



Global Workshop
on Droughts in Transboundary Basins
 26-27 February 2024, Geneva

Drought under Global Change from a Transboundary Perspective



**INTEGRATED DROUGHT
 MANAGEMENT PROGRAMME**



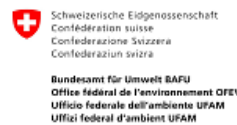
**Global Water
 Partnership**



Ministry of Infrastructure
 and Water Management



UNECE



Schweizerische Eidgenossenschaft
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Bundesamt für Umwelt BAFU
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 Ufficio federale dell'ambiente UFAM
 Uffizi federal d'ambient UFAM



United Nations
 Convention to Combat
 Desertification



UNDRR
 UN Office for Disaster Risk Reduction



WORLD BANK GROUP
 Water



**WORLD
 METEOROLOGICAL
 ORGANIZATION**



INTERNATIONAL NETWORK
 OF BASIN ORGANIZATIONS

Europe Is Drying Up

After unusually low amounts of rain and snow this winter, the continent faces a severe water shortage.

How to prevent conflicts over water in the middle of Europe

'Very precarious': The European countries facing another year of drought

What Switzerland is doing to prevent disputes over water

Water shortage: Switzerland's blue gold is under pressure

Italy begs for water from Swiss reservoirs

27. June 2022 by Marketing

Norditalien will mehr Wasser aus der Schweiz

In der Poebene herrscht zum Teil eine solche Dürre, dass die Ernte bedroht ist. Die italienischen Behörden haben den Notstand ausgerufen und hoffen auf Hilfe aus der Schweiz – doch die ist momentan kaum möglich.

Dry winter could lead to summer drought in Switzerland

Droughts are among the most complex natural hazards

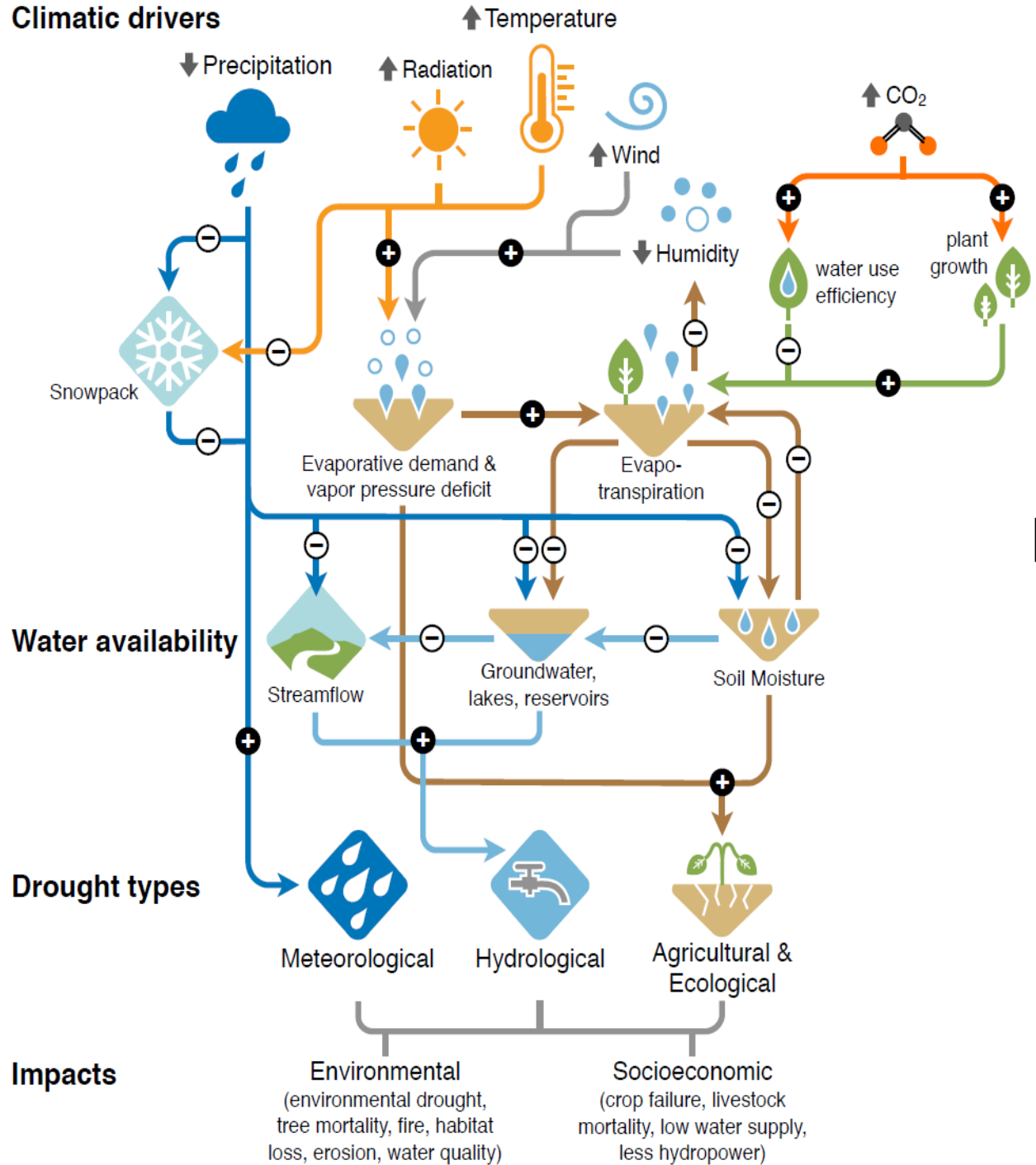
- Drought is a creeping phenomenon with slow onset
- Impacts of drought can accumulate gradually
- Lack of precise and universal definition for drought leads to confusion about when a drought begins and when it ends
- Leads to uncertainty on precise time to implement emergency response actions or mitigation measures.
- Drought expected to increase due to climate change

