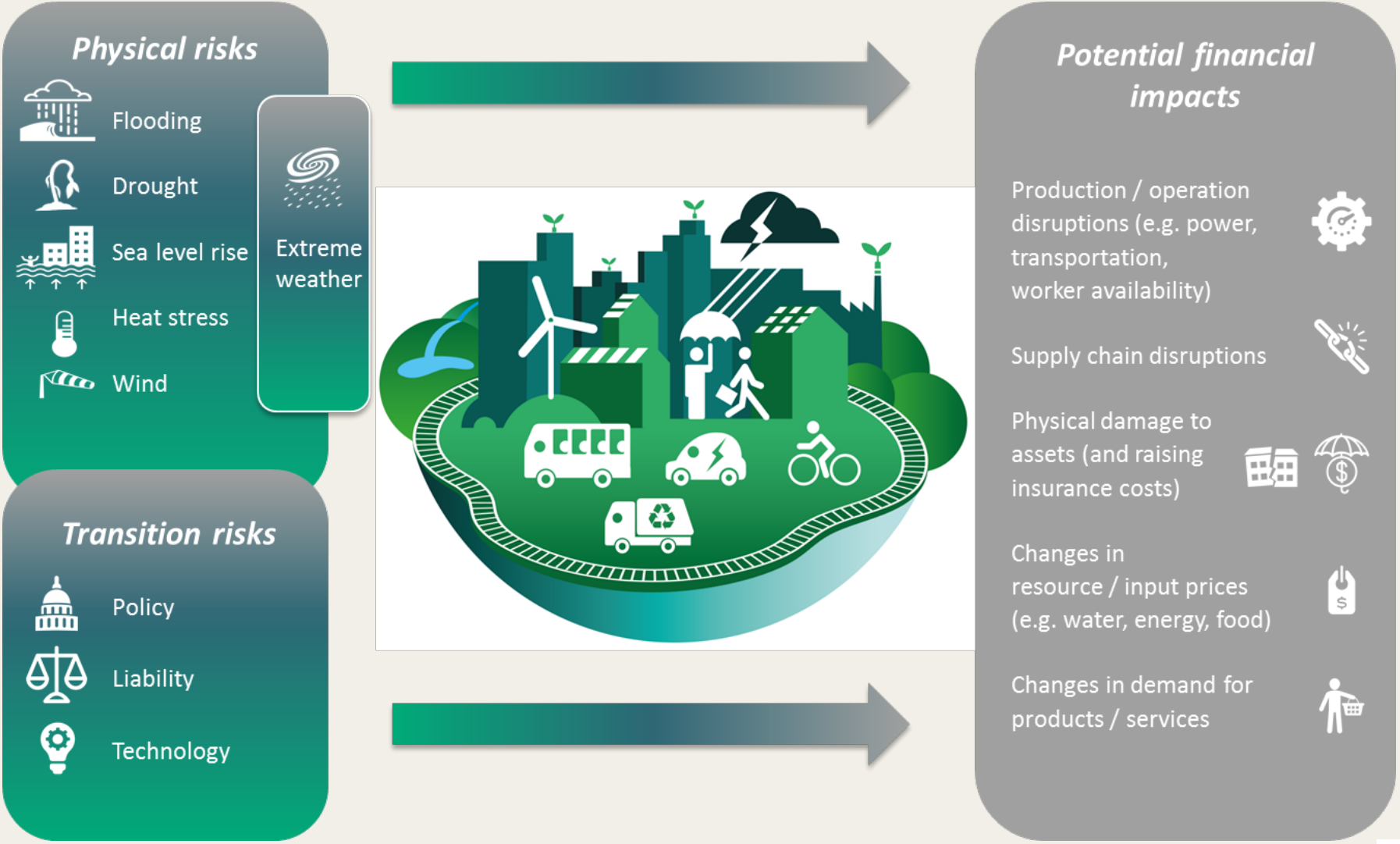


°CICERO

Sustainability reporting and climate risk management

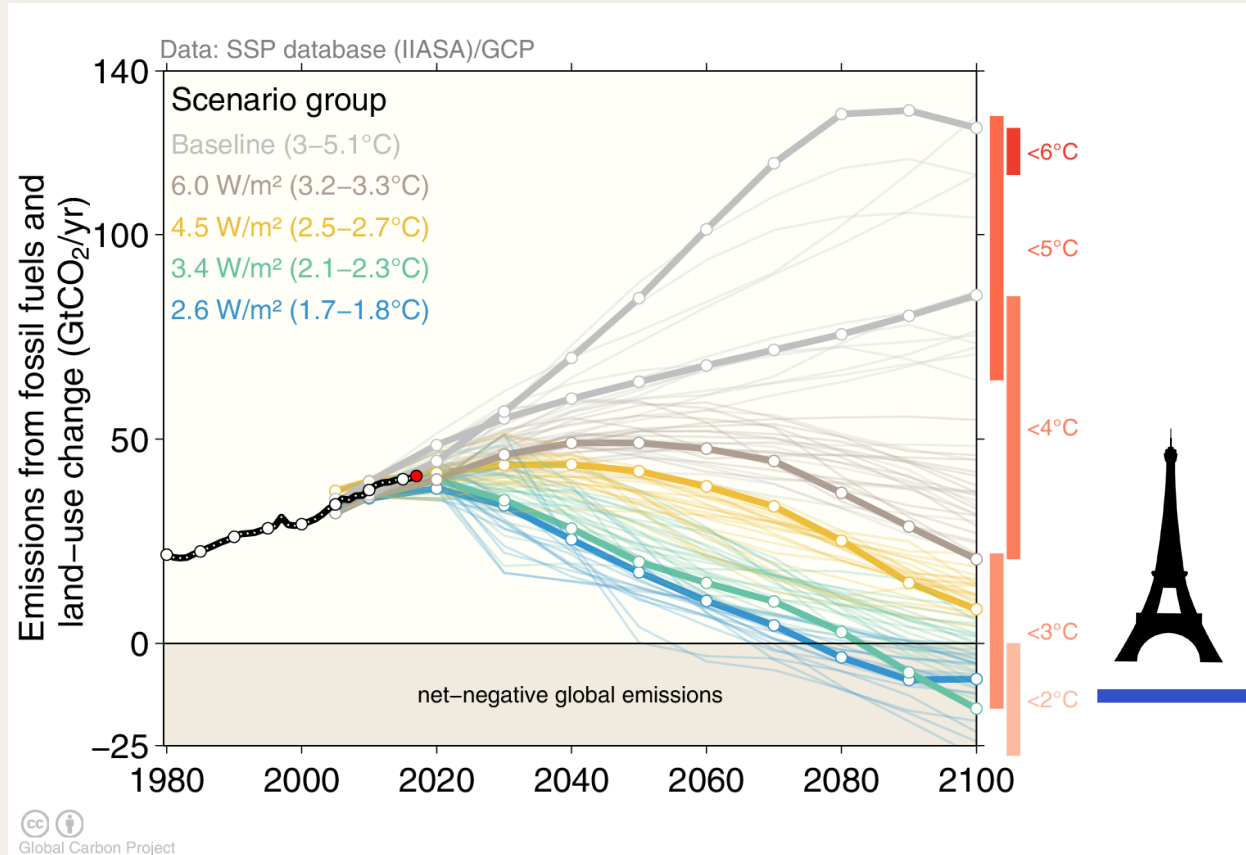
Prof. Dr. Jana Sillmann and Dr. Taro Kunimitsu

