senior Economics Researcher
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What is this work? And why this is important

BiROFin

The need to restore water services resulting in investable\abatement solutions



BiROFin investable solutions database



From extrapolating to promising options for the financial sector

Bottom-up approach to abatement solutions database:

- We **extrapolate to sector-country** level
- Outcome: the **most promising solutions the financial sector** can invest in
 - **Social benefit over cost** (A potentially viable business case:
 - High **investment and market potential**



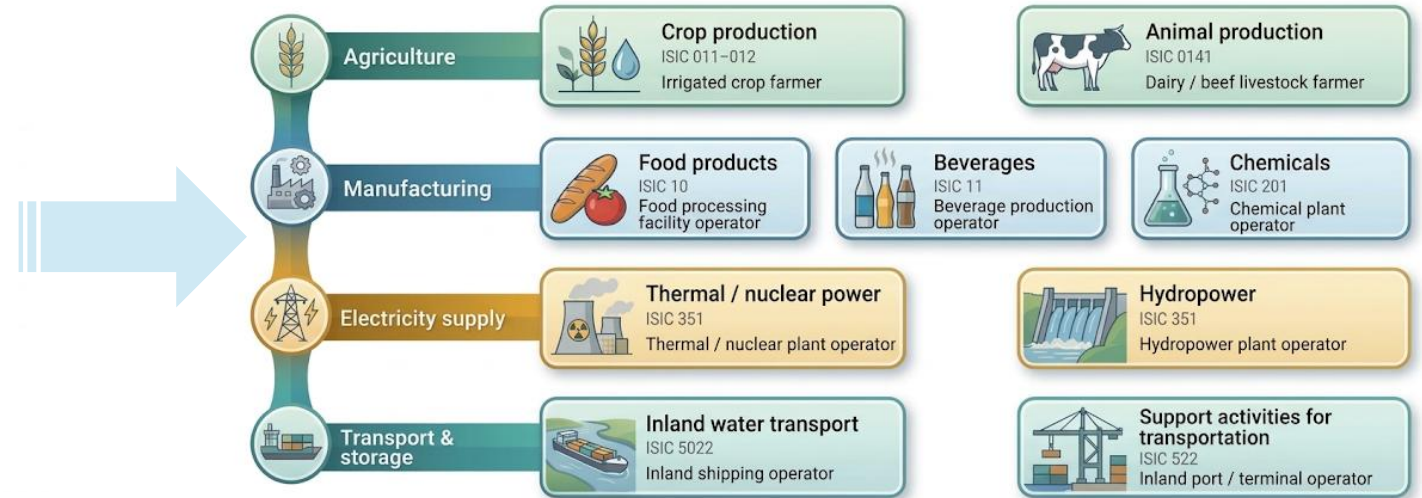
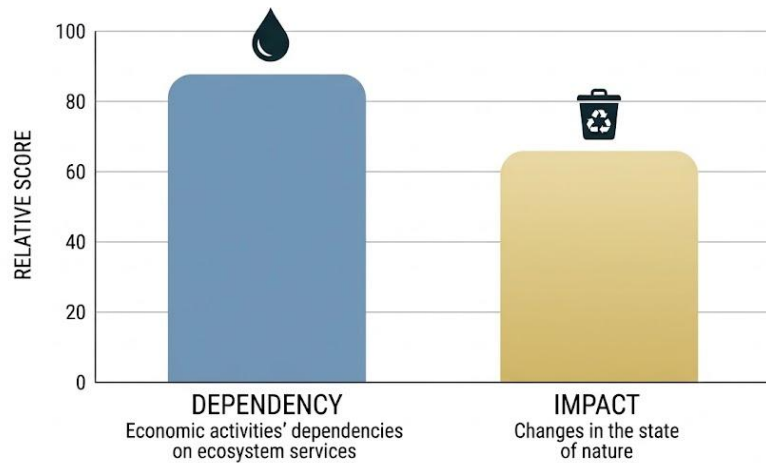
From micro to macro impact:

We focus on sectors with highest water dependency and negative effect on water

Sectors were selected based on two criteria:

- 1. Significant surface water dependency or impact**, assessed using the ENCORE framework:

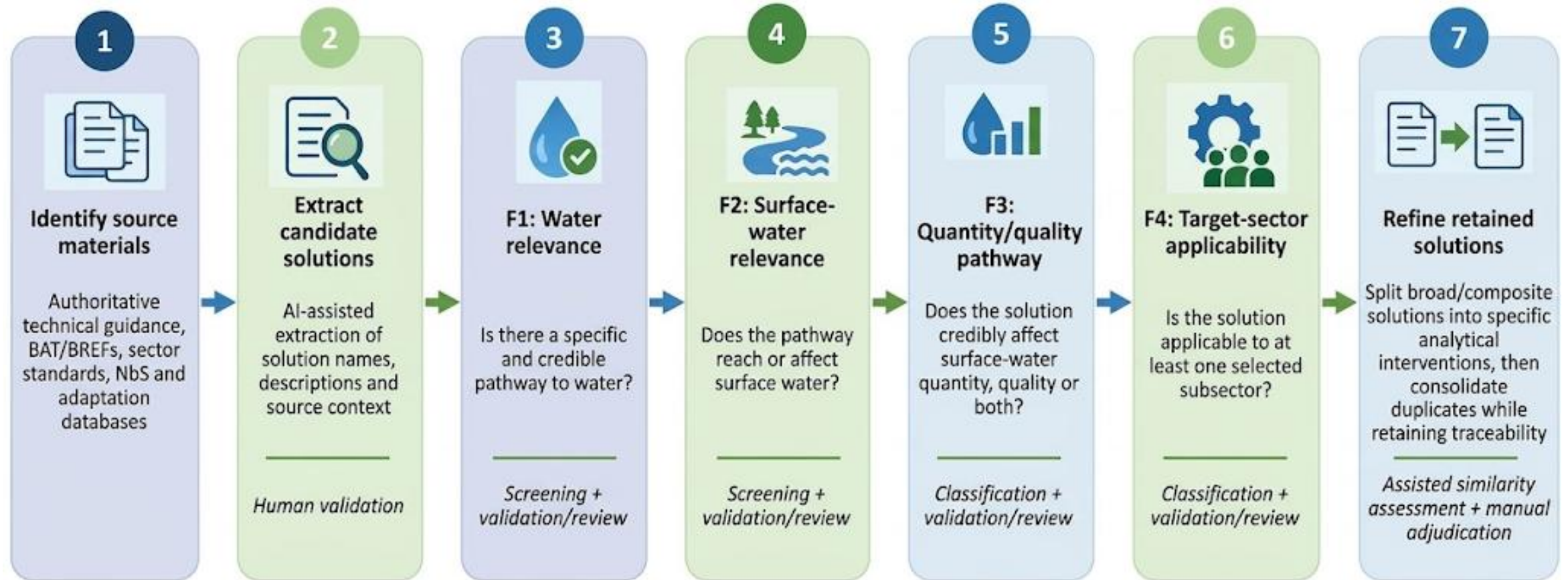
WATER DEPENDENCY & IMPACT - SIMPLE OVERVIEW



- 2. Validated through consultation** with BiROFin financial sector partners.

A seven-step screen identifies the investable and scalable water solutions with the greatest impact

AI-assisted extraction, expert validation and stakeholder consultation



Investable solutions: context, intervention, outcomes

Developing user relevant metrics together with private partners

Solutions	Description of the solution	Type	Surface water risk dimension (quality, quantity, both)	How it reduces water risk	Implementation level	Who implement it	CAPEX level
Precision irrigation	Applies water efficiently and directly to crops (drip/sprinklers) to reduce excess application and water abstraction.	Engineered / technical	Quantity	Reduces water abstraction and avoids excess runoff/leaching.	Farm level	Farmers / land owners	High
Conservation tillage	Minimizes soil disturbance and maintains crop residues to reduce sediment runoff and improve infiltration.	Operational / management	Both	Lowers erosion + runoff; improves infiltration and soil water storage.	Farm level	Farmers / land owners	Medium
Collective water user agreements / irrigation quotas	Farmer collectives or water boards formalise abstraction-sharing rules and drought rotation protocols	Behavioural / incentive	Quantity	Prevents tragedy-of-the-commons abstraction; reduces scarcity risk at basin scale	Catchment level	Water boards / farmer cooperatives	Low
Manure storage and slurry management infrastructure	Covered, sealed slurry stores with sufficient capacity to avoid overflow events and enable controlled spreading during low-risk periods	Engineered / technical	Quality	Eliminates uncontrolled nutrient and pathogen discharge to surface water from overflow	Farm level	Farmers / land owners	High
Constructed wetlands for farm effluent treatment	Shallow vegetated wetland systems that treat dairy yard runoff and parlour washings before discharge or reuse	Nature-based (NbS)	Quality	Removes pathogens, N, P and BOD from effluent; reduces acute pollution risk to surface water	Catchment level	Water boards / regional authorities (coordinating), with landowners as hosts	Medium
Rainwater harvesting for livestock drinking	Collection and storage of rooftop rainwater to substitute surface water abstraction for animal drinking and yard	Engineered /		Reduces surface water abstraction during low-		Farmers / land owners	Low