Drivers of Drought

IPCC Sixth Assessment Report, Chapter 11:

High complexity and interactions between physical processes and drought types/impacts

Important to distinguish from Water Scarcity



Drought and Water Scarcity



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Global Water
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Food and Agriculture
Organization of the
United Nations



United Nations
Convention to Combat
Desertification

IDMP, 2022. Drought and Water Scarcity. WMO No. 1284. Global Water Partnership, Stockholm, Sweden and World Meteorological Organization, Geneva, Switzerland.

Available on:

https://library.wmo.int/index.php?lvl=notice_display&id=2206



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WMO-No. 1284

WEATHER CLIMATE WATER



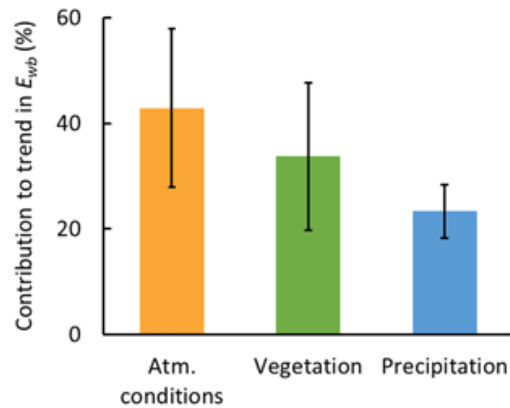
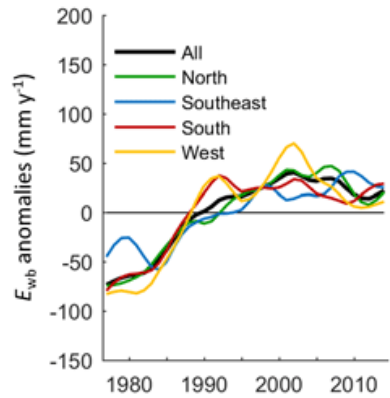
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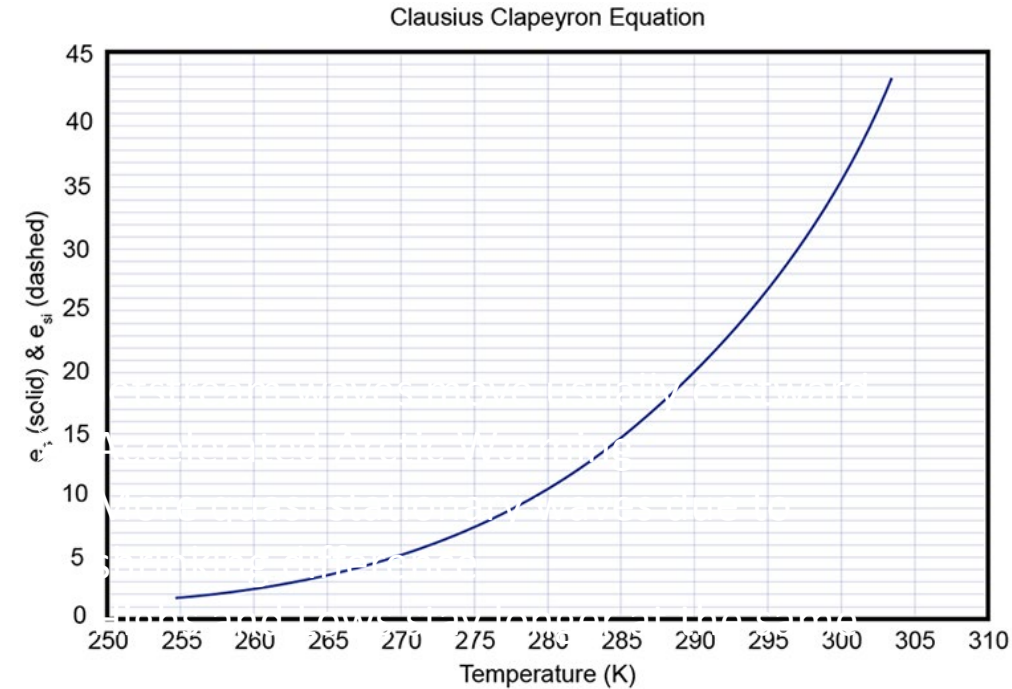
Global Water
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How Climate Change accelerates and intensifies extremes

