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Ecosystem-specific water scarcity indicator for sustainable water management in global supply chains: RESCUE

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2 Dec., 2025 @ Marrakech, Morroco

Dependence on water resources

40% of global population will face water scarcity in 2050

Taskforce on Nature-related Financial Disclosure

Non-finacial information disclosure request for companies on the risks associated with their business

Identification of potential impacts on:

- **Water stress**
- **Ecosystem integrity**
- **Biodiversity importance**

How to address the nexus between water and ecosystems?

Water use induced in global supply chains

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Full length article

Responsibility for sustainable water consumption in the global supply chains

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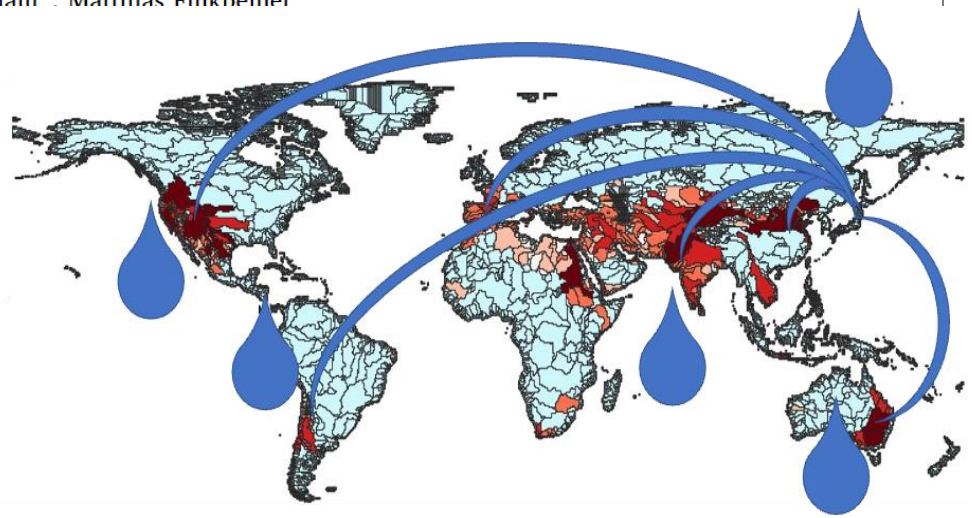
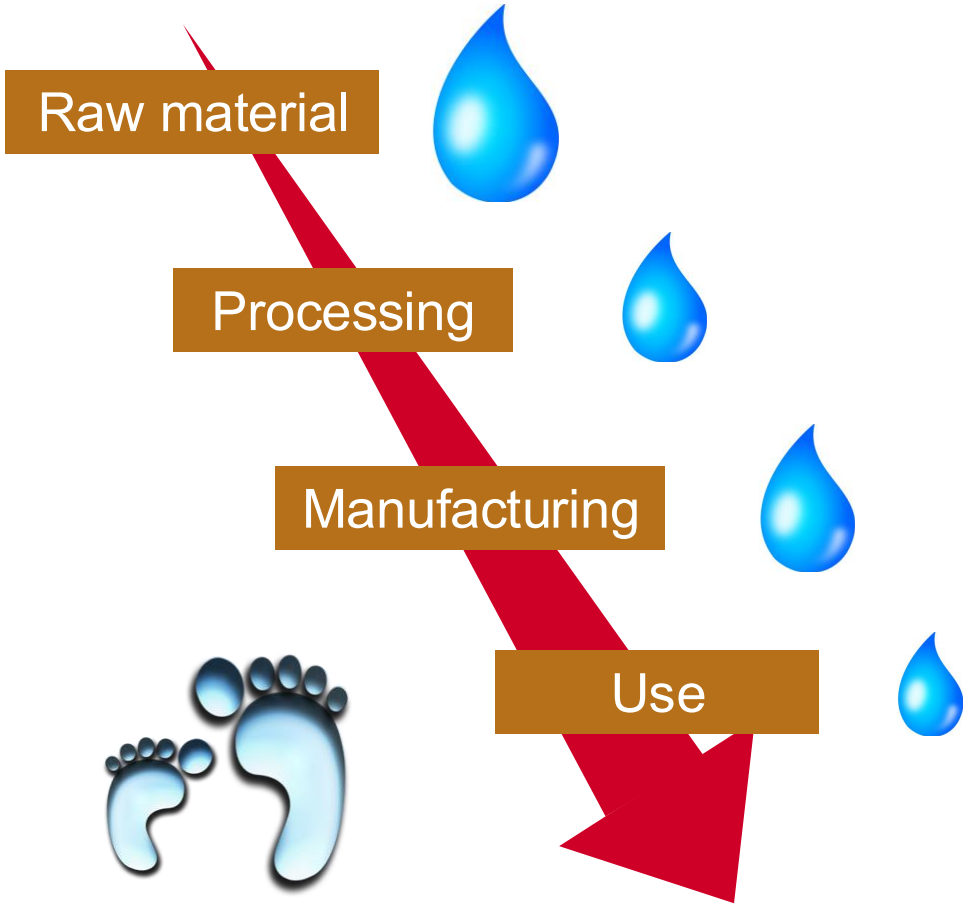
ARTICLE INFO

Keywords:
Freshwater consumption
Regional carrying capacities
Water footprint
Responsibility for global and local sustainability
Hotspots in global supply chains





More than 60% of water consumption is indueced outside the country.

Water footprinting is relevant to support sustainable water management.

Water scarcity assessment in LCA based Water Footprinting (WF)

AWARE model

The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE)

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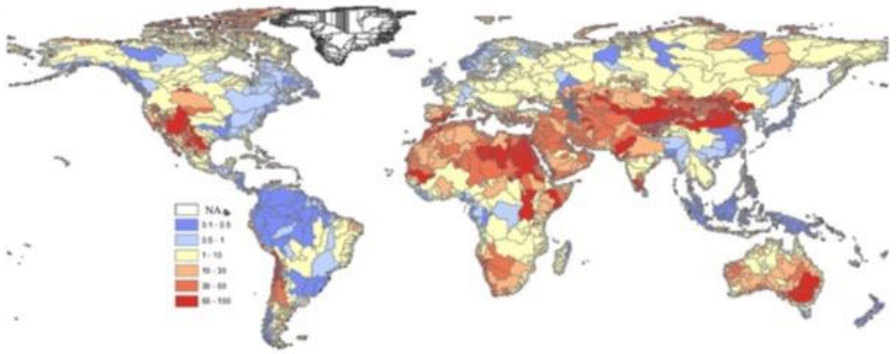
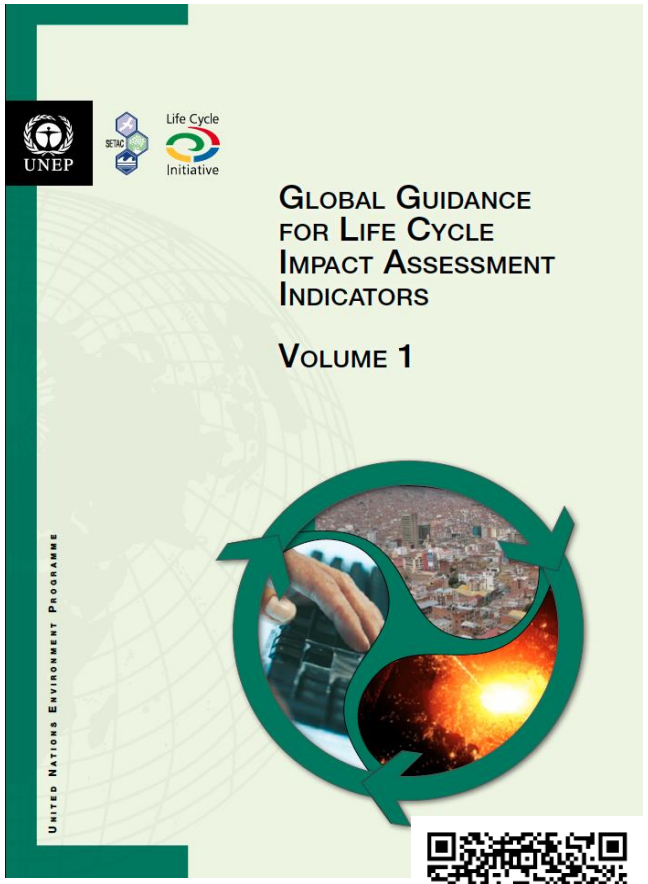
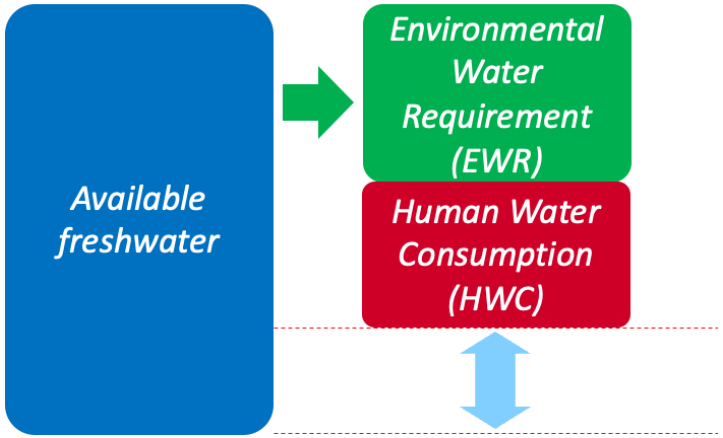




