Swiss Re Institute

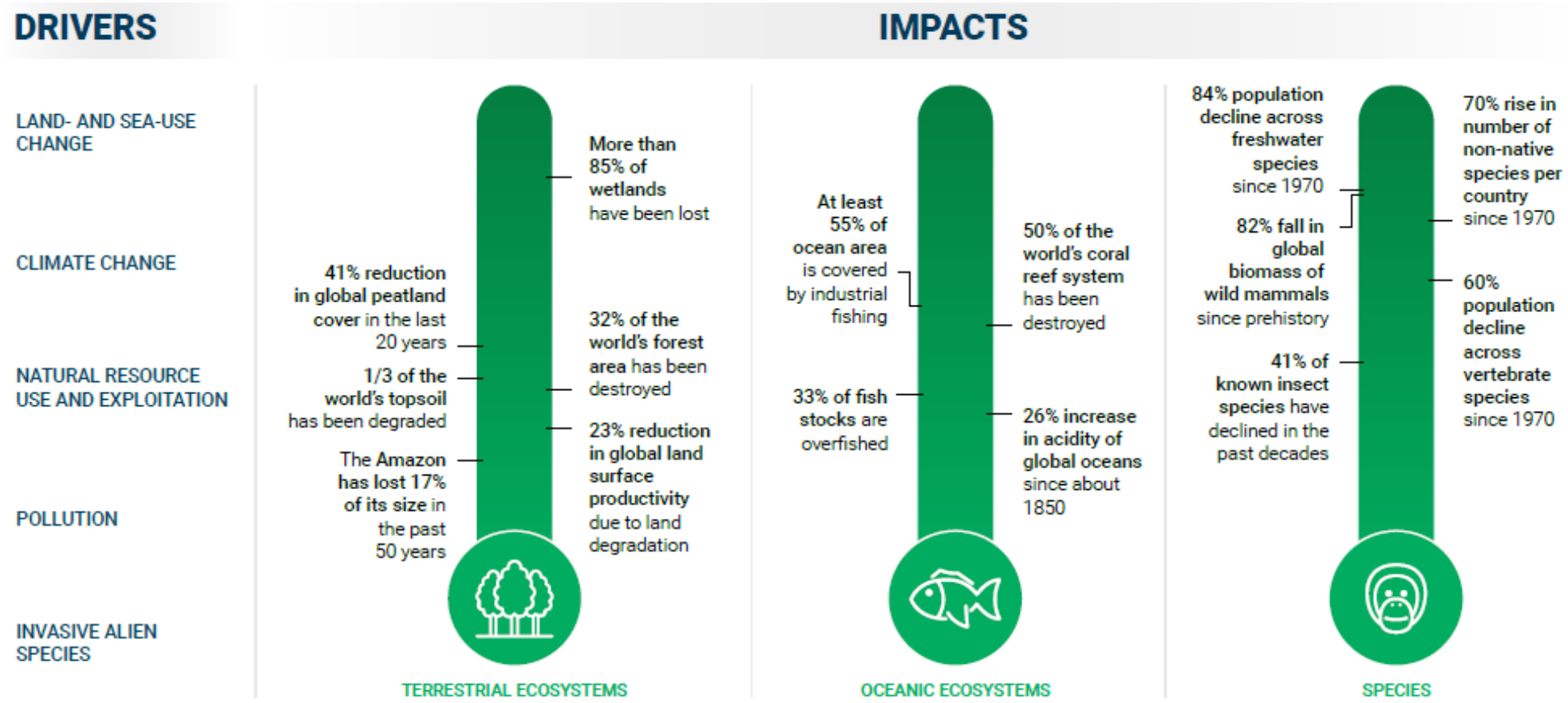
# Measuring the State of Nature

Sustainable Finance Technology Event Series
2 November 2022
ZHAW School of Management and Law
Swiss Sustainable Finance SSF

Oliver Schelske
Group Underwriting - Swiss Re Institute
Exploratory Research
Director Natural Assets & ESG Research