Introduction

Definitions

Abatement measures_water_v2

References

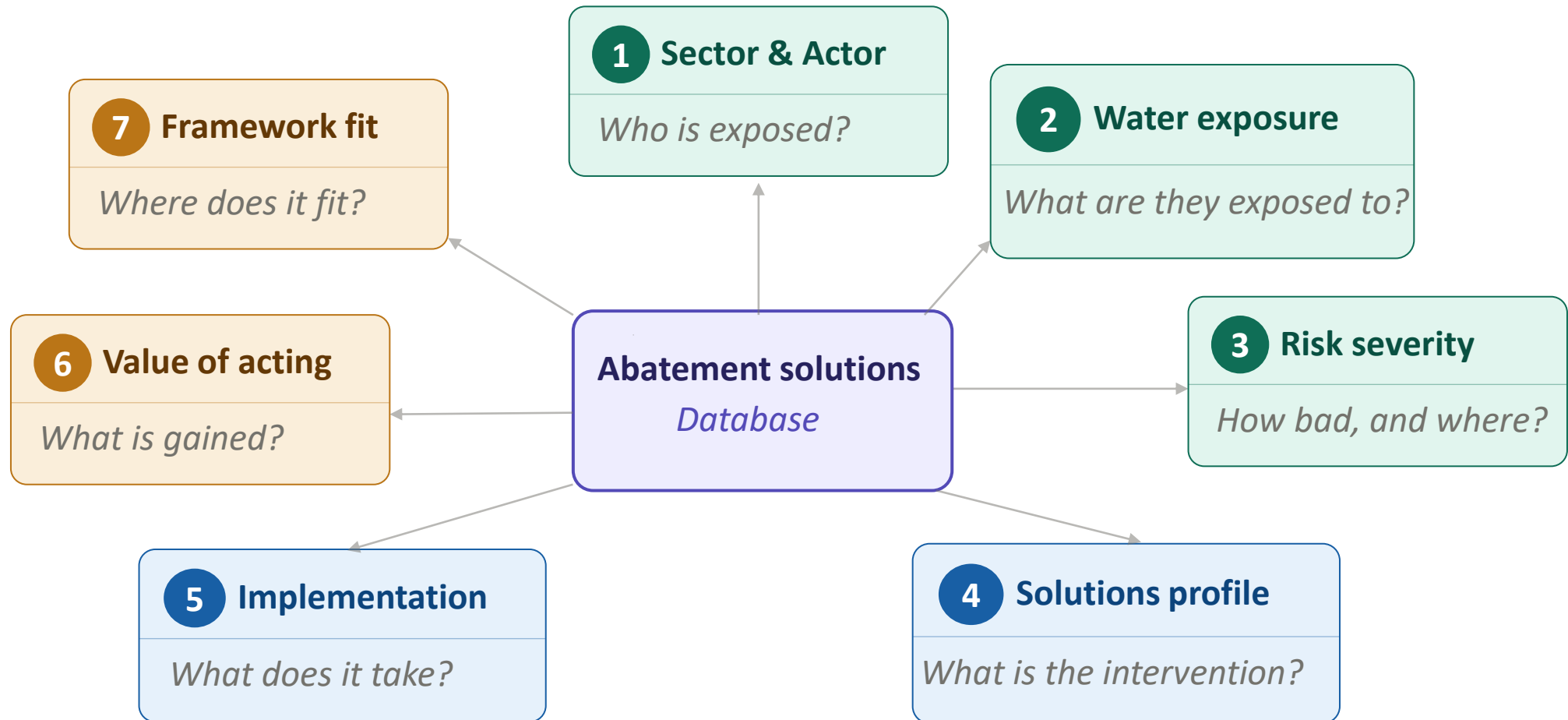
Sheet1



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Investable solutions: context, intervention, outcomes

Developing user relevant metrics together with private partners



● Context — who, what, where ● Solutions — measures & implementation ● Outcomes & framework fit

From scenarios to action: making nature-risk data usable for finance

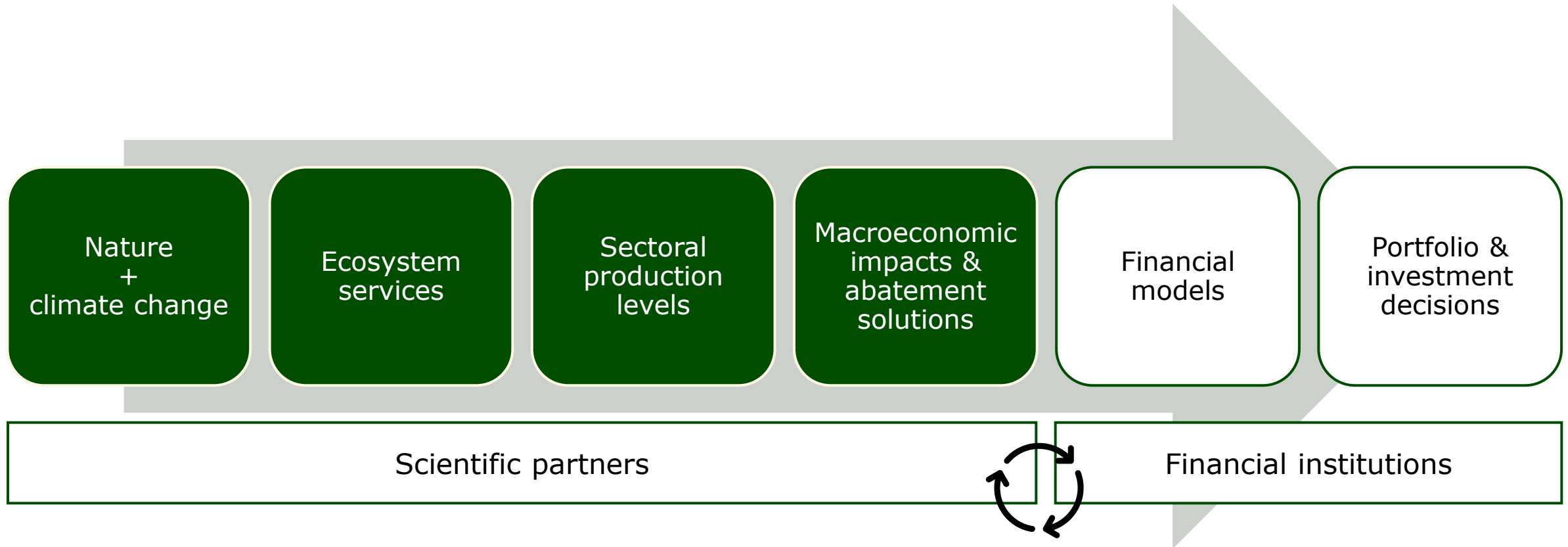
María Naranjo Barrantes

Project Coordinator and Senior Researcher in Sustainable Finance and Trade.
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From better scenarios to better decisions

The next challenge is not only generating better data — it is getting them used



From data to action: Who can use these insights?