AWARE model focus on…

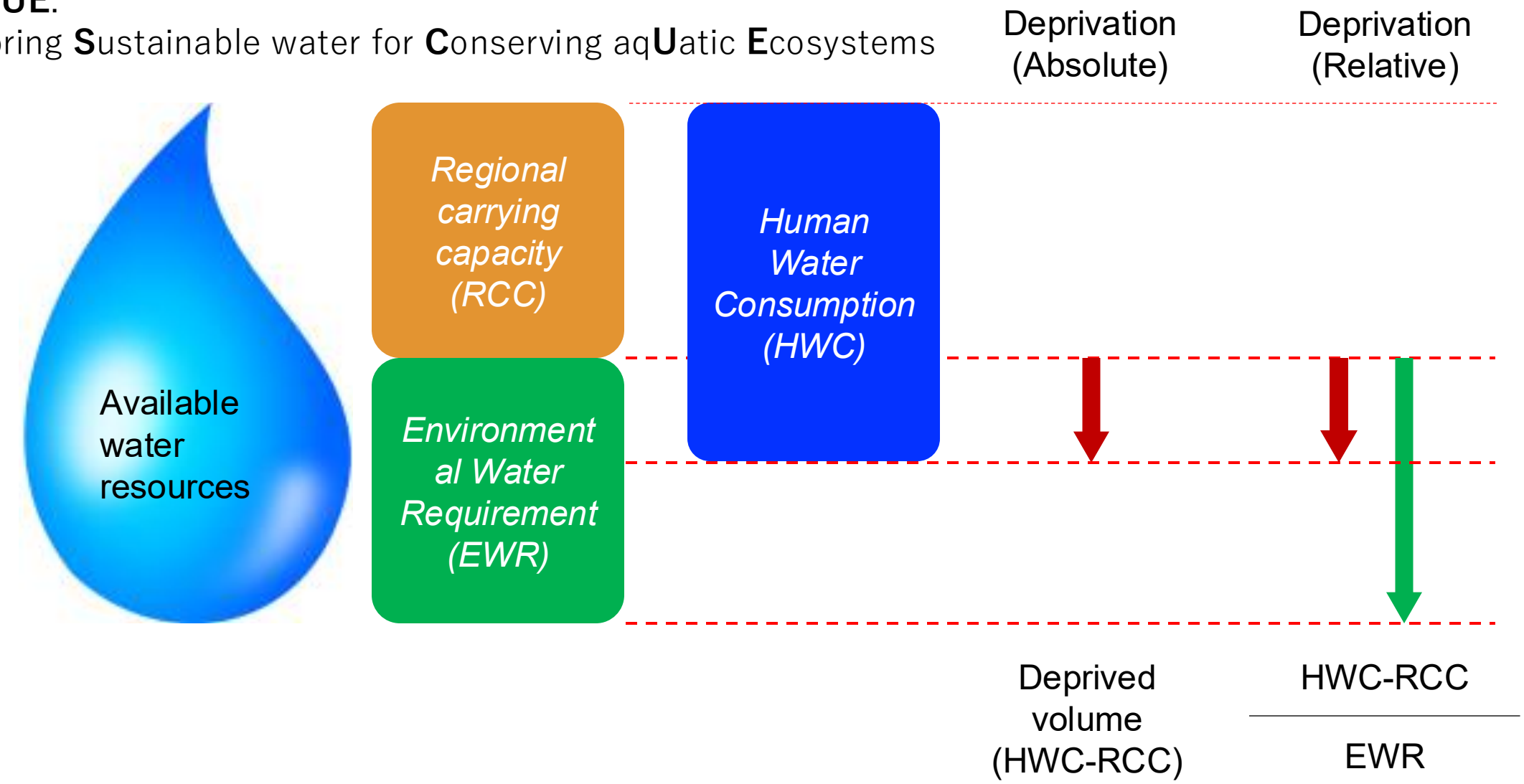


Assessing the potential impacts not specific to ecosystem.

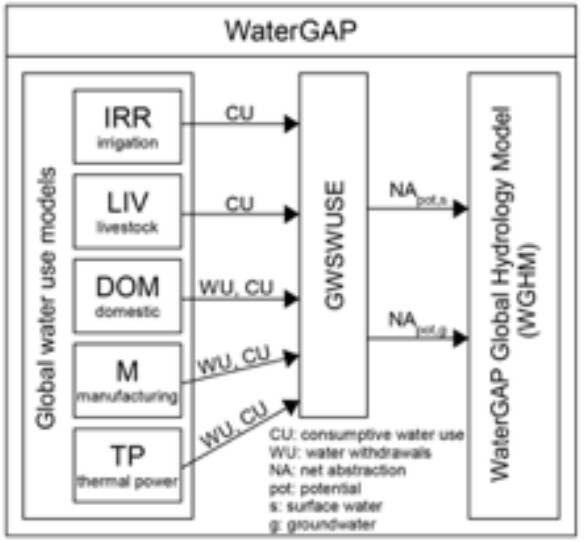
We need ecosystem-specific model for WF!