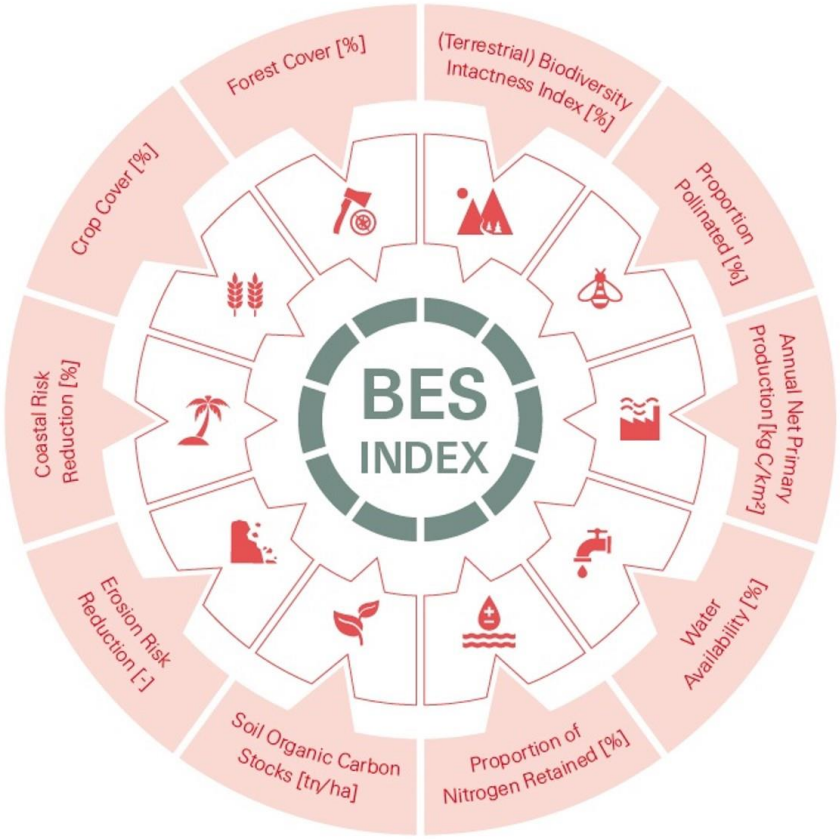
# Biodiversity and ecosystem services are under pressure

## Species extinction rate 1-5y is currently 1000x higher. Scientific community consensus: by 2050, 30-50% of all species may be lost.

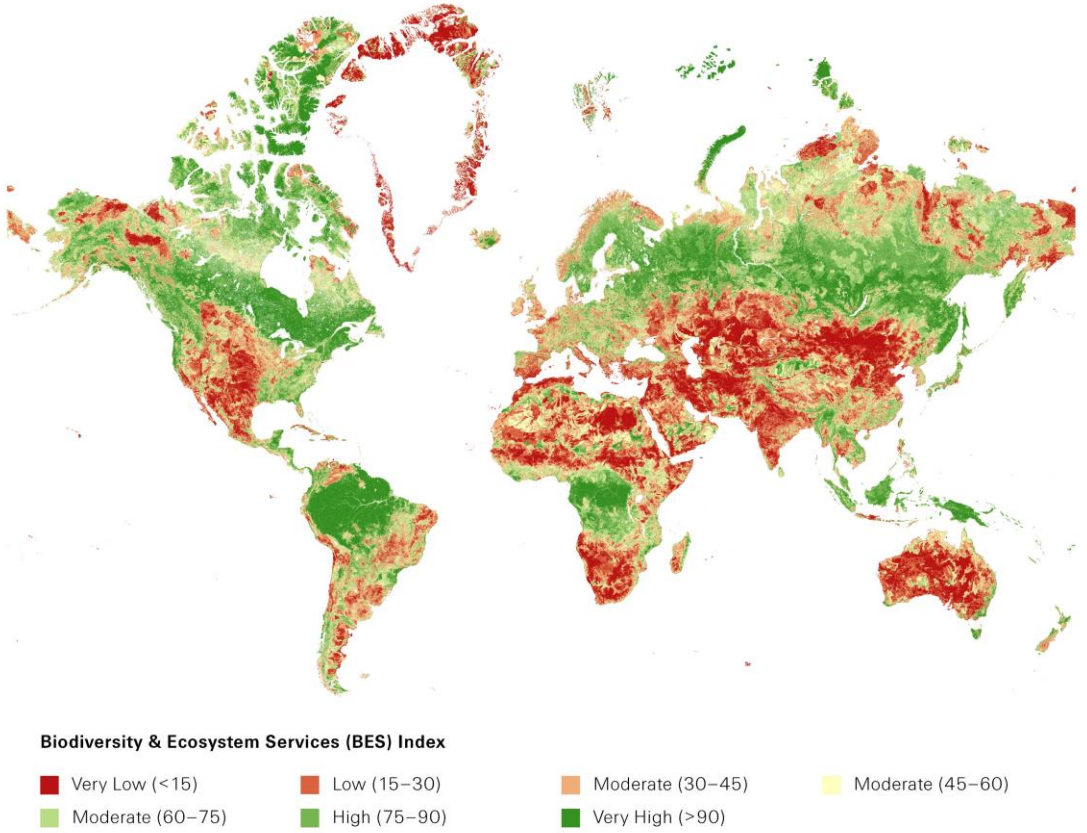



Source: UN SIF 2021, quoting IPBES, WWF, WEF.
UN SIF is the United Nations Sustainable Insurance Forum which is supported by the International Association of Insurance Supervisors (IAIS)