- Warming -> atmospheric water content increases ~7% per 1 °C (Clausius Clapeyron relationship) -> less water in soils and freshwater aquifers
- Increasing temperatures strengthen evaporation



HESS, Duethmann and Blöschl 2018.



- Reduced Snowpack volumes and earlier snowmelt, glacier melting
- Change of weather patterns, e.g. Rossby Waves, El-Nino Southern Oscillation (ENSO), etc.
- Positive feedback of dry soils and diminished plant cover

Observed increase in droughts

From the 2021 6th Assessment Report of the IPCC, WGI:

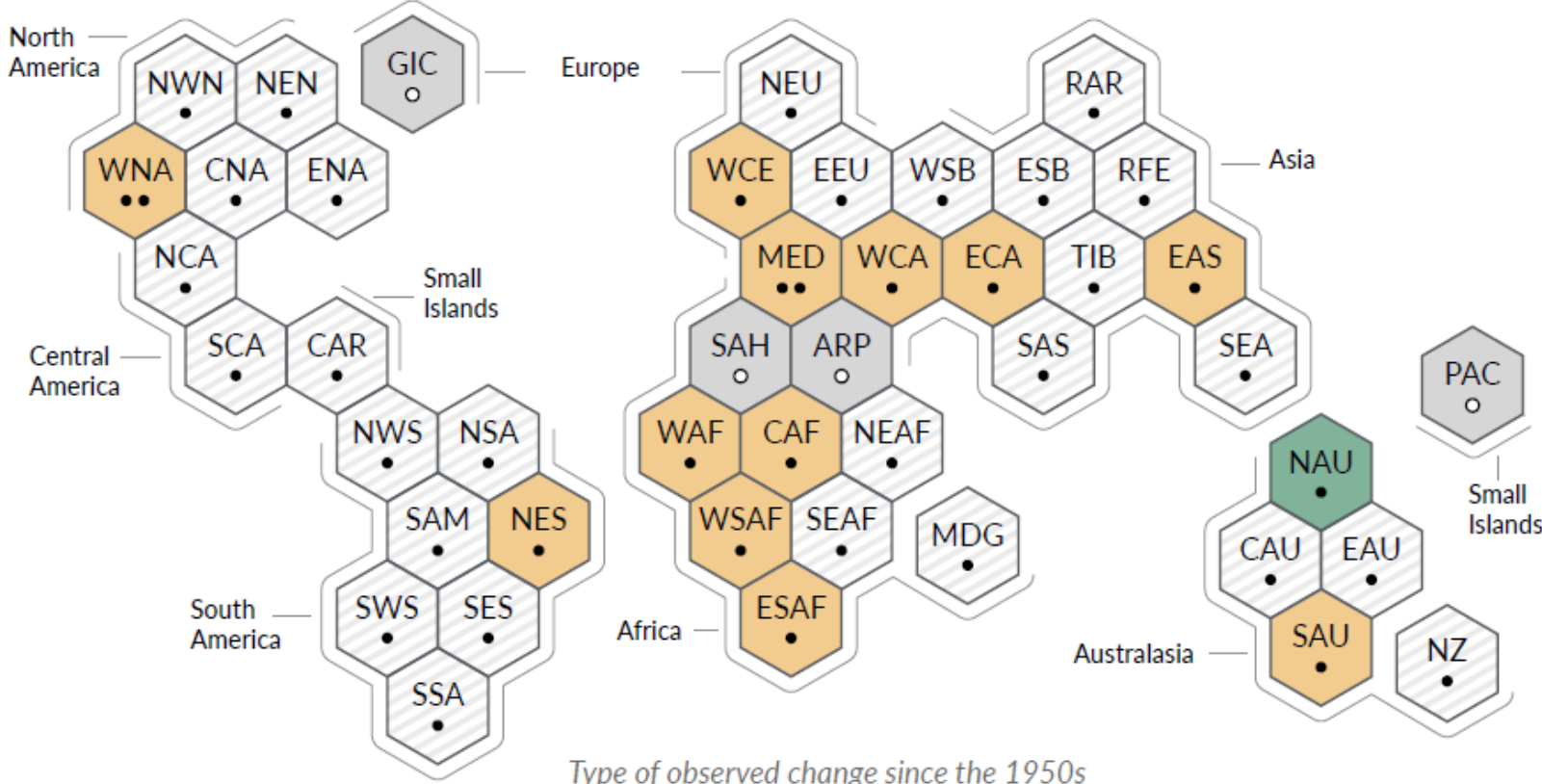
c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in agricultural and ecological drought