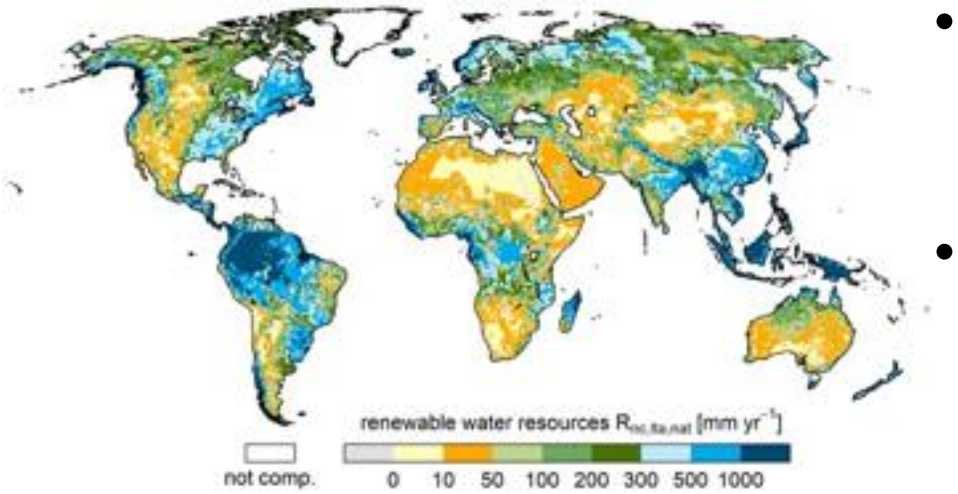
How does water consumption affect on ecosystems?

RESCUE:
REstoring **S**ustainable water for **C**onserving aq**U**atic **E**cosystems



Background data for the analysis



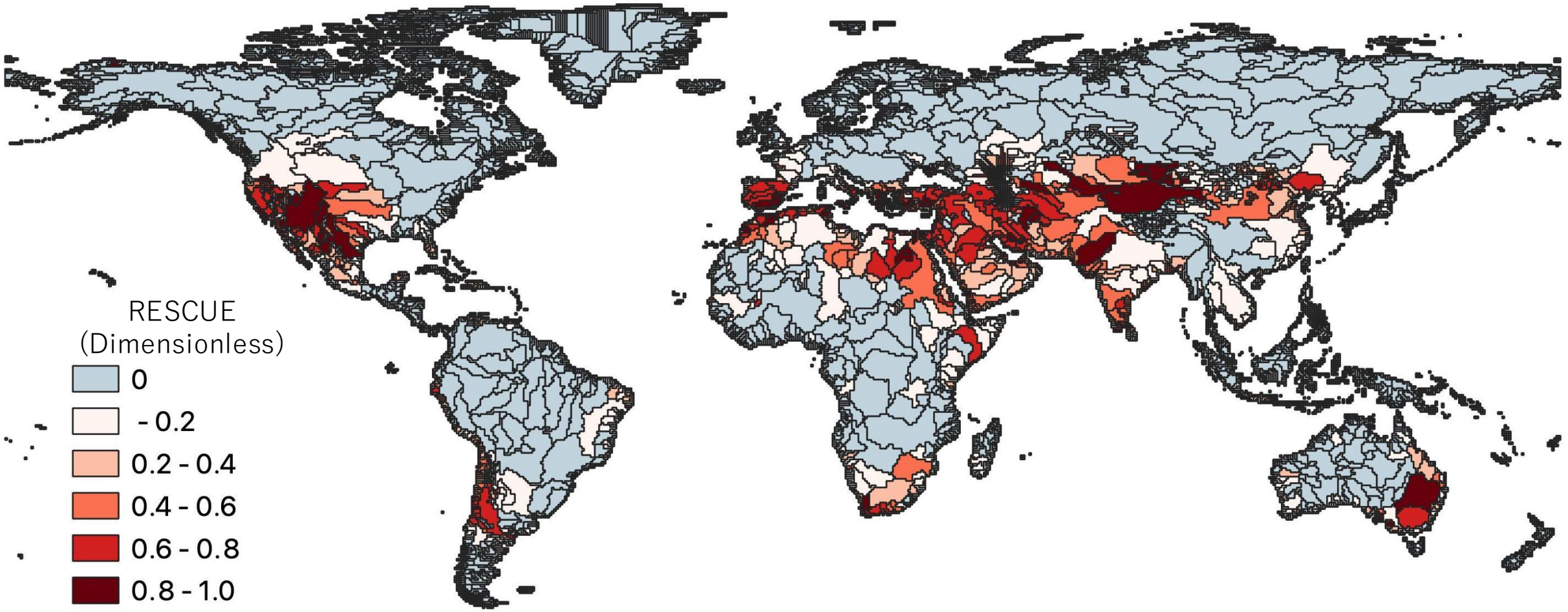


https://gmd.copernicus.org/articles/14/1037/2021/

WaterGAP 2.2d model

- Available water volume
- Human water consumption (irrigation, domestic, industrial, and livestock)
- Temporal coverage and resolution: monthly during 2000-2016
- Geographical coverage and resolution: global watersheds (around 11,000)

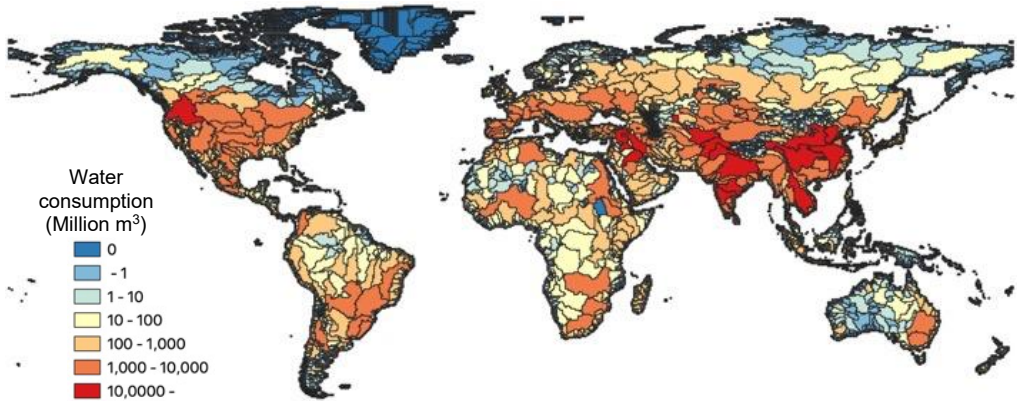
Geographical distribution of RESCUE indicator



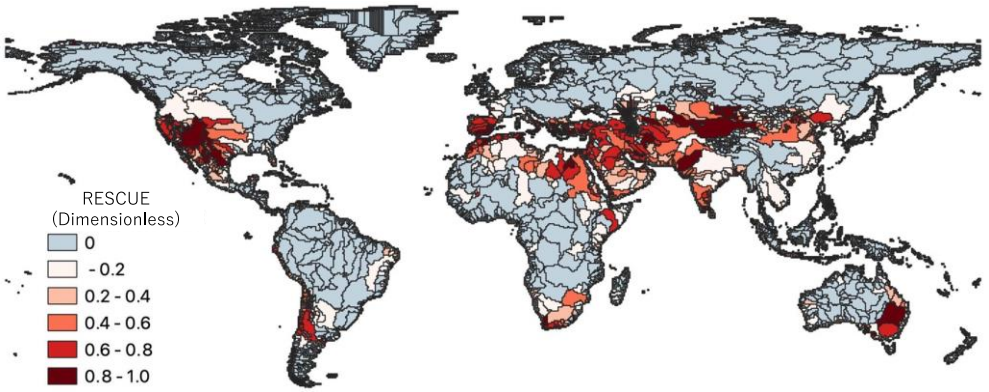
Around **67%** of total water consumption occurs in watersheds with potential impacts .

How does our current water consumption affect?