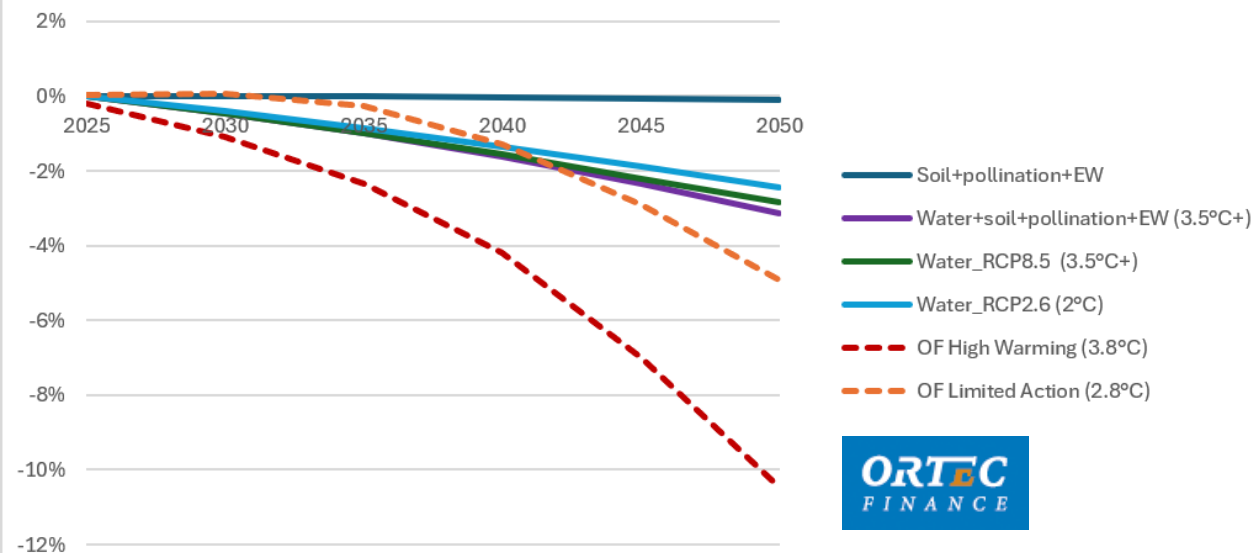
Focusing on the users best positioned to integrate BiROFin insights into financial decisions

Target users

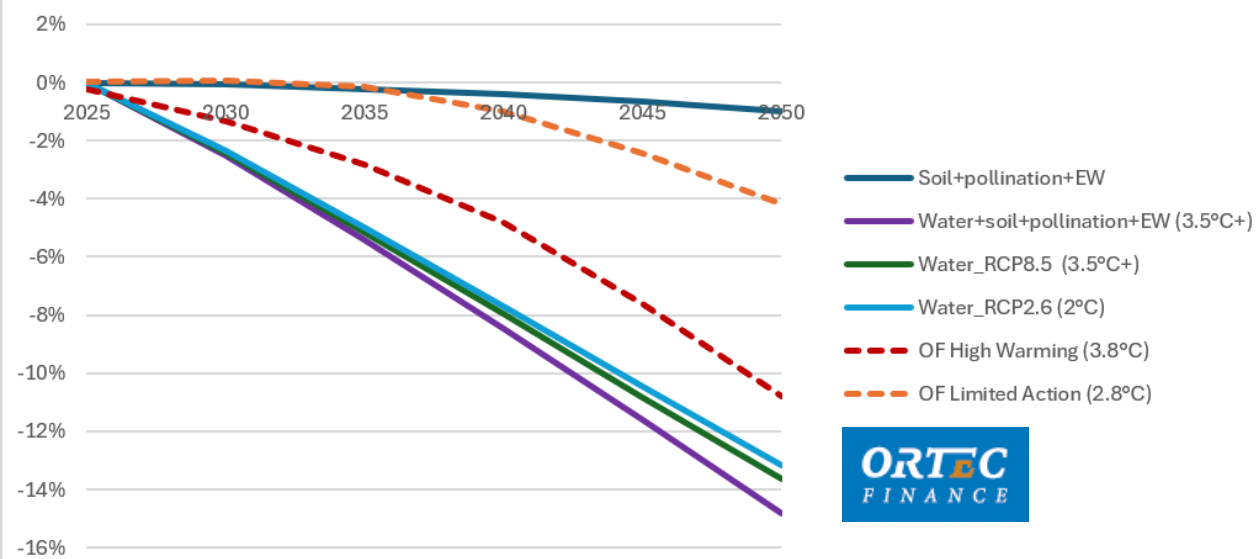
Potential applications

- | | |
|---|--|
| 1 Banks | ➤ Assess water-related economic risks and identify relevant response measures for clients. |
| 2 Investors and asset managers | ➤ Screen country–sector exposures and assess companies' water-related actions. |
| 3 Risk modelling and analytics providers | ➤ Integrate macroeconomic scenarios into stress tests and explore potential risk-reduction measures. |