- Increase (12)
- Decrease (1)
- Low agreement in the type of change (28)
- Limited data and/or literature (4)

Confidence in human contribution to the observed change

- High
- Medium
- Low due to limited agreement
- Low due to limited evidence



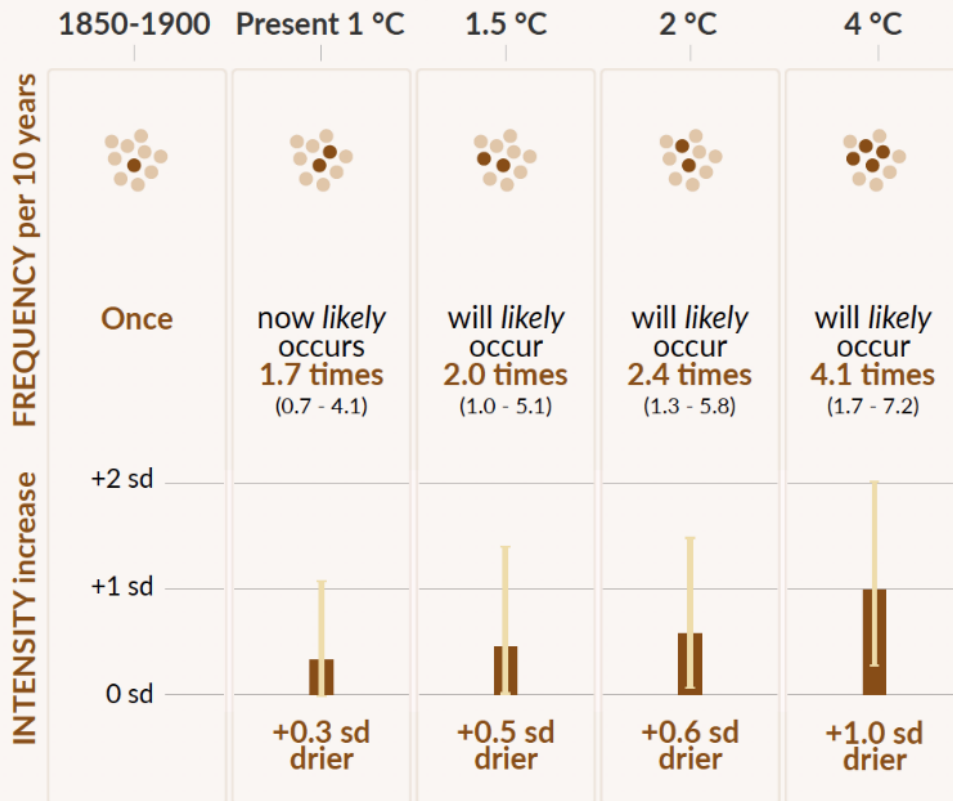
Type of observed change since the 1950s

Agricultural & ecological droughts in drying regions

10-year event

Frequency and increase in intensity of an agricultural and ecological drought event that occurred **once in 10 years** on average across drying regions in a climate without human influence