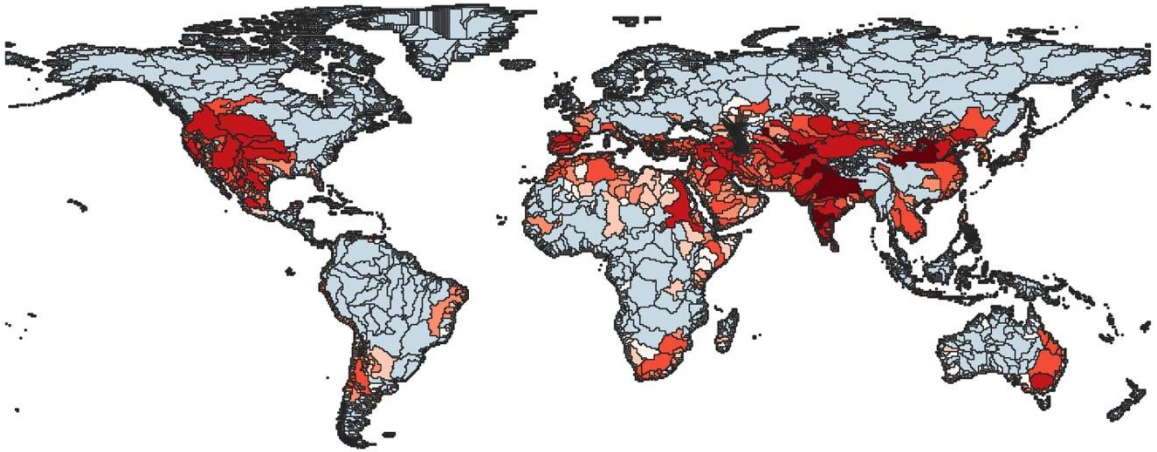
Water consumption volume (m^3)