US GDP Level delta to baseline



China GDP Level delta to baseline



28 February 2023

04 Biodiversity and the financial sector: the framework

07 The challenges in measuring biodiversity loss: There is no price tag (so far)

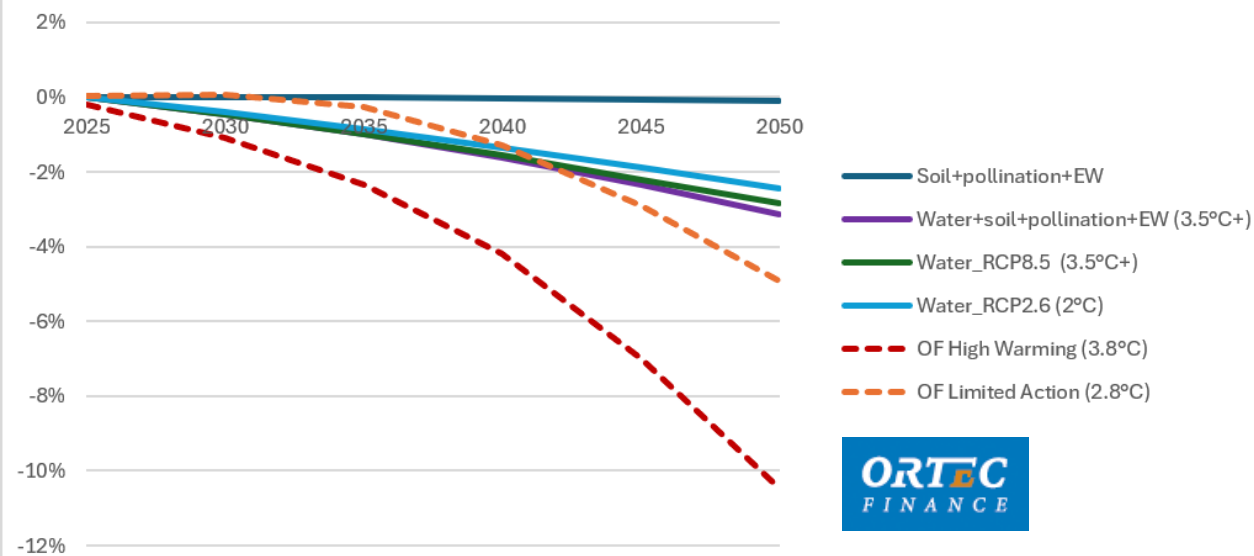
09 The pilot study on pollination-service loss: First quantitative results

Allianz Research

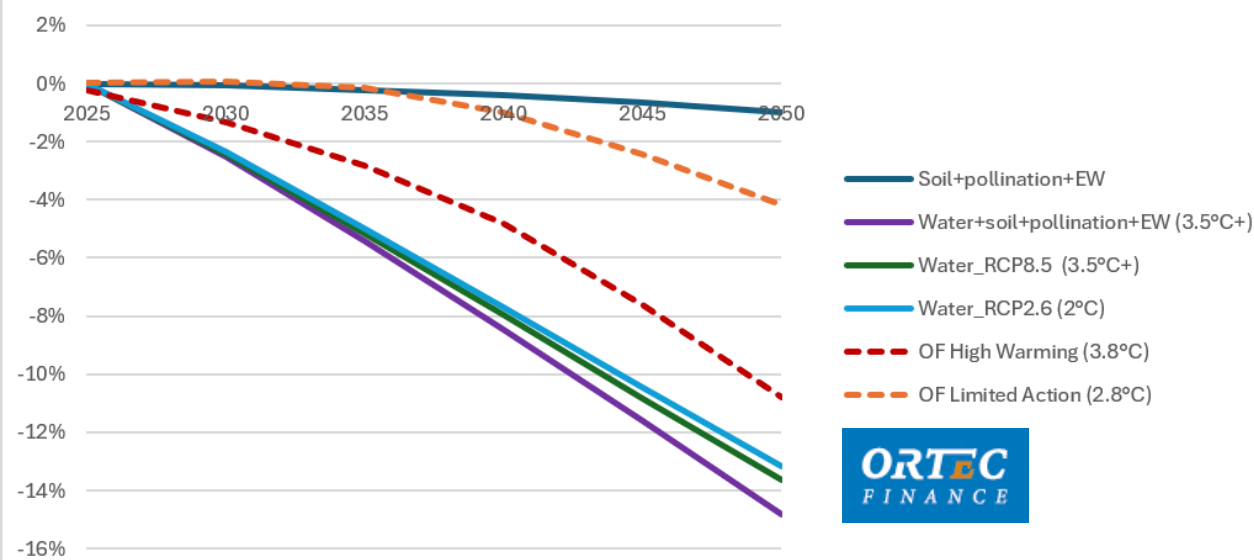
The new risk frontier in finance: biodiversity loss