Future global warming levels



Projections for future drought

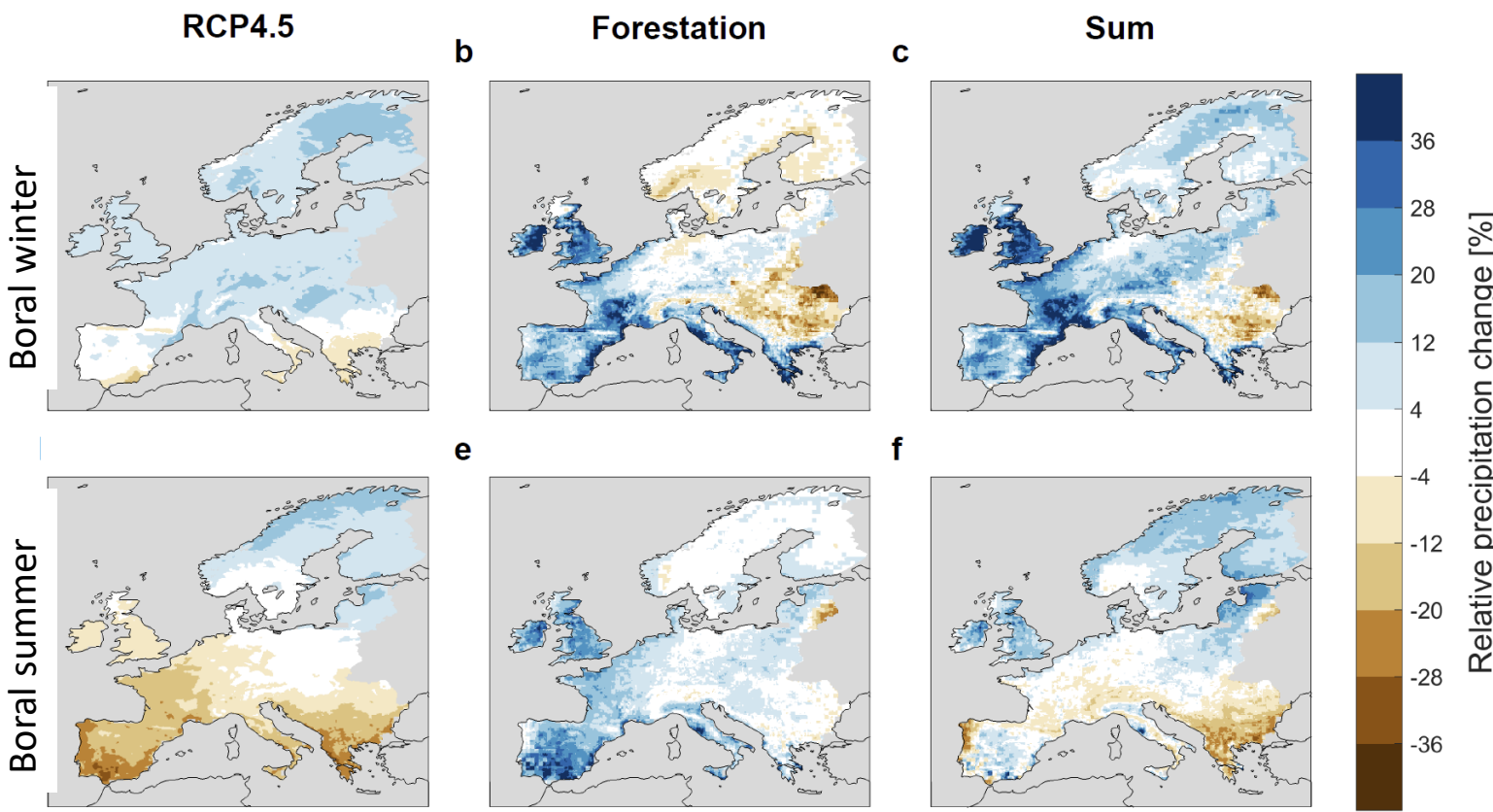
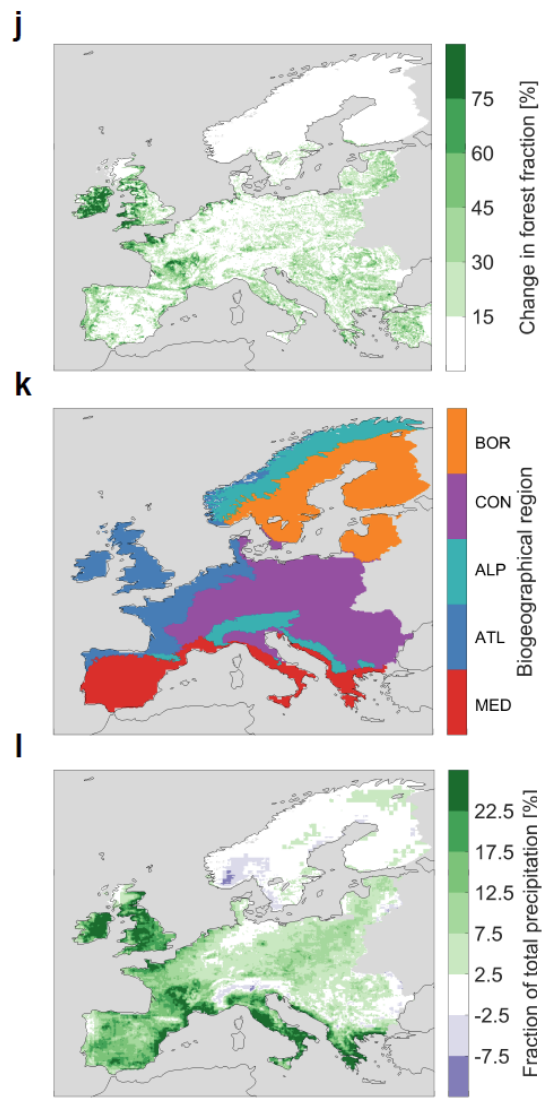