Climate Change Risks and Financial Impacts



Climate Change Impacts across Regions

Climate scenarios extracted from the latest IPCC report



6-8 degrees warmer in Nordics in winter



Increase in floods in central Europe



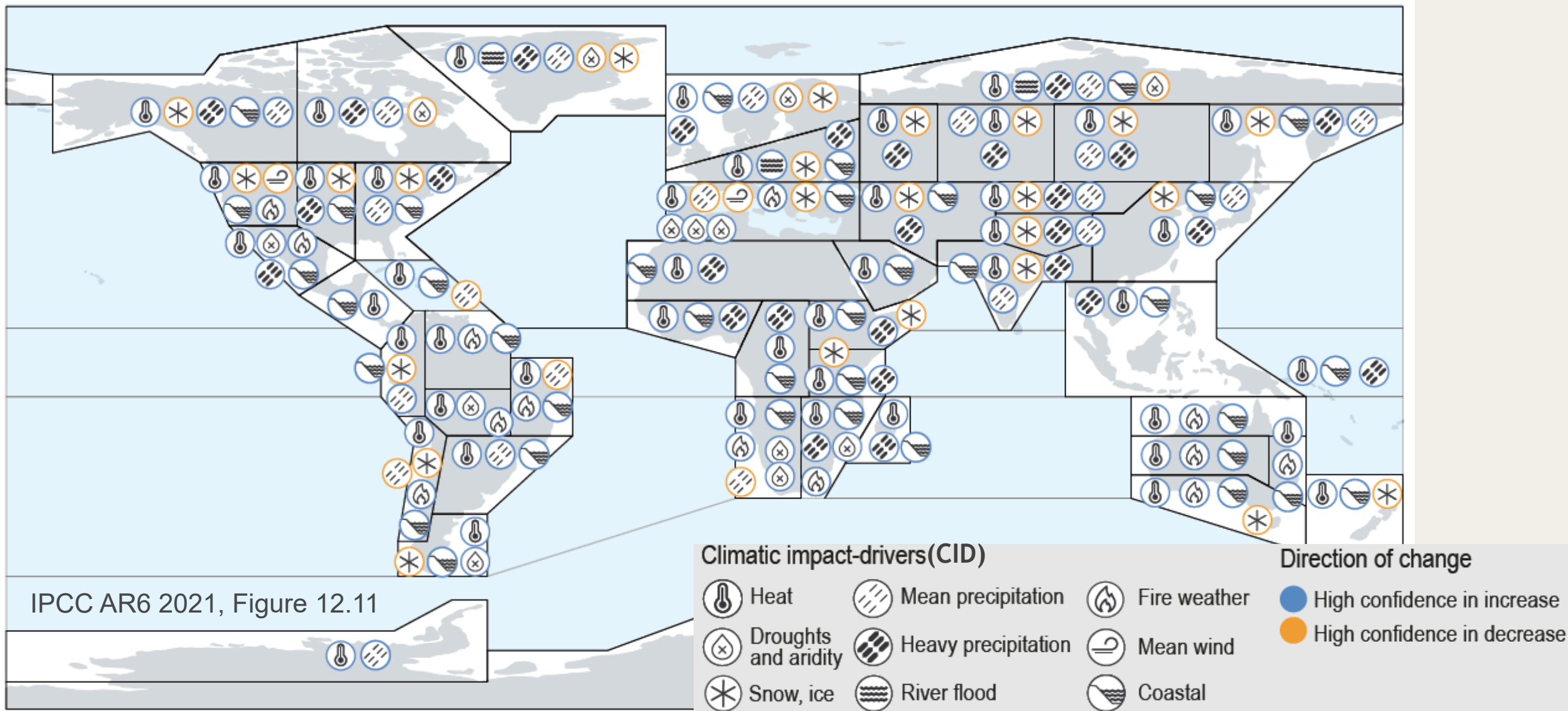
More intense droughts in the Mediterranean region