Concepts, challenges and a first quantitative case study on pollination

US GDP Level delta to baseline



China GDP Level delta to baseline



28 Februar

14 June 2023

05
How biodiversity loss impacts
the financial sector

09
How biodiversity loss can be
prevented

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Allianz Research

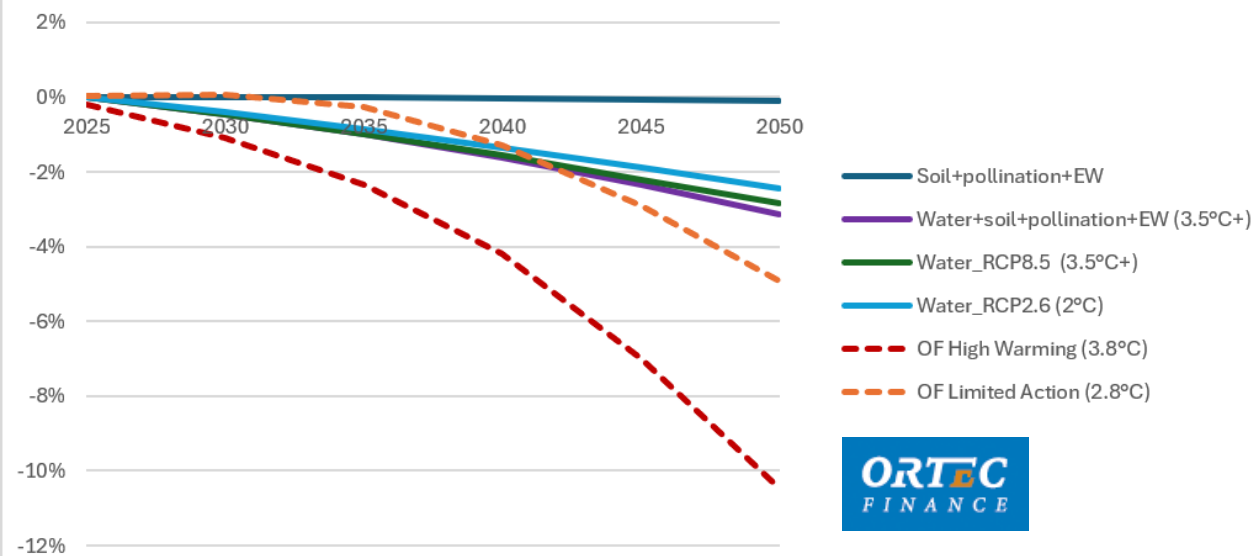
Biodiversity loss part II: portfolio impacts and abatement measures

A quantitative case study on pollination

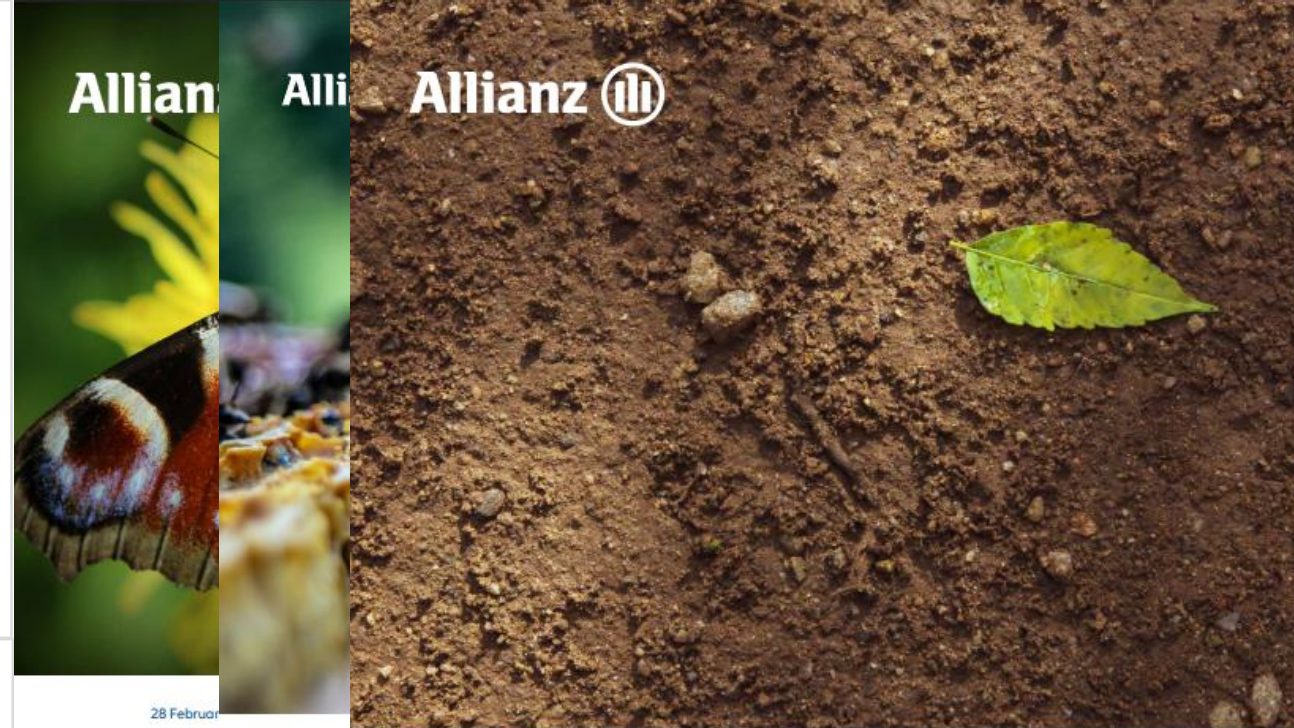
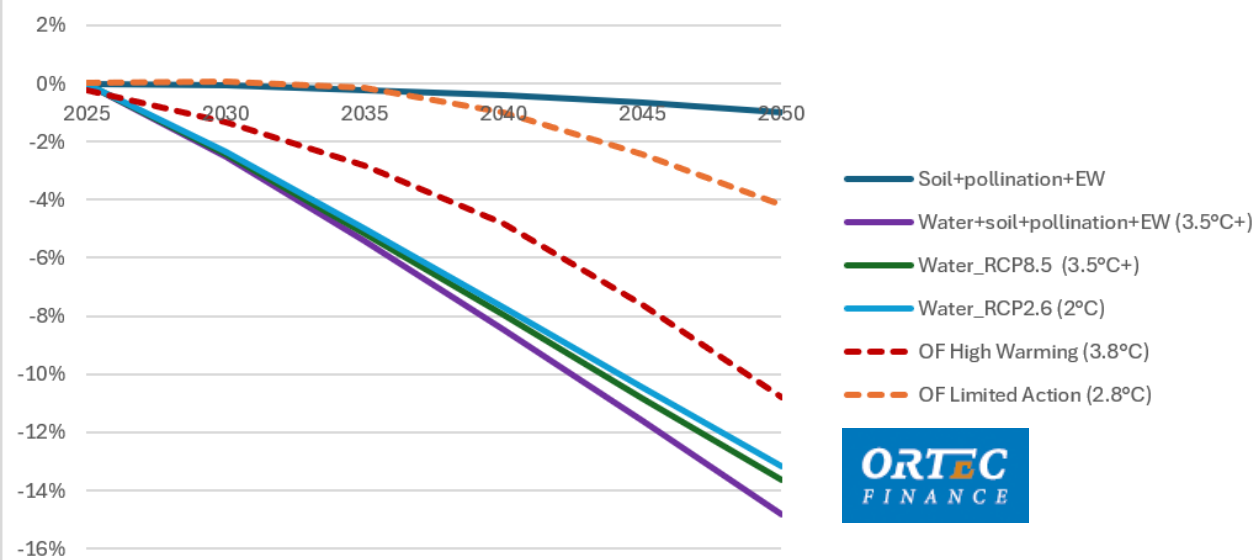