# Measuring and visualizing the capacity of nature contributions to people (IPBES) can inform decisions








Source: Swiss Re Institute and multiple data sources, Full sources details in Swiss Re Institute "Biodiversity and Ecosystem Services - A business case for re/insurance"

# Dependency of economic sectors on Biodiversity & Ecosystem Services

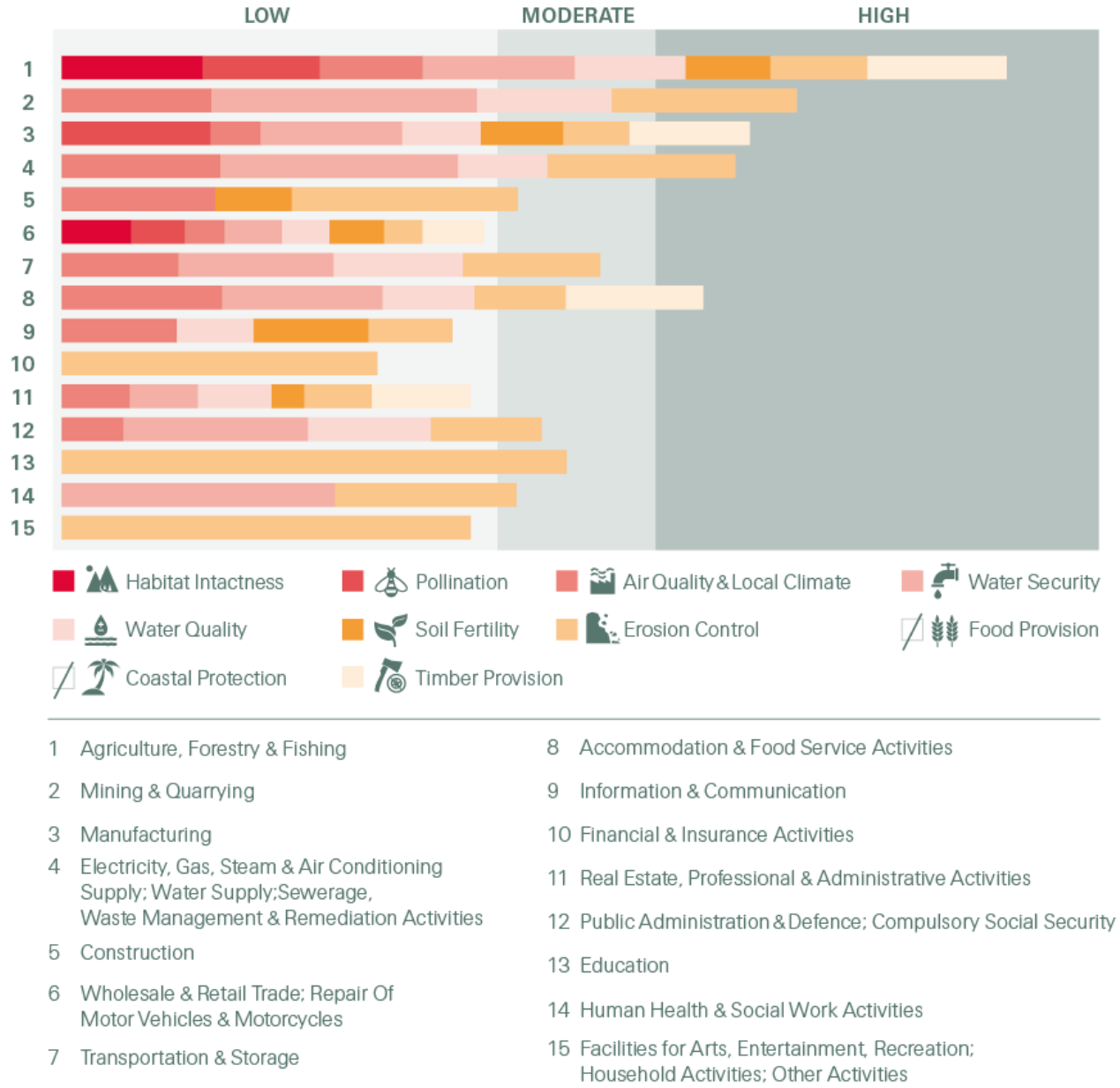
**The analysis highlights**

- the economic sectors that depend on nature
- the dependencies that are more material