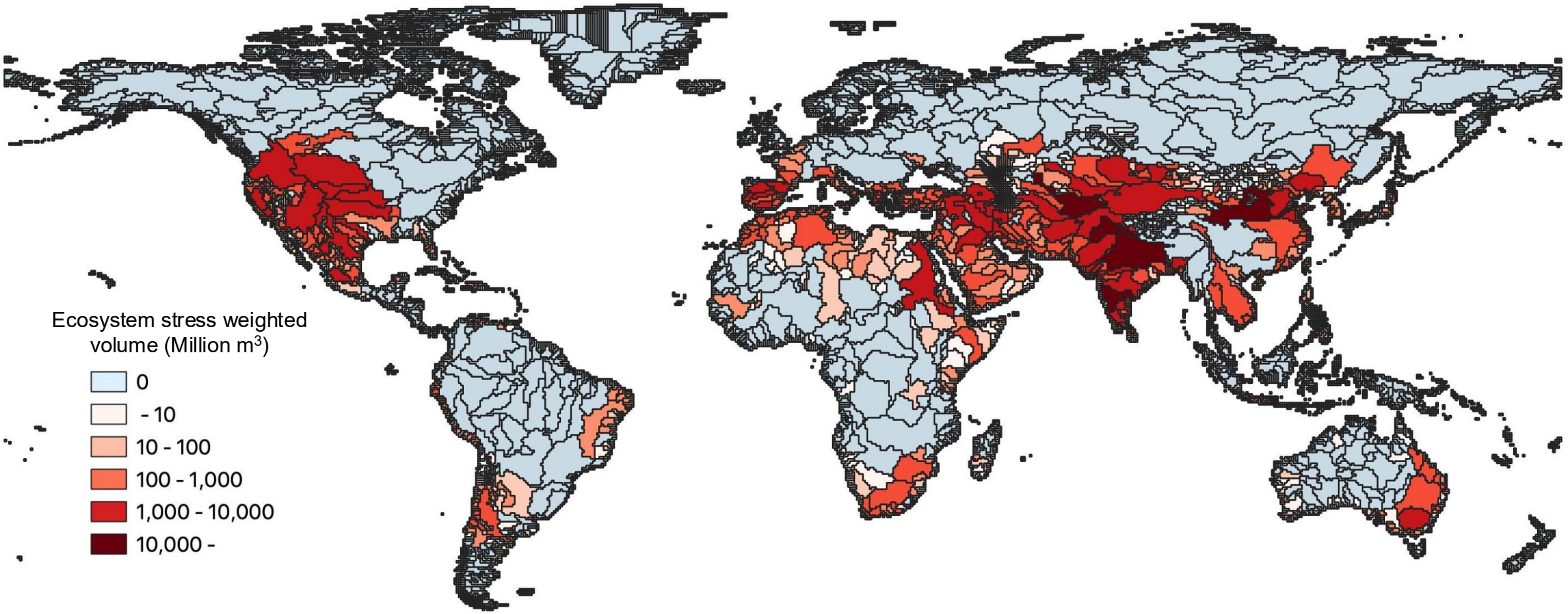
RESCUE indicator



Potential impacts on ecosystems by annual activities

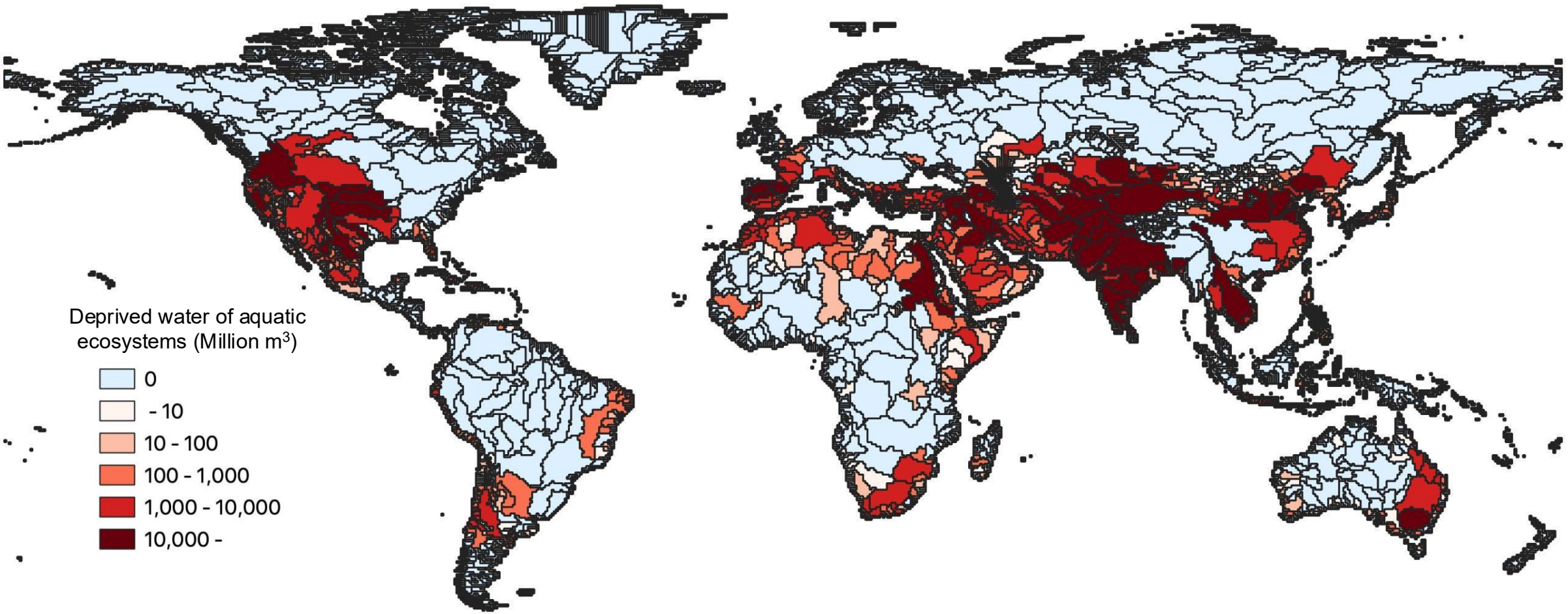


Results 1/2: stress-weighted volume



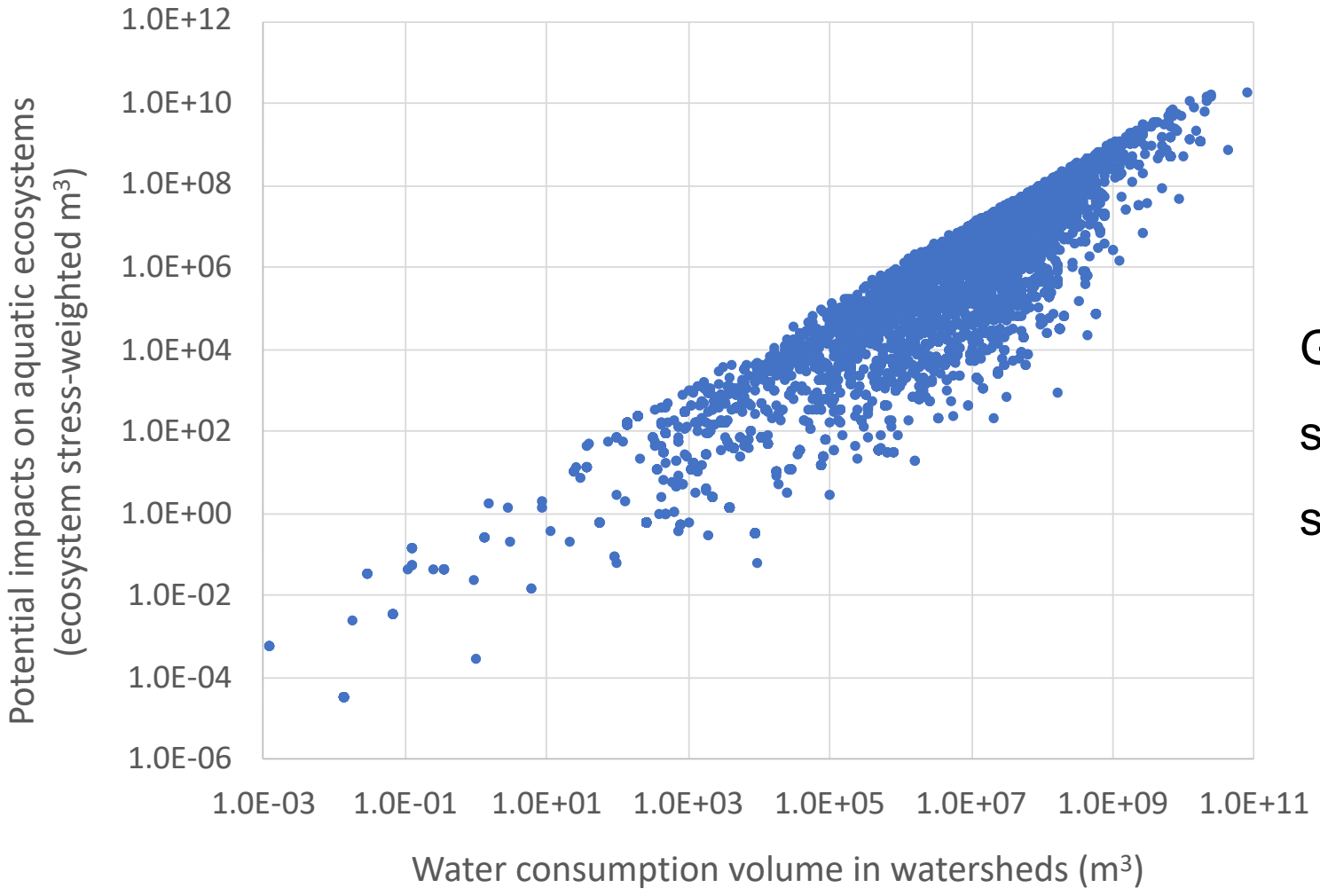
Globally, around **30%** of water requirement for aquatic species has been deprived.

Results 2/2: deprived volume



In total, **228** (billion m^3) is deprived of aquatic ecosystem requirement (**24.3%** of total water consumption).

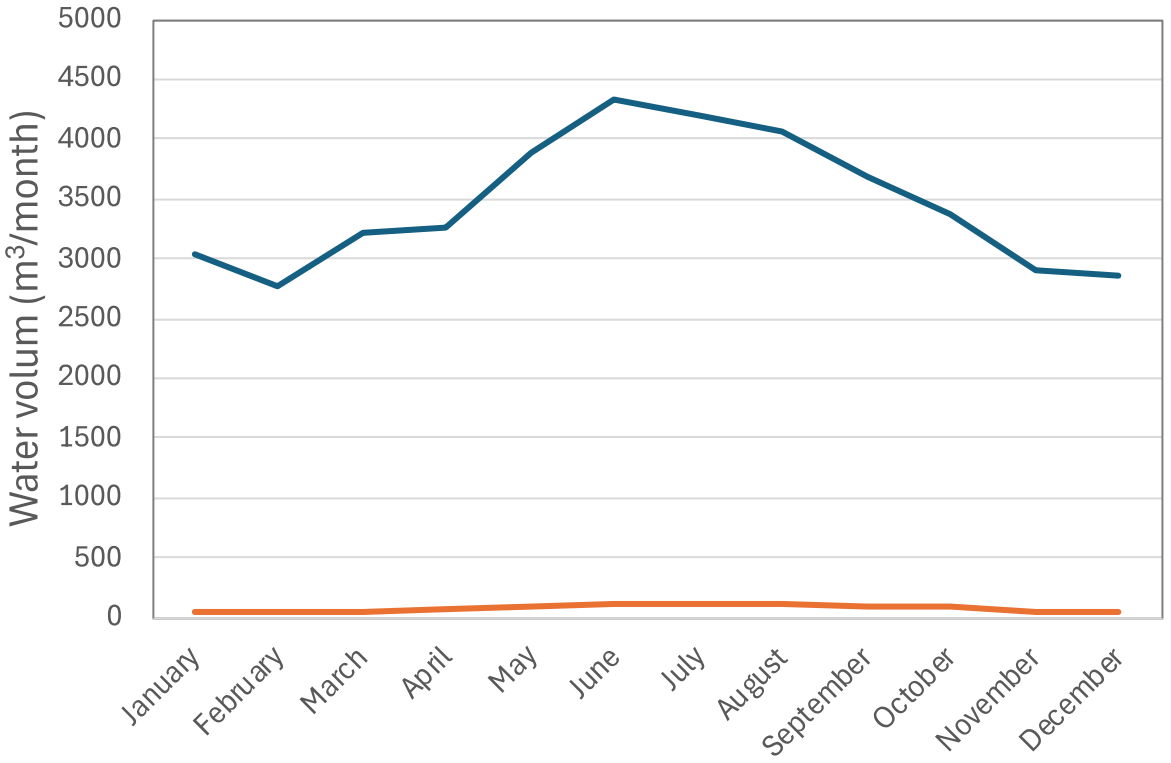
Do we consume water in stressed watersheds?