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US GDP Level delta to baseline



China GDP Level delta to baseline



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14 June 20

30 April 2024

- 03** The knowledge gap
- 04** Ecosystem services of soil
- 05** The social costs of soil organic carbon (SOC) loss
- 07** Abatement measures to preserve soil quality

Allianz Research Ashes to ashes, carbon to soil

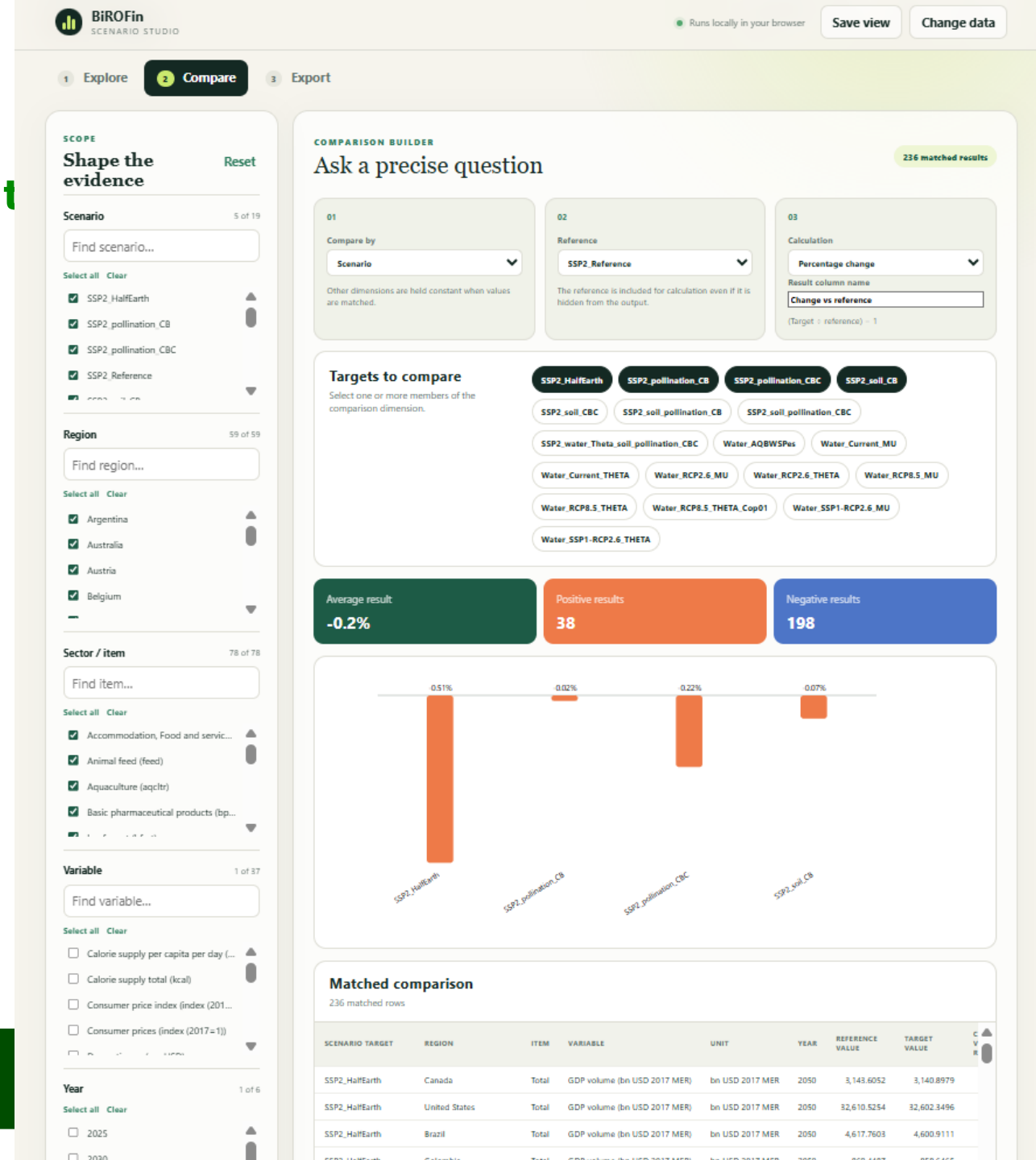
A cost-benefit analysis of abatement measures to increase soil carbon-sequestration capacity