Daswetter.com

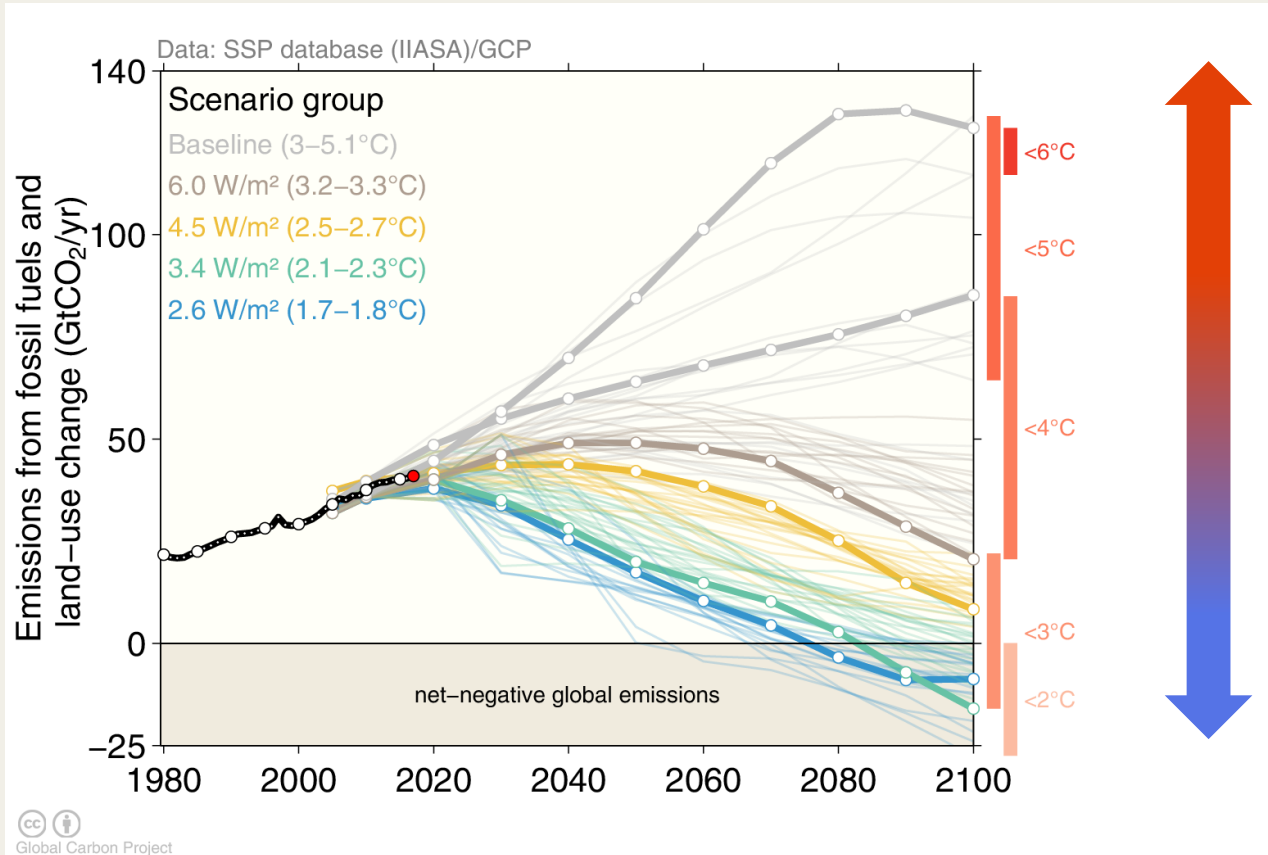
Heat records everywhere

Every region is affected by changes in climatic impact-drivers



Climate Change Impacts vs. Mitigation costs

Climate scenarios extracted from the latest IPCC report



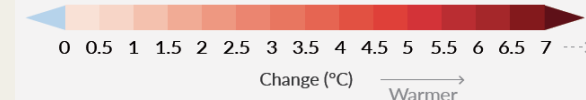
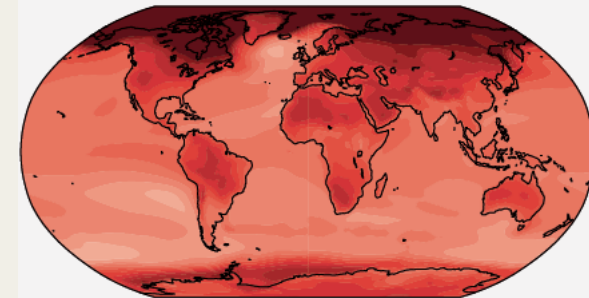
Physical risks

Risks connected to the exposure of the physical consequences of climate change.
(sea level rise, heatwaves, droughts, ...)

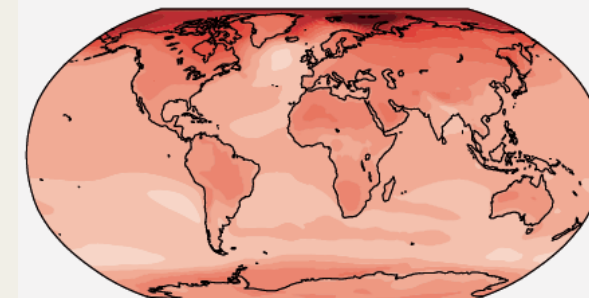
Transition risks

Risks induced by the transition towards a low-carbon economy.
(regulation evolutions, attenuation policies, markets, ...)

Simulated change at 4°C global warming



Simulated change at 2°C global warming

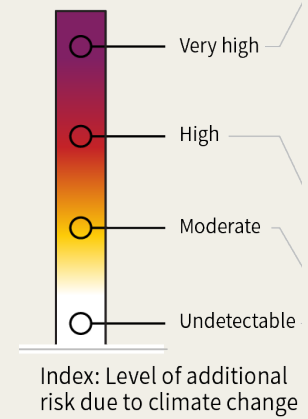
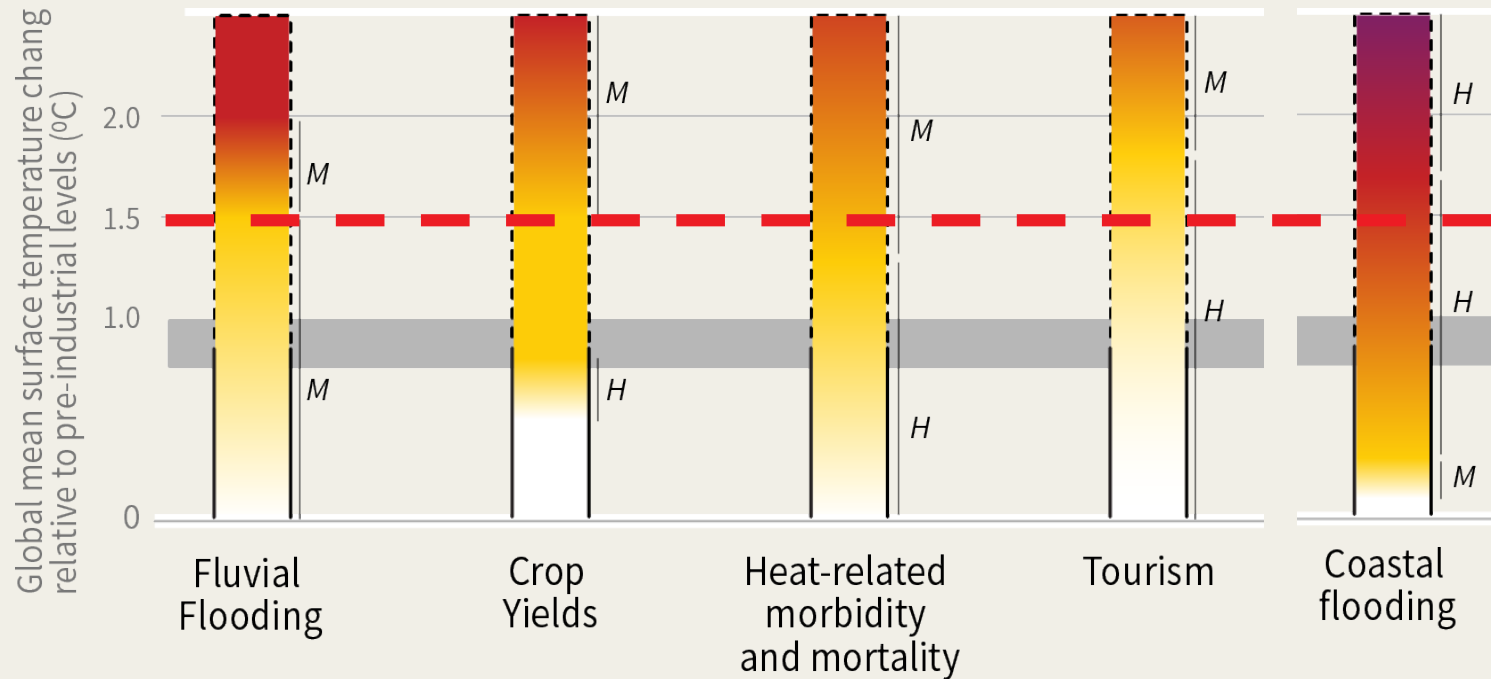