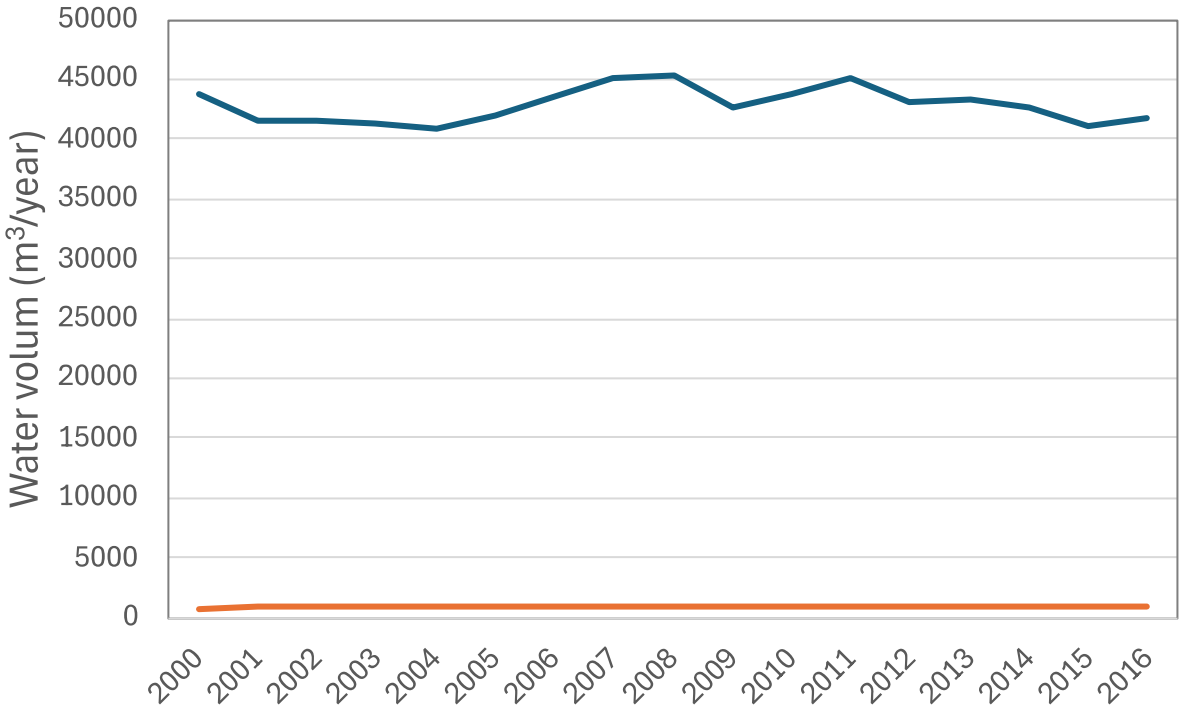
Generally linear tendancy, but some watersheds with large consumption show relatively lower stress.

Uncertainty of the assessment due to temporal variation

Monthly variation

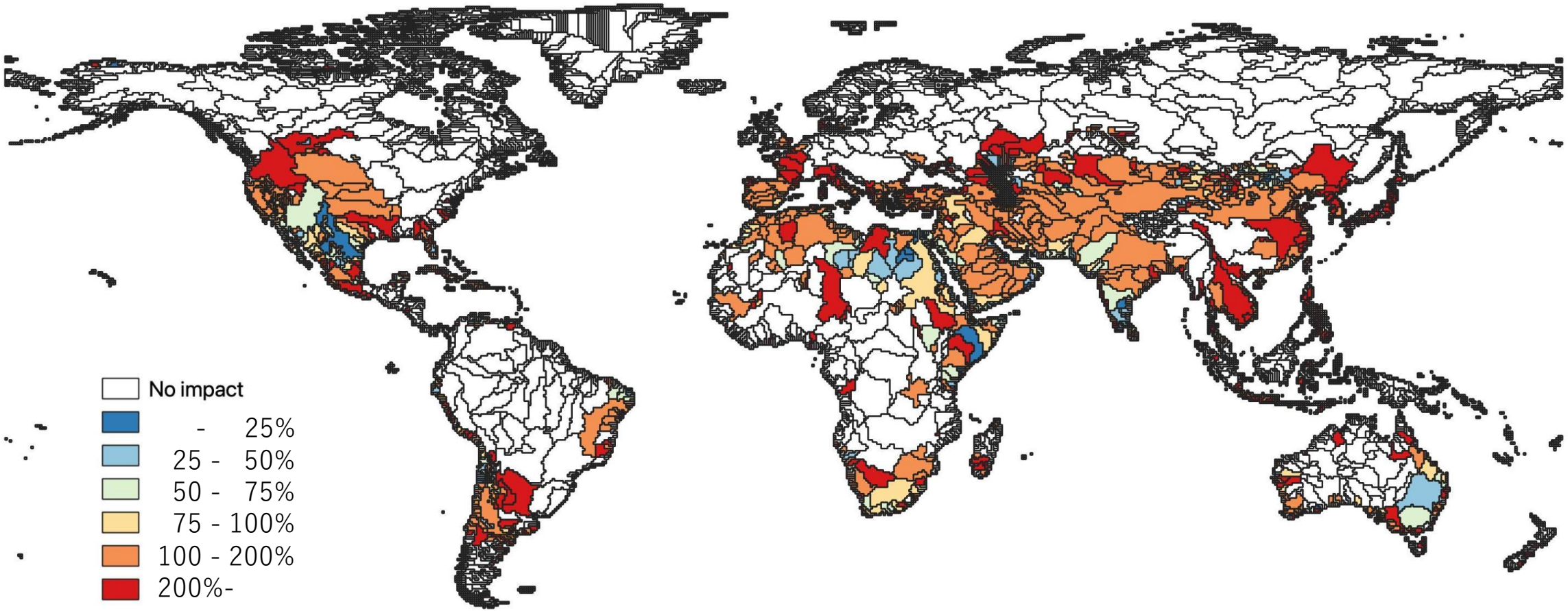


Yearly variation



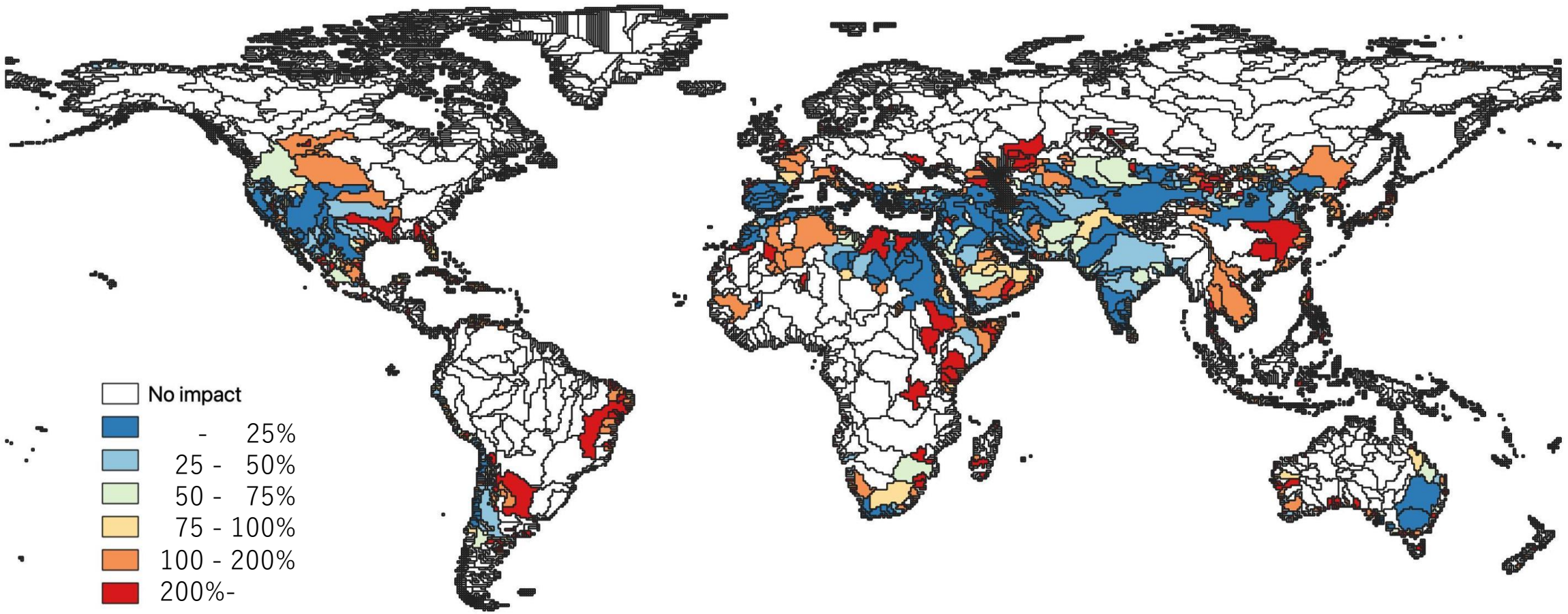
Water availability and consumption temporally varies.
How will it change the CFs?