**Methodology**

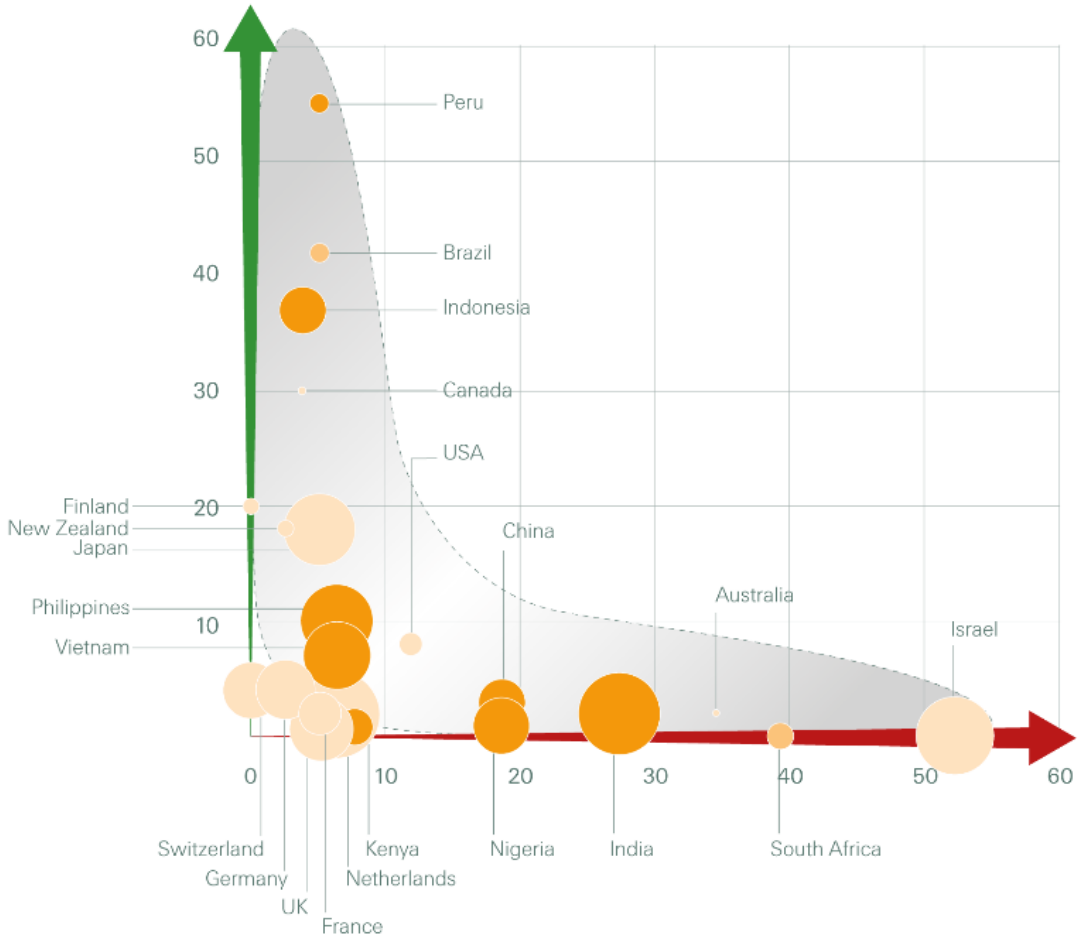
- UN data evaluating the dependency of production processes on different ecosystem services
- 1-5 materiality scores representing loss of functionality and financial impacts
- Aggregation of production processes to sectoral level

- Aggregation of specific nature contributions to people / BES to one dependency number




Source: Swiss Re Institute, NCFA 2020 (UN WCMC ENCORE database), EuroStat 2008

# Countries in comparison




Share of land with a 'very low' ecosystem capacity to provide nature contribution to people in % of country area. Vulnerability towards ecologically relevant large-scale disturbances increase from left to right

Share of land with a 'very high' ecosystem capacity to provide nature contributions to people in % of country area. Resilience towards ecologically relevant large-scale disturbances increases from bottom to top