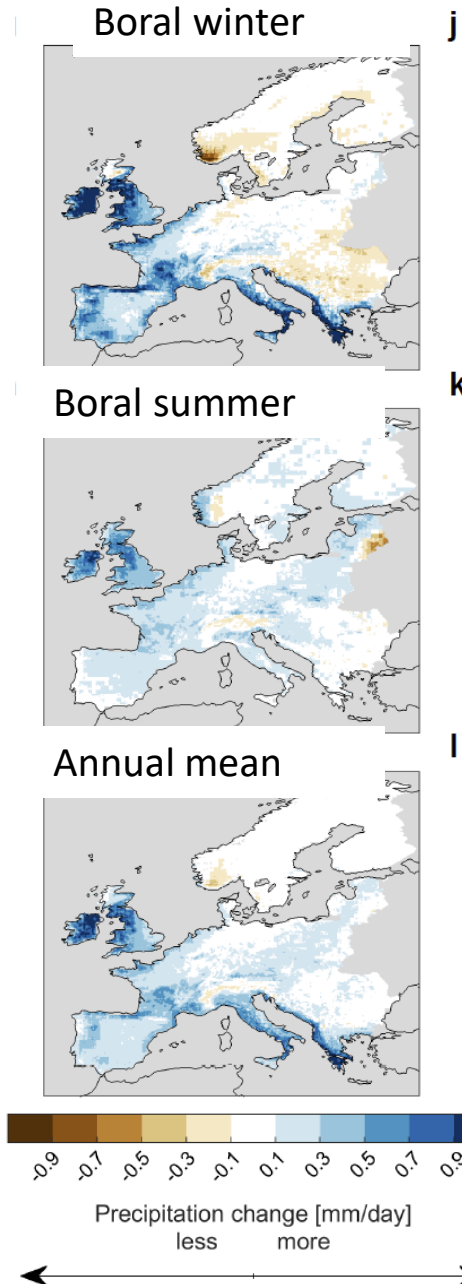
Even in a “best case” scenario, when achieving Paris goals (1.5°C warming):