Physical Risks from Changing Climate

Risks and/or impacts for specific natural, managed and human systems

The key elements are presented here as a function of the risk level assessed

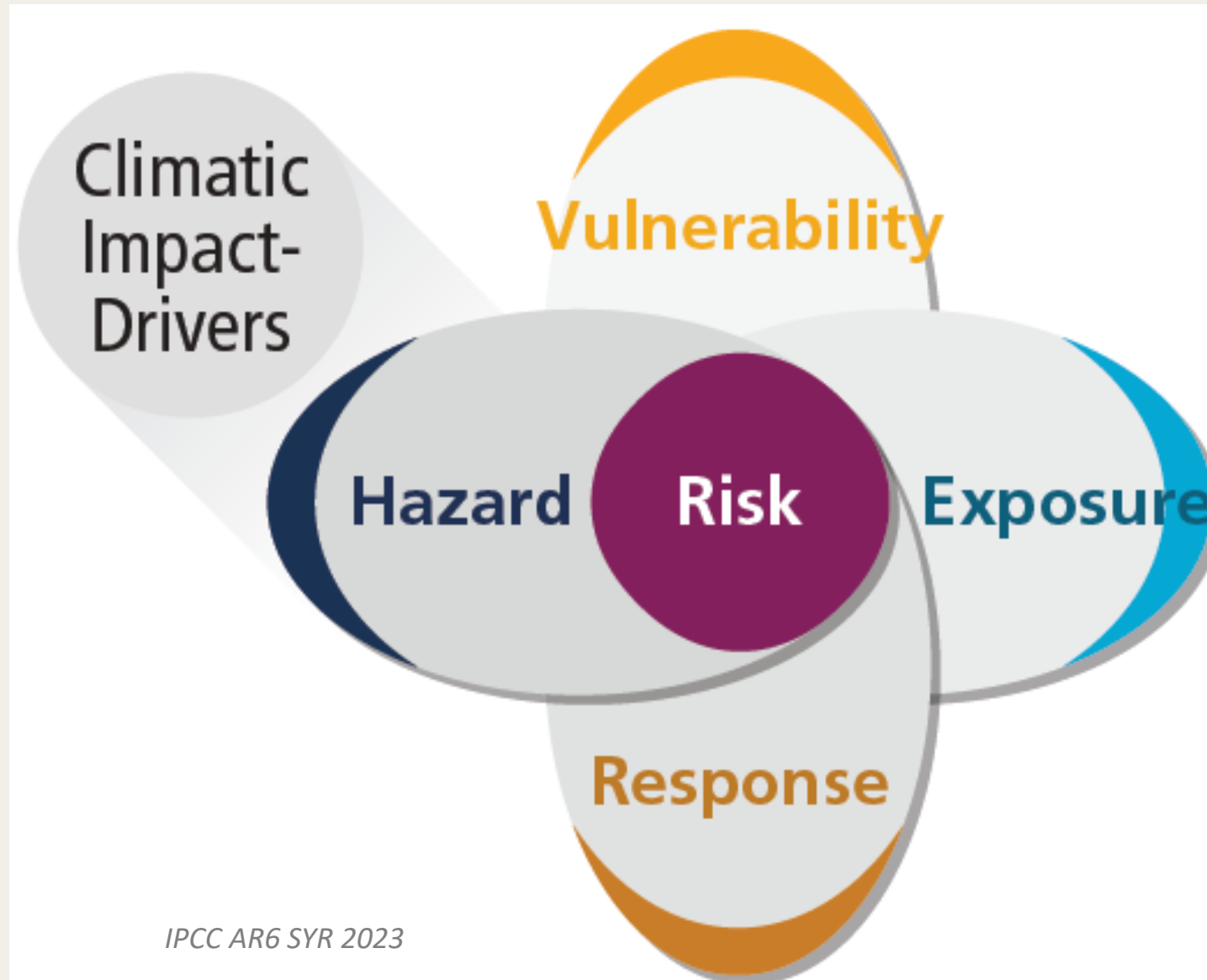
From moderate to high risk



Confidence level for transition: L=Low, M=Medium, H=High and VH=Very high



Intergovernmental Panel on Climate Change (IPCC) Climate Risk Framing



Every region faces more severe and/or frequent compound and cascading risks

c) Example of complex risk, where impacts from climate extreme events have cascading effects on food, nutrition, livelihoods and well-being of smallholder farmers

Multiple climate change risks will increasingly compound and cascade in the near term

