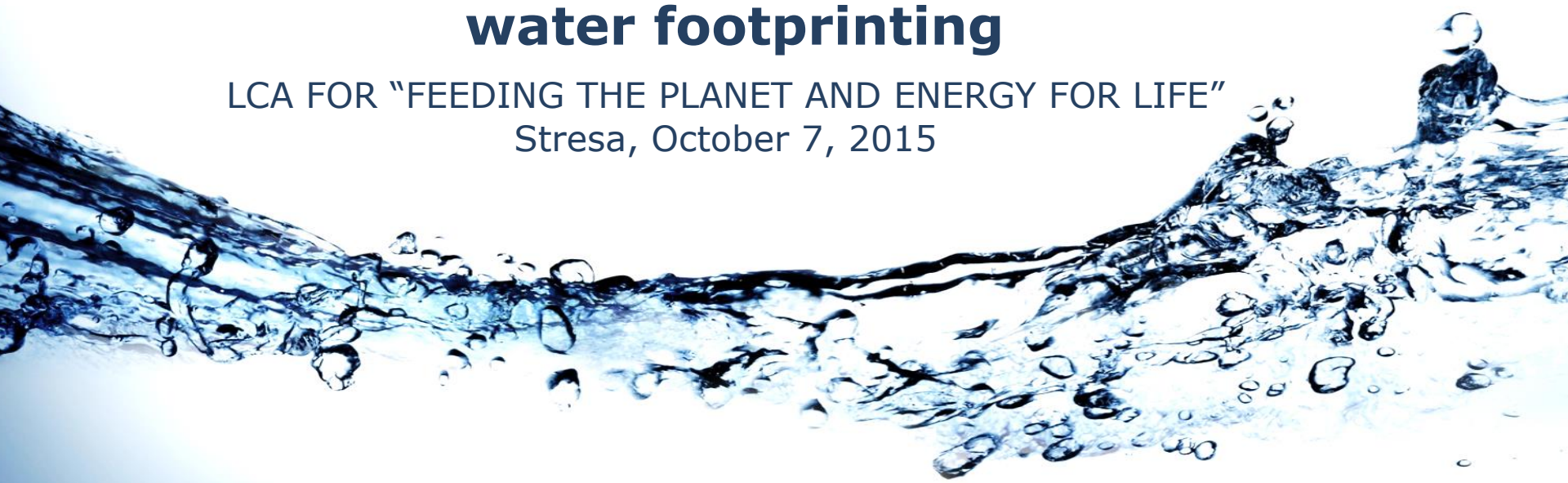
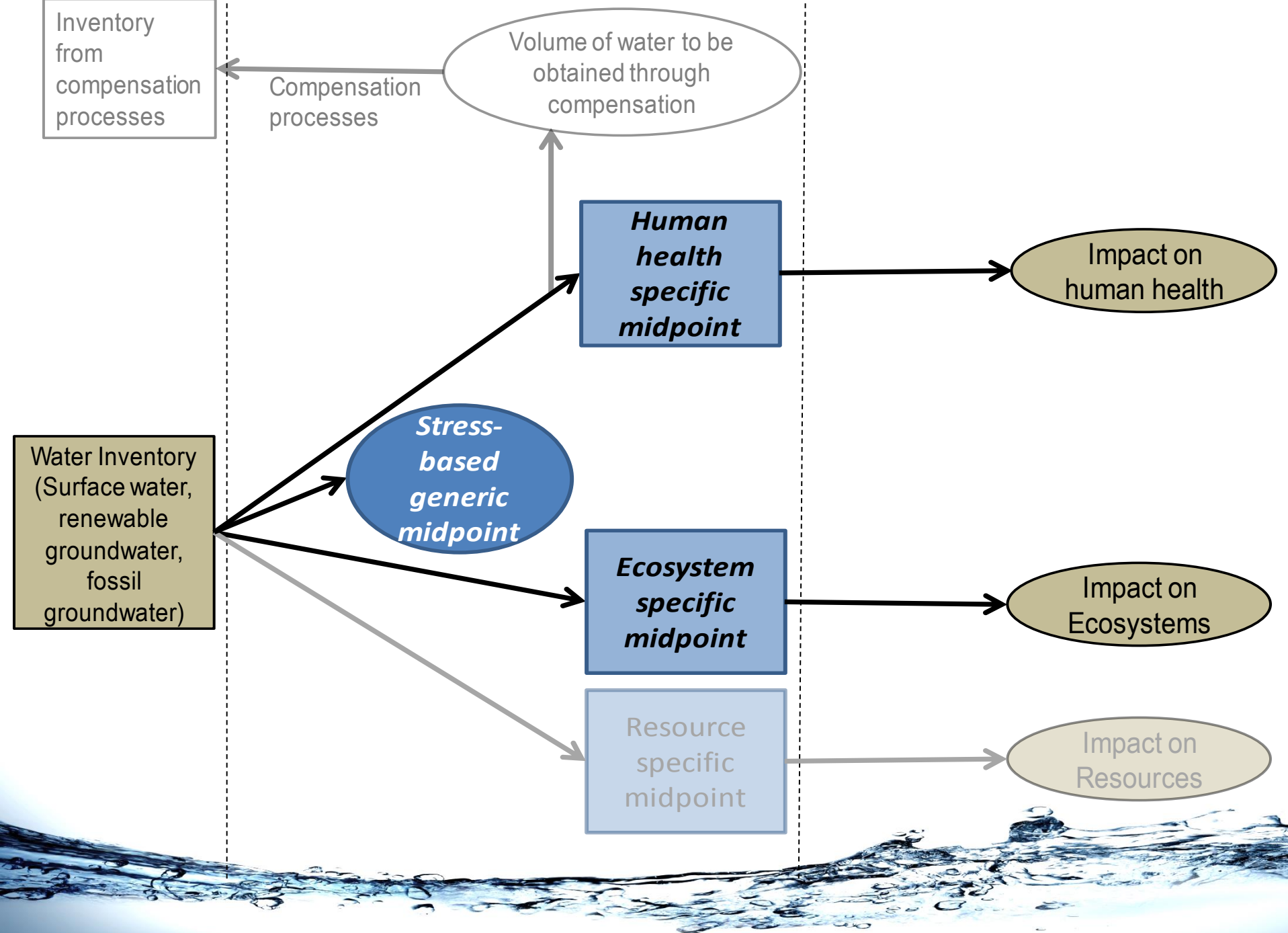