Uncertainty: seasonal variation



Less than 50% of avg.: **15%**, 50-100%: **12%**, more than 100%: **74%** of total water consumption

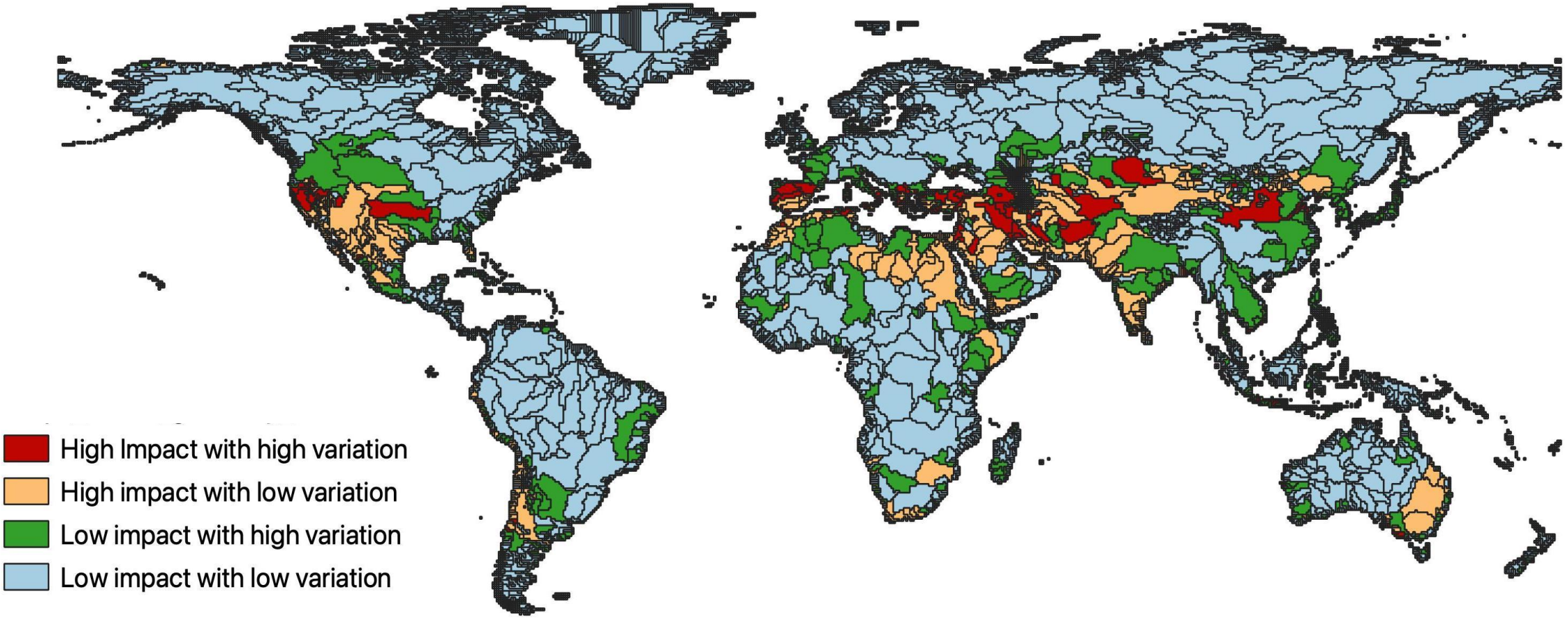
Uncertainty: yearly variation



Less than 50% of avg.: **65%**, 50-100%: **14%**, more than 100%: **21%** of total water consumption

Impact and uncertainty

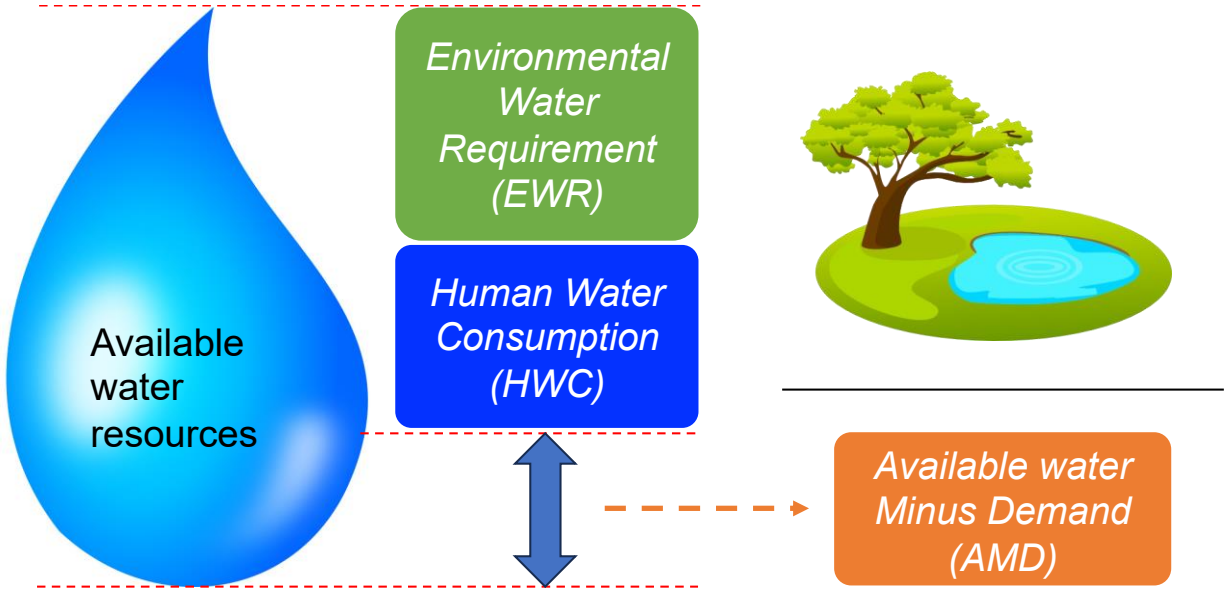
When we compare with global averag...