SDGs



Reduced household income

More frequent and more intense
Extreme heat and drought

Reduced soil moisture and health



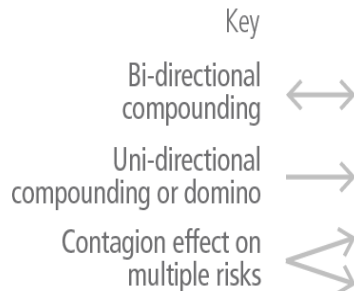
Food prices increase



Reduced labour capacity

Food yield and quality losses

Reduced food security



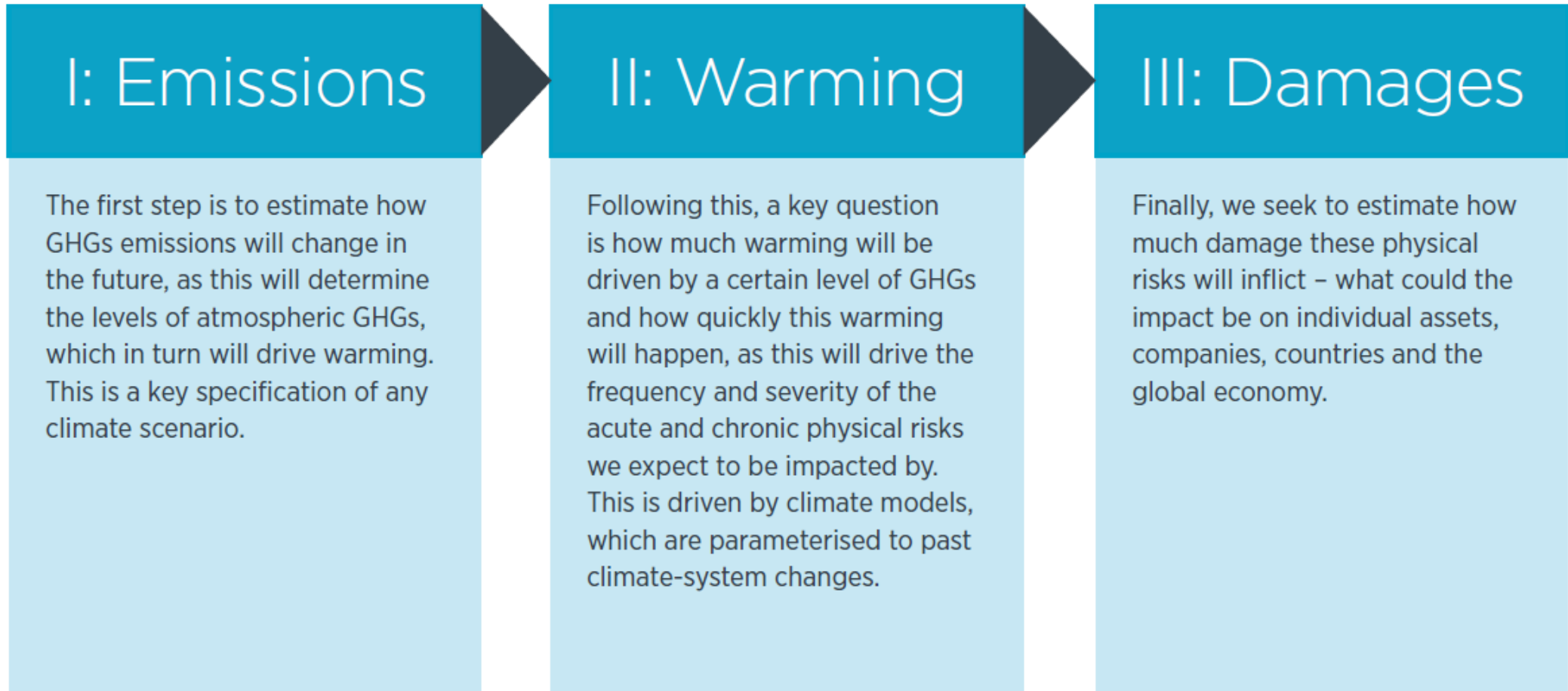
Decreased quality of life

Increased malnutrition
(particularly maternal malnutrition and child undernutrition)



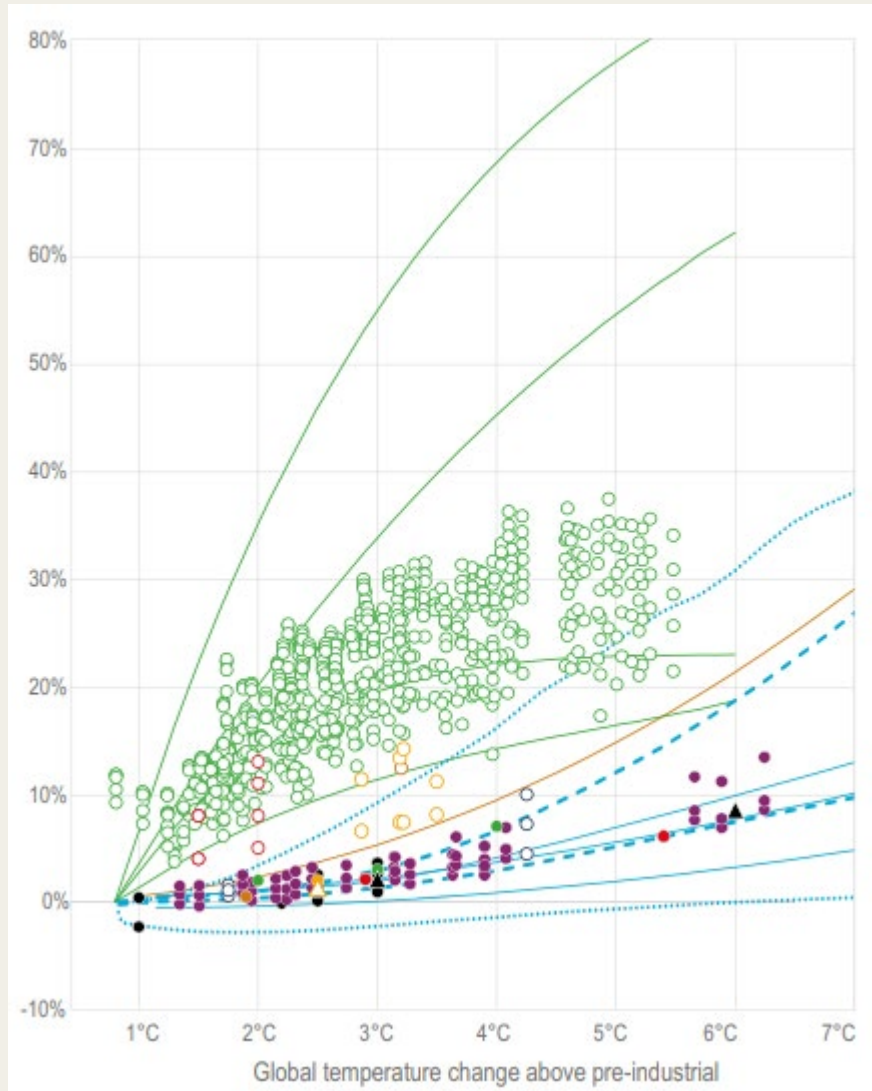
Economic Impacts from Climate Change

Figure 6: The climate-change modelling process



Economic Impacts from Climate Change

Percentage loss in global GDP



Statistical modeling (regression-based econometric models)

Structural models (e.g. IAM, CGE)

→ frequently cited estimates of economic costs of climate change by using Integrated Assessment Models may be substantially underestimated