Making BiROFin accessible, Two complementary pathways: Better data finance collaboration

BiROFin scenario explorer

- Provide structured access to macroeconomic scenarios
- WUR data infrastructure
- Maintain and update datasets over time

Data that users can access and integrate



Making BiROFin accessible, usable and actionable

Two complementary pathways: Better data access and stronger science-finance collaboration

BiROFin scenario explorer

- Provide structured access to macroeconomic scenarios
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Data that users can access and integrate

Science-based Alliance

- Connect scientists and financial-sector users
- Interpret scenarios and uncertainties
- Identify user needs and future research priorities

Knowledge that users understand and apply



Transforming finance requires more than better data

Lasting change requires shifts in practices, structures and views



PRACTICES

How are decisions made?



STRUCTURES

What enables change?



VIEWS

How is nature valued?





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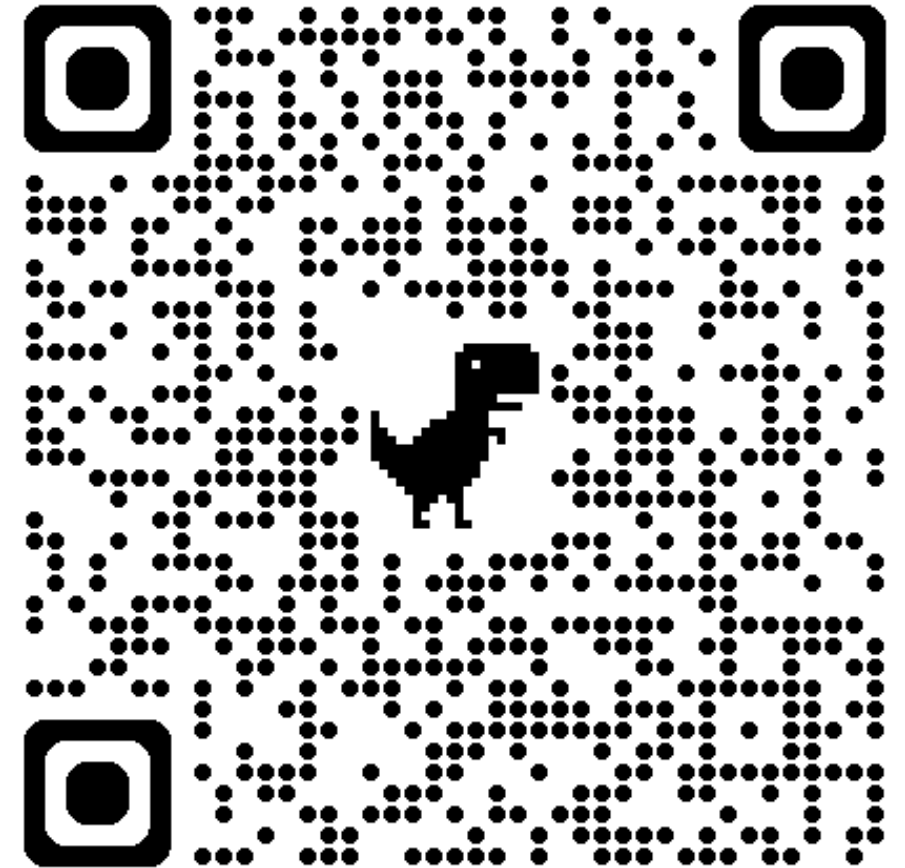
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Thank you for your participation!

We share updates on research progress, upcoming publications, and stakeholder engagement opportunities through external workshops and public channels. Interested parties can stay connected through our project website or by contacting the research team directly.

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