Low dependency on BES

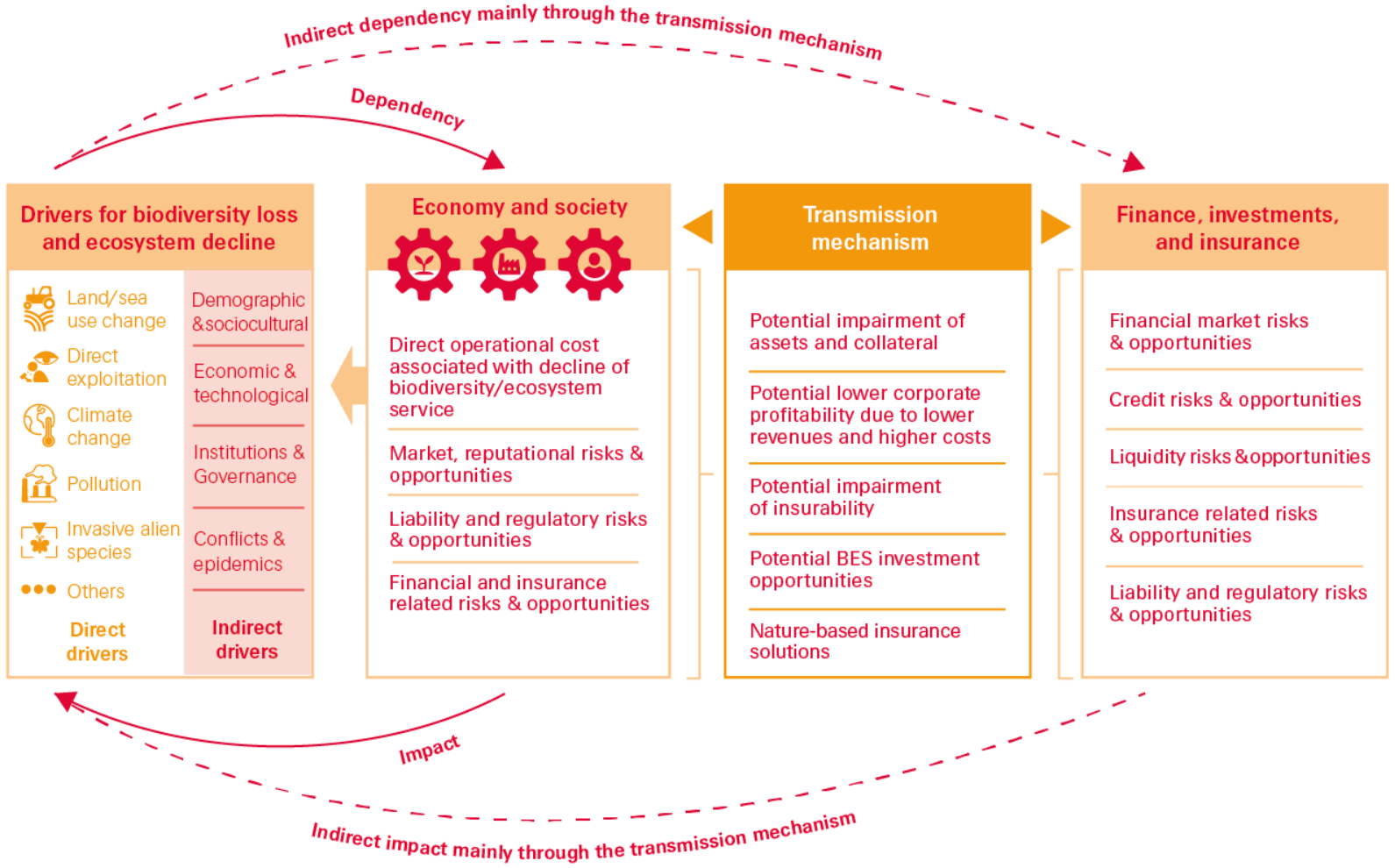
Moderate dependency on BES

High dependency on BES

Bubble size representing population density (people per km$^2$)

Picture shows selected countries.
Sources: Multiple data sources, for all, see Swiss Re Institute 2020. Biodiversity and Ecosystem Services: A business case for re/insurance