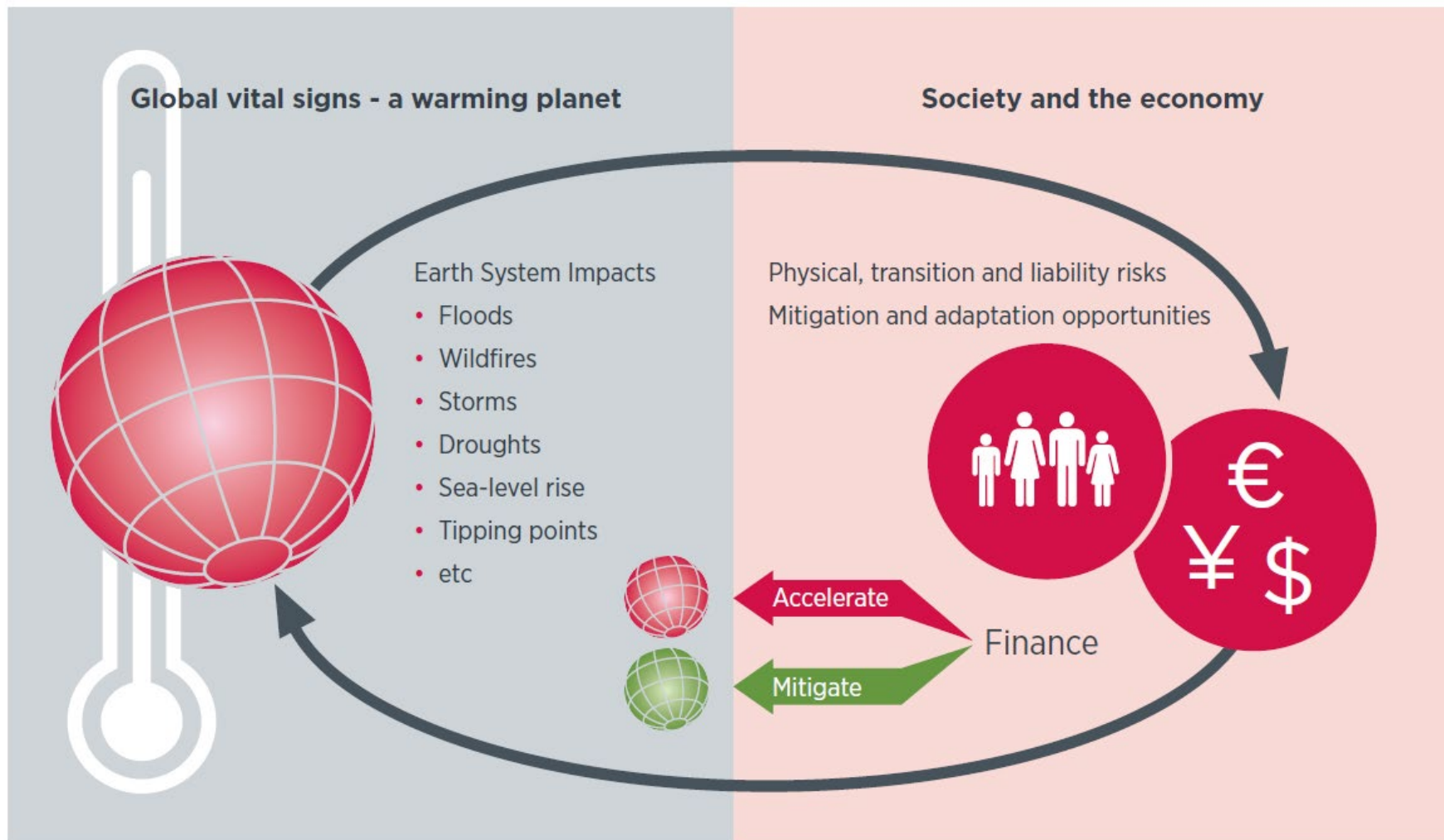
Economic Impacts from Climate Change

- Climate change and the associated impacts of climate extremes will cost A LOT OF MONEY
- Assessing the economic costs is associated with **high uncertainties**
- Often only direct impacts considered but **indirect and cascading impacts can increase the costs**
- We currently **lack sufficient tools and data** to systematically and comprehensively estimate economic costs of climate extremes on a global scale



Double Materiality and Climate Risk

Figure 2: Double materiality - the interaction between the physical climate and our economy



Source: Sandy Trust, reproduced with permission

Source: Trust et al. 2023 *The Emperor's New Climate Scenarios*

Physical Climate Risk: User Needs and Information Gaps

I4CE
INSTITUTE FOR CLIMATE ECONOMICS
Line Institute for Carbon and Climate at Wageningen University & Research

ClimINVEST

Getting started on Physical climate risk analysis in finance - Available approaches and the way forward

ClimINVEST Research Project Work Package 1

December 2018

Romain Hubert | Julie Evain | Morgane Nicol

Partners: CICERO, carbone 4, WAGENINGEN UNIVERSITY & RESEARCH, Climate Adaptation Services, METEO FRANCE, ERA4CS European Research Area for Climate Services.

Project ClimINVEST is part of BRACE, an ERA-NET funded by JPI Climate, and funded by RCUK (RCJ, AMR, PPE, ERAC) with co-funding by the European Union (Grant 680862).

Table 1. Details of available approaches on physical climate risk analysis

Service provider	Acclimatise	Moody's Investors Service	WRI	Four Twenty Seven	Carbone 4	Carbon Delta	Mercer	Ecolab, Truost and Microsoft
Approach	Aware for projects	Physical Effects of Climate Change on Sovereign Issuers	Aqueduct Water Risk Atlas	427 Climate Risk Scores	CRIS	Climate VaR	TRIP Framework	Water Risk Monetizer
Output								
Qualitative scoring	●	●	●	●	●	●	●	●
Quantitative						●	●	●
On Counterparty								
Project	●				●			
Element of value chain								
Sector				●	●	●	●	●
Geography				●	●	●	●	●
Asset class				●	●	●	●	●
Portfolio				●	●	●	●	●
Sovereigns			●	●	●	●	●	●
Companies			●	●	●	●	●	●
On time horizon								
Restricted to one horizon	●	●	●	●	●	●	●	●
Detail and agg. per horizons								
Time horizons addressed:								
Past	●	●	●	●	●	●	●	●
Future								
2020 or 2050			●	●	●	●	●	●
2030 and 2040				●	●	●	●	●
Past or 2030				●	●	●	●	●
2050 and 2100								
15 yrs from now								
2050								
3.5 or 10 yrs from now								
On hazard								
All hazards combined	●	●	●	●	●	●	●	●
Specific hazard(s) addressed								
Extremes								
Floods	●	●	●	●	●	●	●	●
Landslides	●	●	●	●	●	●	●	●
Fires	●	●	●	●	●	●	●	●
Storms	●	●	●	●	●	●	●	●
Temperature				●	●	●	●	●
Drought			●	●	●	●	●	●
Precipitation				●	●	●	●	●
Chronic changes								
Temperature	●	●	●	●	●	●	●	●
Precipitation	●	●	●	●	●	●	●	●
Water scarcity	●	●	●	●	●	●	●	●
Sea level rise				●	●	●	●	●
Ice and Snow	●	●	●	●	●	●	●	●
On Scenario								
Multiple scenarios				●	●	●	●	●
IPCC scenarios	●	●	●	●	●	●	●	●
Other	●	●	●	●	●	●	●	●
Service								
Paid	Paid	Paid	Free	Paid	Paid	Paid	Paid	Free