- Drought will occur 2 time more often and will be significantly more severe
- “There will be an increasing occurrence of some extreme events unprecedented in the observational record with additional global warming, even at 1.5°C of global warming”
- Every additional 0.5°C of global warming causes increases in agricultural and ecological droughts in some regions (*high confidence*).

IPCC Sixth Assessment Report, WG1

... but it's not only Climate Change: the role of land use

- Forest cover scenario according to Global Reforestation Potential Map for Europe
- Strong increase in precipitation
- Could potentially offset deficit through climate change in regions?
- Transboundary approach crucial



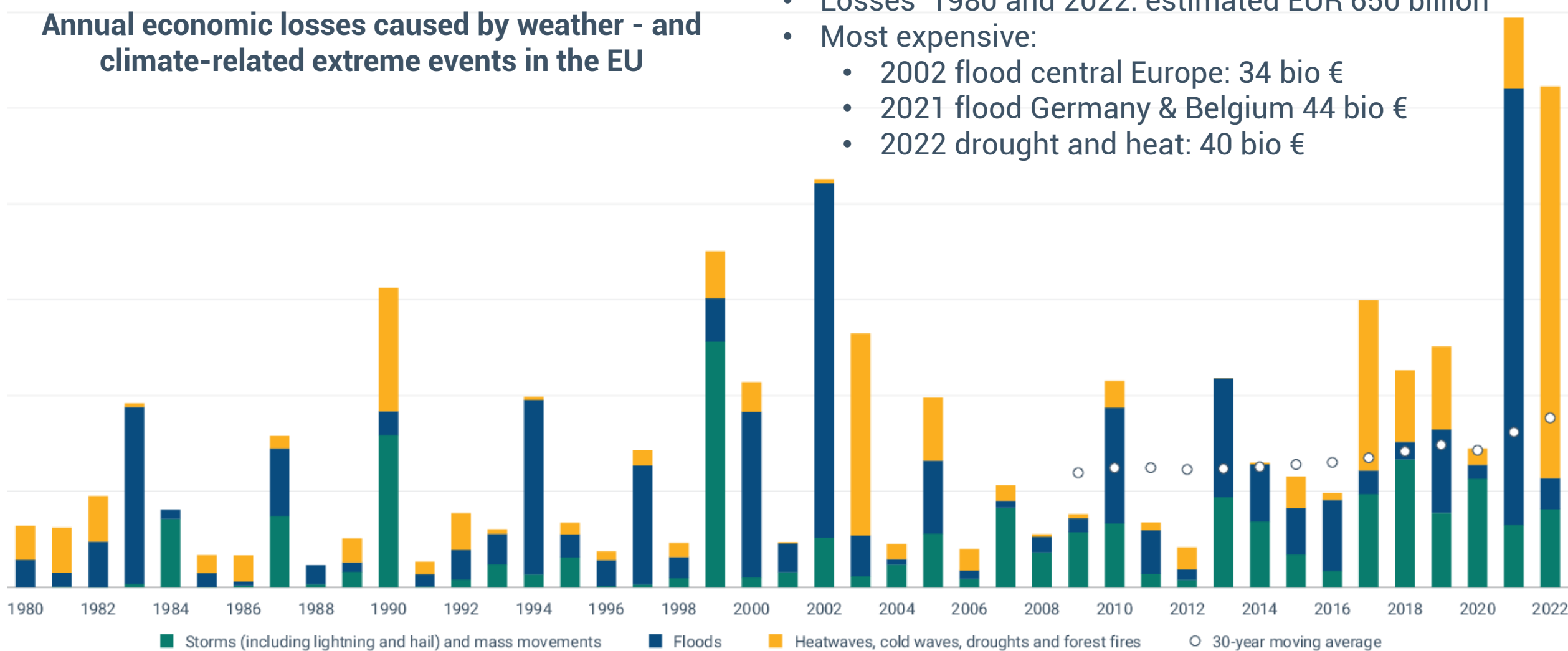
Meier et al.,
Nature Geosci., 2021

... and does it matter economically?