High impact & high variation: **16%**, high impact & low variation: **26%** of total water consumption

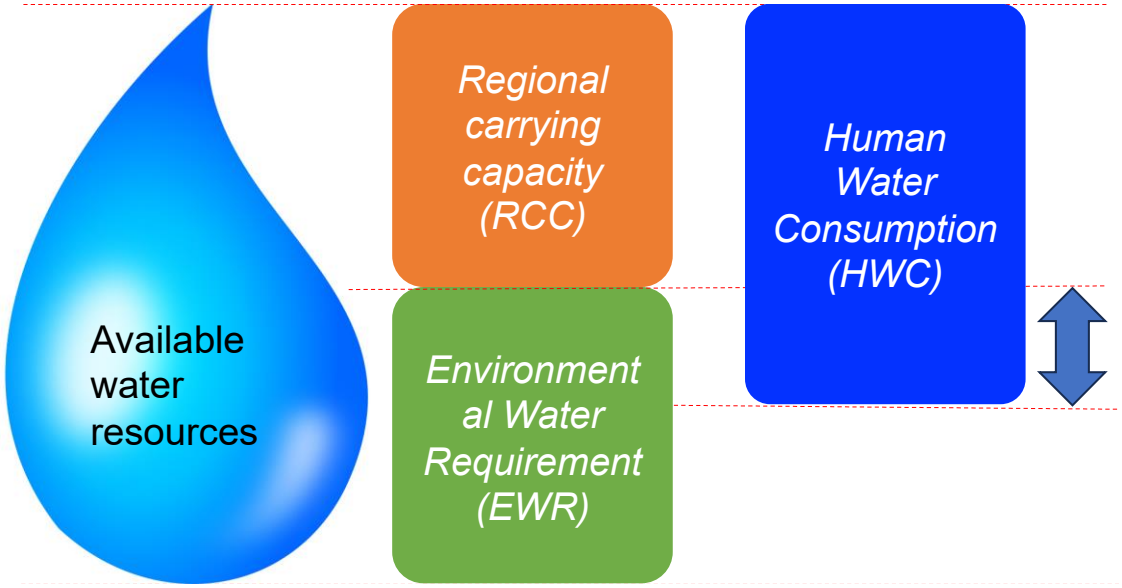
Uncertainty of the assessment due to temporal variation

Available WAter REmaining



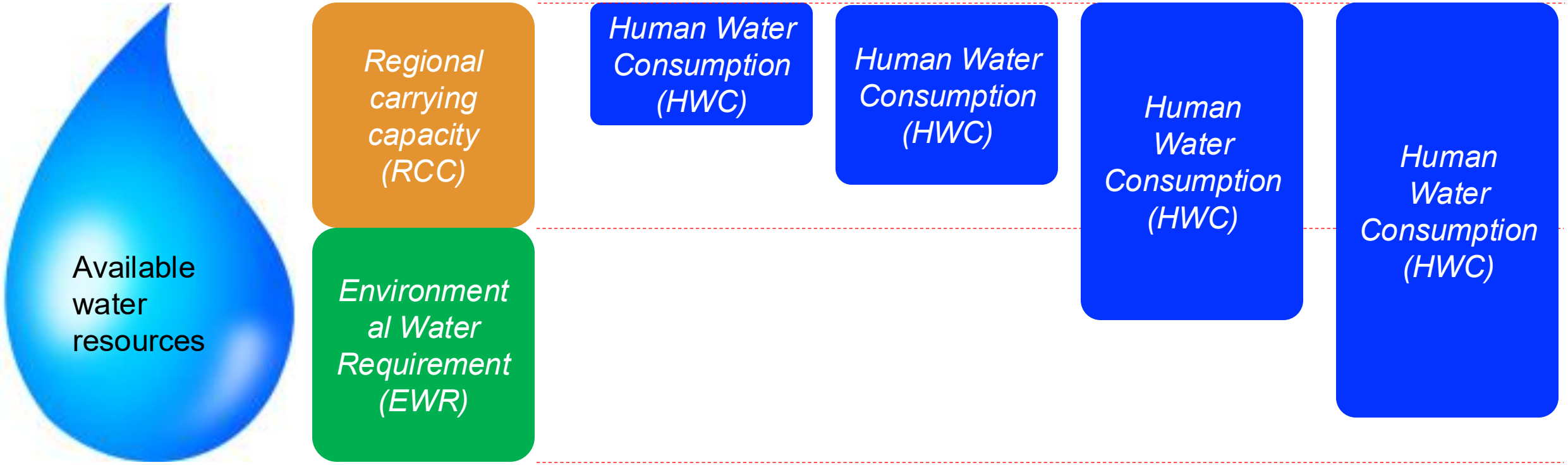
How much of water resources are remaninig after meeting the demand for ecosystems and human?

RESCUE



How much of water are we depriving of the ecosystem demand?

The meanings of the indicator in 4 cases: RESCUE

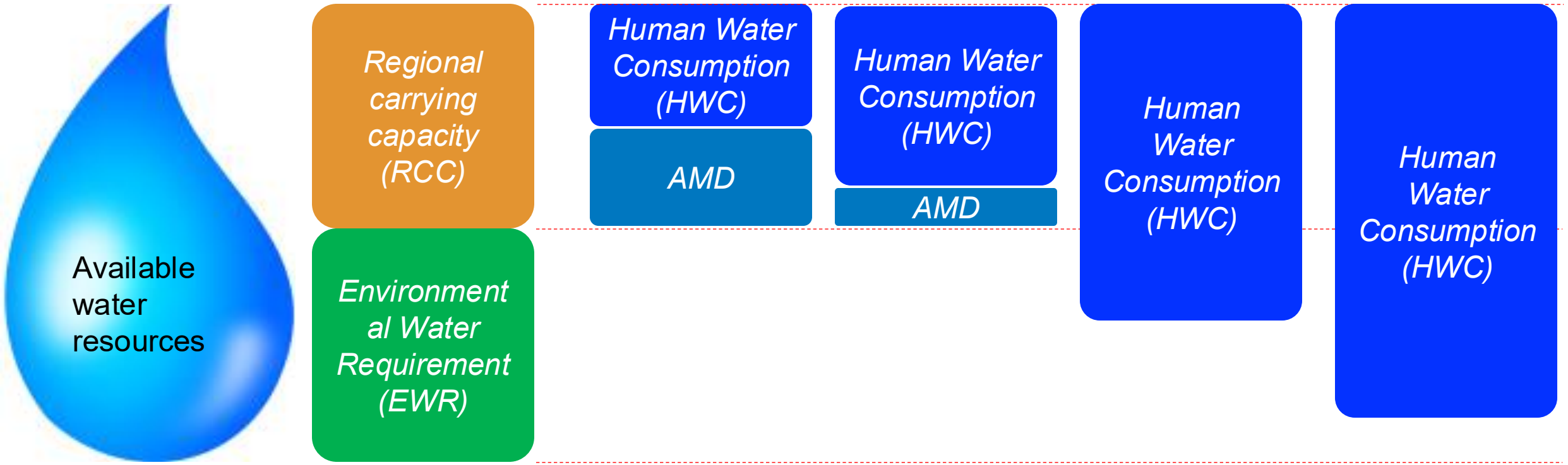


Case of RESCUE

No impact | No impact | Low impact | High impact

No discrimination

The meanings of the indicator in 4 cases: AWARE



Case of AWARE

Low impact

High impact

Max. (100)

No discrimination

Key takeaways

- RESCUE is a new ecosystem-specific midpoint indicator for LCA-based water footprint.
  - **Stress-weighted water volume**: potential stress on aquatic ecosystems
  - **Deprived water volume**: the magnitude of deprived water for ecosystems

- RESCUE and AWARE are complementary.
  - RESCUE can assess **the current potential impacts on aquatic ecosystem**.
  - AWARE can assess the **future pressure where not yet depriving** of ecosystem water requirement.

- Temporal variation of the CFs is relevant at some watersheds.
  - Inventory needs to be discriminated at **monthly level**.

شكرًا لك!

Merci!

Thank you!

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