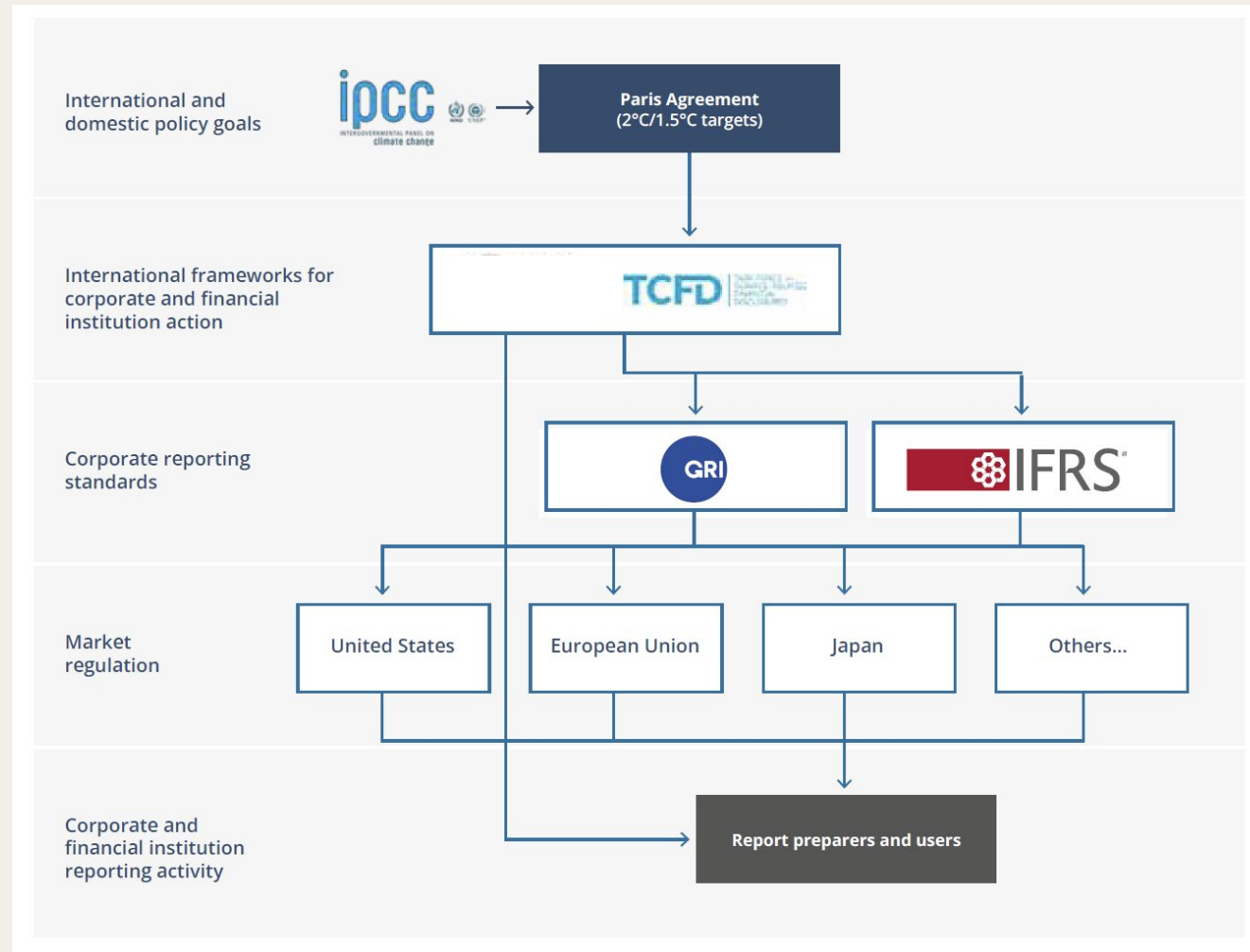
*) Note that Carbone4 is a research project partner in the ClimINVEST project.
**) Ecolab, Truost and Microsoft are referred to collectively as "Truost".
Source: I4CE (2018).

Why climate-related disclosures?

1. Demand for companies to report on **climate-related risk** is increasing
 - Focus is especially on **informing investors for decision making**
 - Disclosure standards are needed both for investors and companies, and industry-led standards have been created
 - Voluntary, report within/along with annual financial filings

Current (emerging) landscape

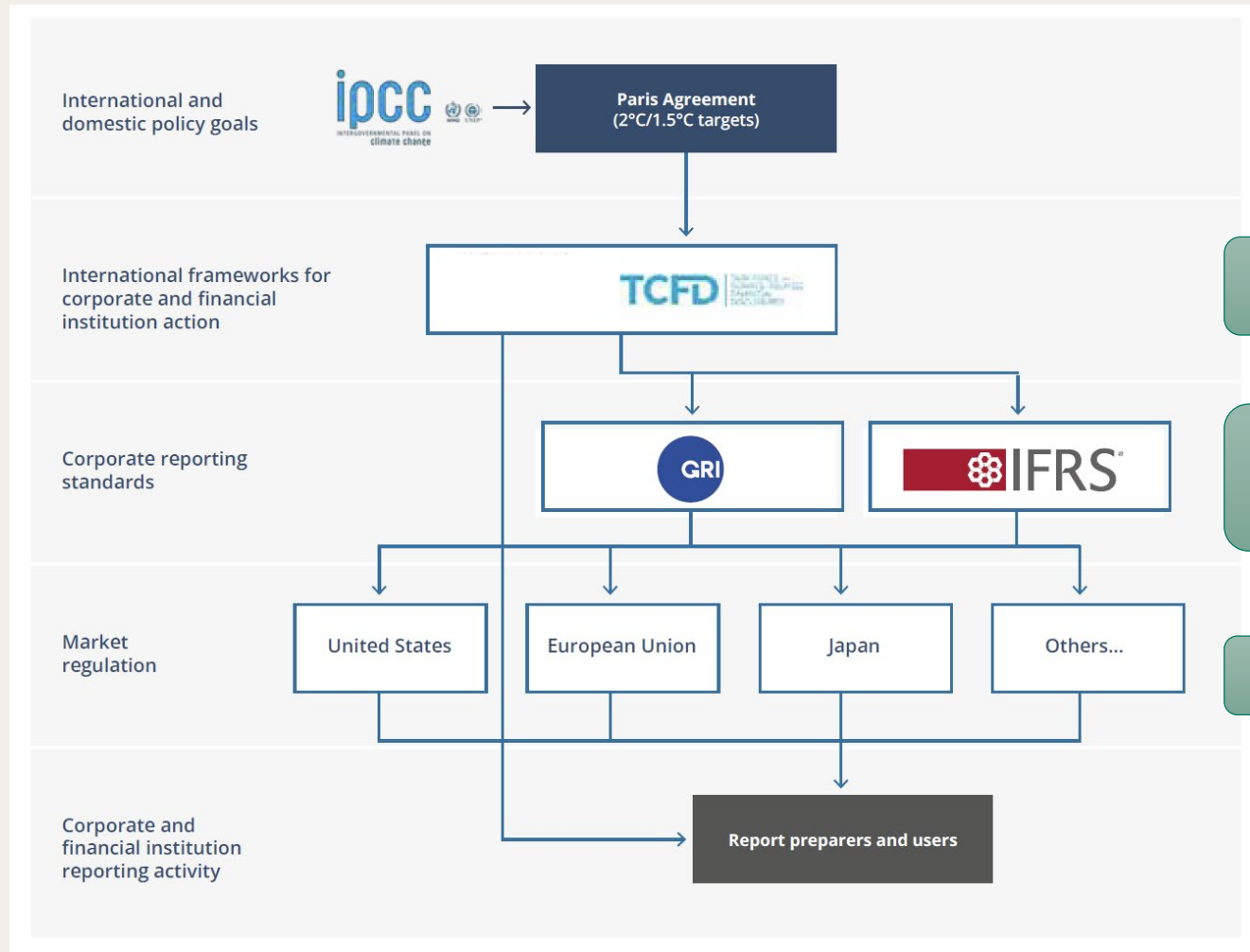
TCFD: Task Force on Climate-Related Financial Disclosures
GRI: Global Reporting Initiative
IFRS: International Financial Reporting Standards
TNCD: Taskforce on Nature-related Financial Disclosures