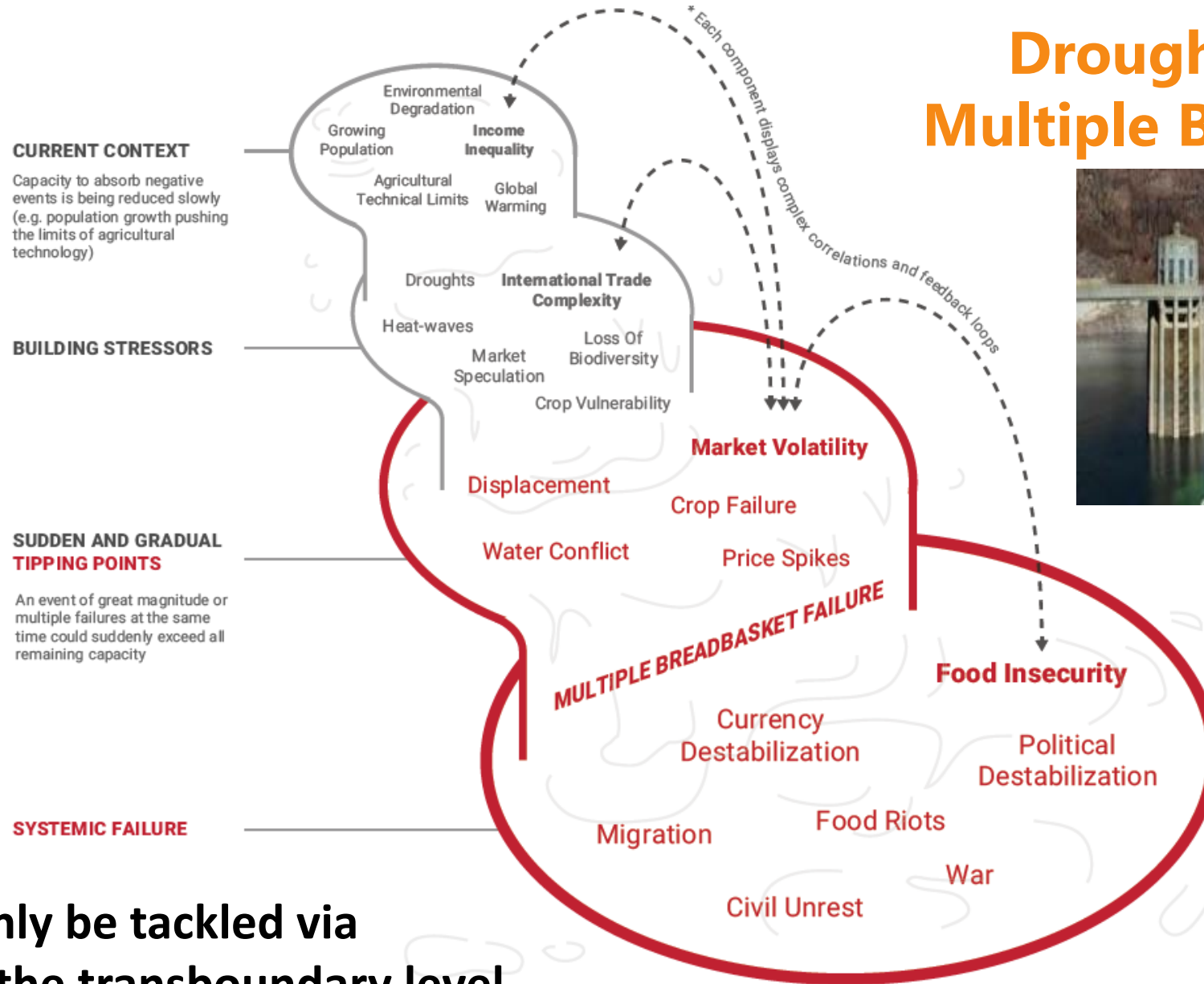
Billion EUR (2022 prices)

Annual economic losses caused by weather - and climate-related extreme events in the EU

- Losses 1980 and 2022: estimated EUR 650 billion
- Most expensive:
 - 2002 flood central Europe: 34 bio €
 - 2021 flood Germany & Belgium 44 bio €
 - 2022 drought and heat: 40 bio €



Drought in the context of Multiple Breadbasket Failure



This can only be tackled via including the transboundary level

UN DRR GAR19

IDMP: 10 Years of Integrated Drought Management

IDMP promotes the Three Pillars of Integrated Drought Management

PILLAR 1

MONITORING AND
EARLY WARNING



PROACTIVE
DISASTER
MANAGEMENT

PILLAR 2

RISK AND IMPACT
ASSESSMENT



PILLAR 3

RISK MITIGATION,
PREPAREDNESS
AND RESPONSE



IDMP has
over 45
Partners to
jointly
support
countries in
increasing
their drought
resilience

Integrating knowledge & practice for drought resilience

Date: 30th September – 3rd October 2024

Where: Barcelona, Spain



In collaboration with: **Alliance**
International Drought Resilience Alliance

International Organizing Committee



WORLD METEOROLOGICAL ORGANIZATION



Global Water Partnership



United Nations Convention to Combat Desertification



IOM UN MIGRATION



THE WORLD BANK
IBRD • IDA



UNDRR
UN Office for Disaster Risk Reduction



IWMI

International Water Management Institute



AE Met
Agencia Estatal de Meteorología

For more info visit:



Vater ship

Get in touch: Integrated Drought Management Helpdesk

The image shows three interactive cards arranged horizontally. Each card has a title in an orange box, a central icon, and a description in a white box below. The 'Ask' card is highlighted with a blue border. Each card also has a small orange '+' icon in the bottom right corner.

- Ask:** Icon of two speech bubbles, one with a question mark and one with an 'i'. Text: "Ask for assistance on integrated drought management".
- Find:** Icon of a magnifying glass. Text: "Find knowledge resources on integrated drought management".
- Connect:** Icon of a group of stylized human figures holding hands in a circle. Text: "Learn about the activities of IDMP and connect to them".

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