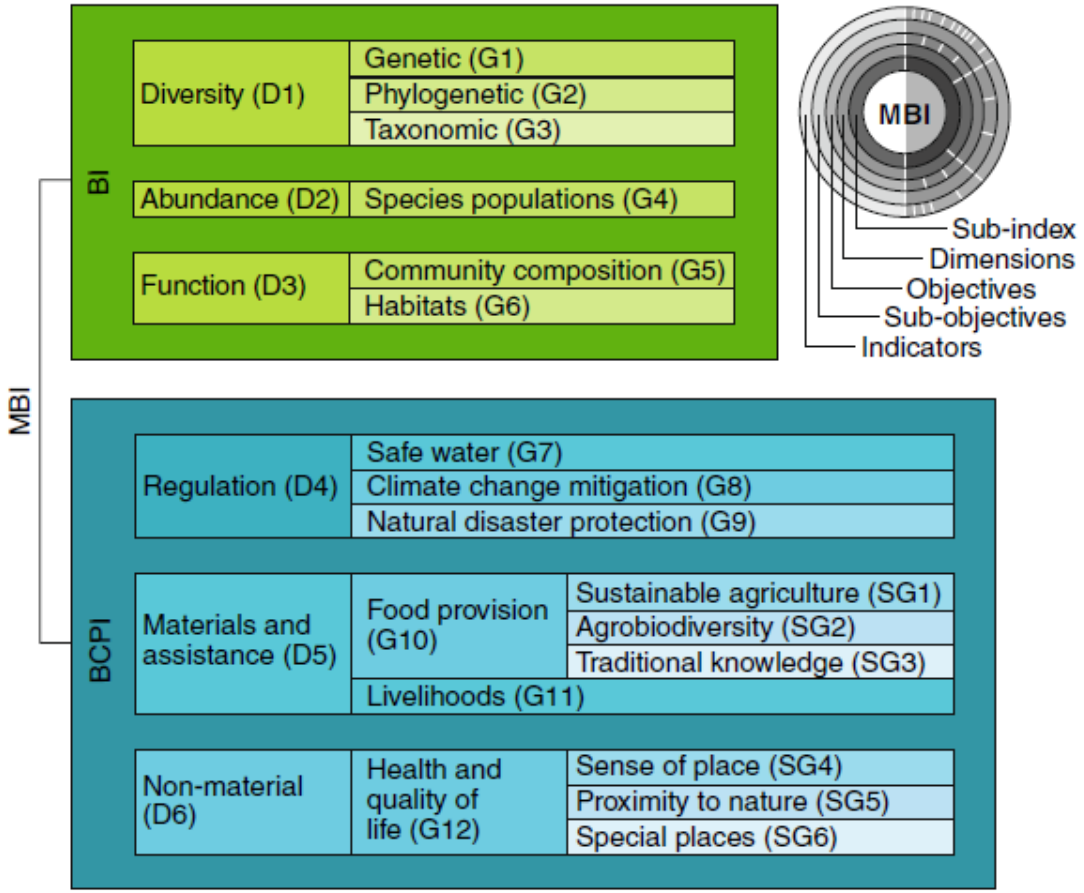
# Why a financial services perspective




Source: Swiss Re Institute, adapted from DNB 2020, IPBES 2019, OECD 2019, PwC/WWF 2020, TEEB 2012

# Outlook

# The future of measuring nature on a national level to compare globally – developing a multi-dimensional biodiversity monitoring index