Based on figure from TNCD recommendations (2023)

Current (emerging) landscape

SEC: Securities and Exchange Commission
ESRS: European Sustainability Reporting Standards



Framework - recommendation

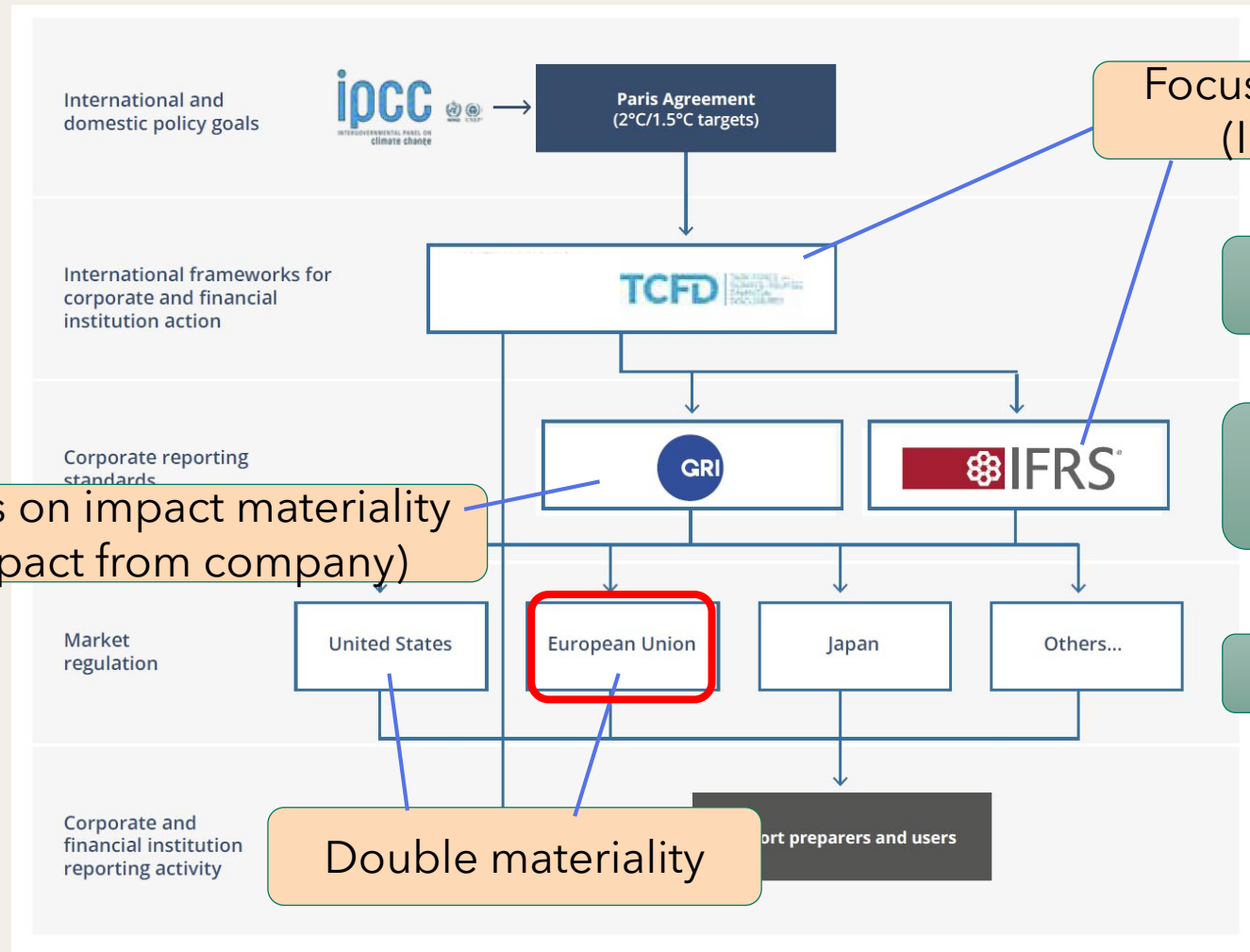
Industry-led standards - voluntary, but aims to be adopted by jurisdictions

e.g. Singapore mandates reporting with IFRS standards
UK standards will be based on IFRS standards

Jurisdiction requirements

e.g. US: SEC regulations proposed
EU: ESRS adopted by commission

Current (emerging) landscape



Focus on financial materiality
(Impact on company)

Framework - recommendation

Industry-led standards - voluntary, but aims to be adopted by jurisdictions

e.g. Singapore mandates reporting with IFRS standards
UK standards will be based on IFRS standards

Jurisdiction requirements

e.g. US: SEC regulations proposed
EU: ESRS adopted by commission

Focus on impact materiality
(Impact from company)

Double materiality

ESRS - European Sustainability Reporting Standards

CSRD: Corporate Sustainability Reporting Directive
ISSB: International Sustainability Standards Board

1. What: the reporting standards for those subject to **CSRD** in Europe
2. Who: All large companies and listed companies ~ 50,000 companies
3. Status: Adopted by EC (July 2023), will come into effect from FY 2024, phase-in by 2026 depending on size of company
4. Aligns with ISSB and GRI standards - interoperability

- *Cross-cutting standards:*
 - ESRS 1 General requirements
 - ESRS 2 General disclosures
- *Standards on Environmental, Social and Governance matters:*
 - ESRS E1 Climate change
 - ESRS E2 Pollution
 - ESRS E3 Water and marine resources
 - ESRS E4 Biodiversity and ecosystems
 - ESRS E5 Resource use and circular economy
 - ESRS S1 Own workforce
 - ESRS S2 Workers in the value chain
 - ESRS S3 Affected communities
 - ESRS S4 Consumers and end-users
 - ESRS G1 Business conduct

(EC 2023)

Norwegian regulations

- Proposed March 15, 2024
- Basically, an adoption of CSRD and ESRS from EU
- There are slight modifications for Norway
 - Large state-owned enterprises will also be covered
 - No independent assurance services providers (IASPs) needed for the moment (further assessment to be conducted)
- Same schedule as EU, starting FY2024, reporting in 2025



Issues

1. Many companies use consultancies for scenario analysis and evaluation. Climate services based on “blind faith” – insufficient knowledge can lead to maladaptation (Keenan 2019)
2. Why should companies even bother beyond regulations? - How important is transparency for companies?

Opportunities for sectors

1. Reporting will generate better data basis for understanding and quantifying physical climate impacts and risk assessment
2. Will allow better estimates of economic impacts of climate change
3. Provides better evidence for decision making
4. Double Materiality: Reveals responsibilities and opportunities
5. Collaboration between sciences and decision-makers: Transparent and robust methods and data

Tusen takk!

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