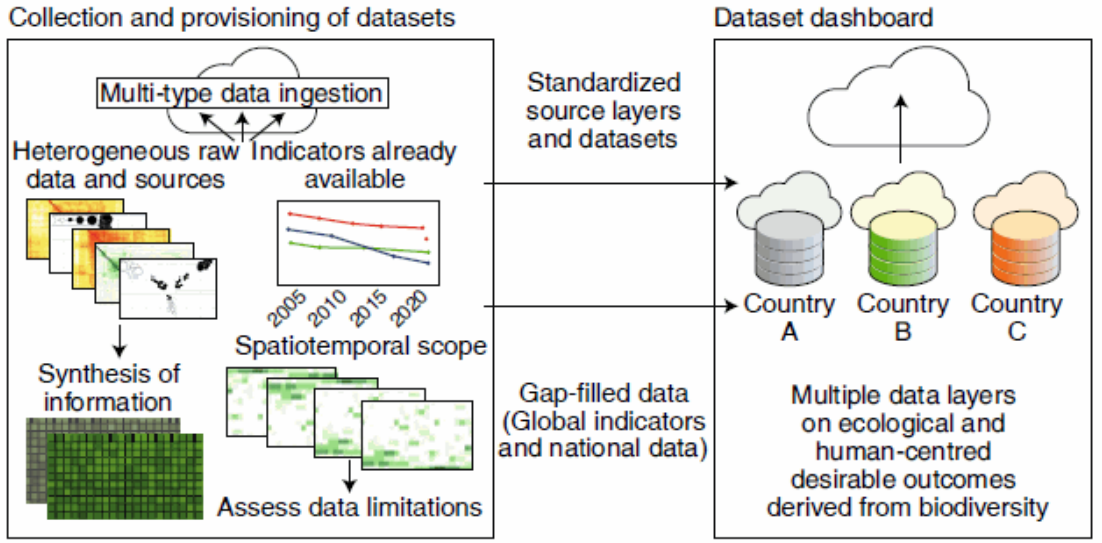



"Sub-index scores are derived from a wide range of indicators and metrics. Indicators/metrics in the outer layer could be arranged around public biodiversity health objectives (G) (and sub-objectives (SG)), given the diversity of values about living nature, and those around specific biodiversity dimensions (D). Dimensions combine to indicate the current status for each of the biodiversity health objectives." [see source]

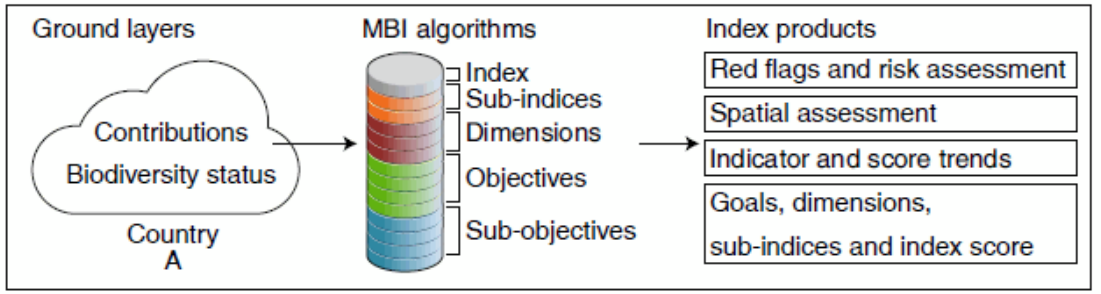
Source: Soto-Navarro C.A. et al. 2021. Towards a multi-dimensional biodiversity index for national application. In: nature sustainability. Publication provided in conjunction with the Swiss project 'Anwendung des MBI im politischen Diskurs', lead by sanu, scnat, MBI – connecting biodiversity and people. The keynote speaker has been part of the Mitglied Beirat / Begleitgruppe. Project funding by FOEN – Swiss Federal Office for the Environment, and supported / co-initiated by Luc Hoffmann Institute, Gland. See Towards a policy-smart and multidimensional biodiversity measure - UNEP-WCMC

# UN WCMC vision for the multi-dimensional biodiversity index - from data contribution to application

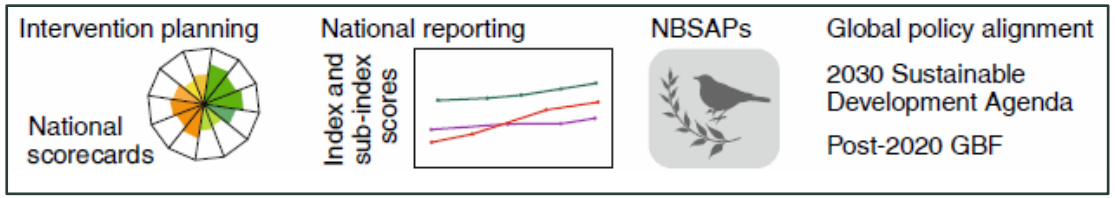
## Data contribution and mobilization




## Data integration and MBI production




## MBI applications and use




Source: Soto-Navarro C.A. et al. 2021. Towards a multi-dimensional biodiversity index for national application. In: nature sustainability. Publication provided in conjunction with the Swiss project 'Anwendung des MBI im politischen Diskurs', lead by sanu, scnat, MBI – connecting biodiversity and people. The keynote speaker has been part of the Mitglied Beirat / Begleitgruppe. Project funding by FOEN – Swiss Federal Office for the Environment, and supported / co-initiated by Luc Hoffmann Institute, Gland. See Towards a policy-smart and multidimensional biodiversity measure - UNEP-WCMC

# Biodiversity & Ecosystem Services (BES) - a risk and opportunity view

**-36%** NL investments (EUR510bn)

Dutch financial institutions°

USD **6-11tr/a**

Land degradation°°

USD **10tr/a** and 395m jobs by 2030

Nature based solutions[x]

**+91%** flood damages (USD272bn)*

Coral reefs

**-20%- -40%** USD 235-577 bn**

Pollinators

BES decline can result **in loss of functionality,** and consequently can lead to **financial losses** of economic activities that **depend** on nature for their operations.[Y]

Financial services are affected through the transmission mechanism, by providing capital or risk protection to clients.[YY]

**Physical risks**

**Transition risks**

°DNB 2020; °°OECD 2020; *Beck et al and TNC 2018. According to the OECC, land degradation impacted the global economy by a staggering USD 6-11 trillion per year between 1997 and 2010.
**Sánchez-Bayo & Wyckhuys 2019, Lautenbach 2012, IPBES 2019, OECD 2019. [x]WEF 2020. [Y]TEEB 2012, OECD 2019; PWC/WWF 2020, [YY]DNB 2019, CDC biodiversité 2019

Swiss Re Institute

# Thank you for your attention

Oliver Schelske
Swiss Re Institute - Group Underwriting
Exploratory Research
Natural Assets & ESG Research Lead

Follow Swiss Re

# Legal notice

# Global trends in the capacity of nature to sustain contributions to life quality from 1970 to the present, published by IPBES 2019

| | Nature's contribution to people | Selected indicator | 50-year global trend | Directional trendacross regions |
|---|---|---|---|---|
| Regulation of environmental processes | 1 Habitat creation and maintenance | ▪ Extend of suitable habitat | ↓ | ○ |
| | | ▪ Biodiversity intacness | ↓ | ○ |
| | 2 Pollination and dispersal of seeds and other prapagules | ▪ Pollinator diversity | ↓ | ○ |
| | | ▪ Extent of natural habitat in agricultural areas | ↓ | ○ |
| | 3 Regulation of air quality | ▪ Retention and prevented emissions of air pollutants by ecosystems | ↘ | ⇅ |
| | 4 Regulation of climate | ▪ Prevented emissions and uptake of greenhouse gases by ecosystems | ↘ | ⇅ |
| | 5 Regulation of ocean acidification | ▪ Capacity to sequester carbon by marine and terrestrial environments | → | ⇅ |
| | 6 Regulation of freshwater quantity, location and timing | ▪ Ecosystem impact on air-surface-ground water partitioning | ↘ | ⇅ |
| | 7 Regulation of freshwater and coastal water quality | ▪ Extent of ecosystems that filter or add consistent components to water | ↘ | ○ |
| | 8 Formation, protection and decontamination of soils and sediments | ▪ Soil organic carbon | ↘ | ⇅ |
| | 9 Regulation of hazards and extreme events | ▪ Ability of ecosystems to absorb and buffer hazards | ↘ | ⇅ |
| | 10 Regulation of detrimenta organisms and biological processes | ▪ Extent of natural habitat in agricultural areas | ↓ | ○ |
| | | ▪ Diversity of cometent hosts of vector-borne diseases | ↘ | ○ |

| | Nature's contribution to people | Selected indicator | 50-year global trend | Directional trendacross regions |
|---|---|---|---|---|
| Material and assistance | 11 Energy | ▪ Extend of agricultural land – potential land for bioenergy production | ↗ | ⇅ |
| | | ▪ Extend of forested land | ↘ | ⇅ |
| | 12 Food and feed | ▪ Extend of agricultural land – potential land for food and feed production | ↗ | ⇅ |
| | | ▪ Abundance of marine fish stocks | ↓ | ⇅ |
| | 13 Materials and assistance | ▪ Extend of agricultural land – potential land for material production | ↗ | ⇅ |
| | | ▪ Extent of forested land | ↘ | ⇅ |
| | 14 Medicinal, biochemical and genetic resources | ▪ Fraction of species locally known and used medicinally | ↘ | ○ |
| | | ▪ Phylogenetic diversity | ↓ | ○ |
| Non-material | 15 Learning and inspiration | ▪ Number of people in close proximity to nature | ↓ | ○ |
| | | ▪ Diversity of life from which to learn | ↓ | ○ |
| | 16 Physical and psychological experiences | ▪ Area of natural and traditional landscapes and seascapes | ↘ | ○ |
| | 17 Supporting identities | ▪ Stability of land use and land cover | ↘ | ○ |
| | 18 Maintenance of options | ▪ Species' survival probability | ↓ | ○ |
| | | ▪ Phylogenetic diversity | ↓ | ○ |


Source: IPBES 2019