Outcome of WULCA harmonization activities: recommended characterization factors for water footprinting

LCA FOR "FEEDING THE PLANET AND ENERGY FOR LIFE"
Stresa, October 7, 2015



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GOAL: stress-based midpoint

- 💧 No common midpoint for human health and ecosystems
- 💧 Consistent (proportional) results cannot be obtained between a midpoint indicator and the endpoint indicators
- 💧 Desire to develop a stress-based midpoint indicator
 - Not necessarily correlated to HH and EQ
 - Simple single indicator to support decision
 - In compliance with ISO 14046

**Consensus work started in 2014 incl. 3 expert workshops
-> Recommended method at beginning of 2016**

The question the indicator aims to answer

“What is the *potential of depriving* another user of water (human *or* ecosystems) when consuming water in this area”



Water Scarcity / water stress

- 💧 Previous methods: mainly use-to-availability ratio
 - 💧 Withdrawal-to-availability (WTA)
 - 💧 Consumption-to-availability (CTA)
 - 💧 **Consensus: Demand-to-availability (DTA)**
 - 💧 Demand includes human (CTA) and ecosystem demand (EWR)
- 💧 Additionally: natural scarcity
 - 💧 Aridity
 - 💧 **Consensus: Area / Availability**
- 💧 Assess on monthly time step



2 options for the agreed indicator

Combine Demand-to-availability with scarcity (availability per area)

1

$$DTAx = \left[\frac{\text{Demand}}{\text{Availability}} \right] \times \left[\frac{\text{Area}}{\text{Availability}} \right]^x$$

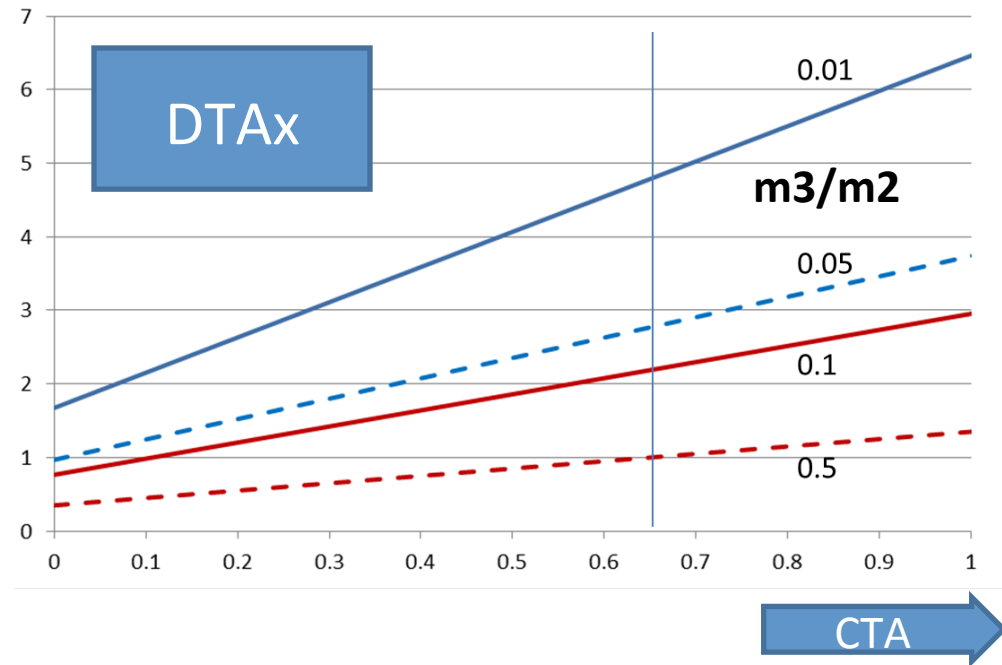
Equal contribution of relative and absolute availability: $X = 0.34$

***Demand = human consumption + environmental water requirement (EWR)**



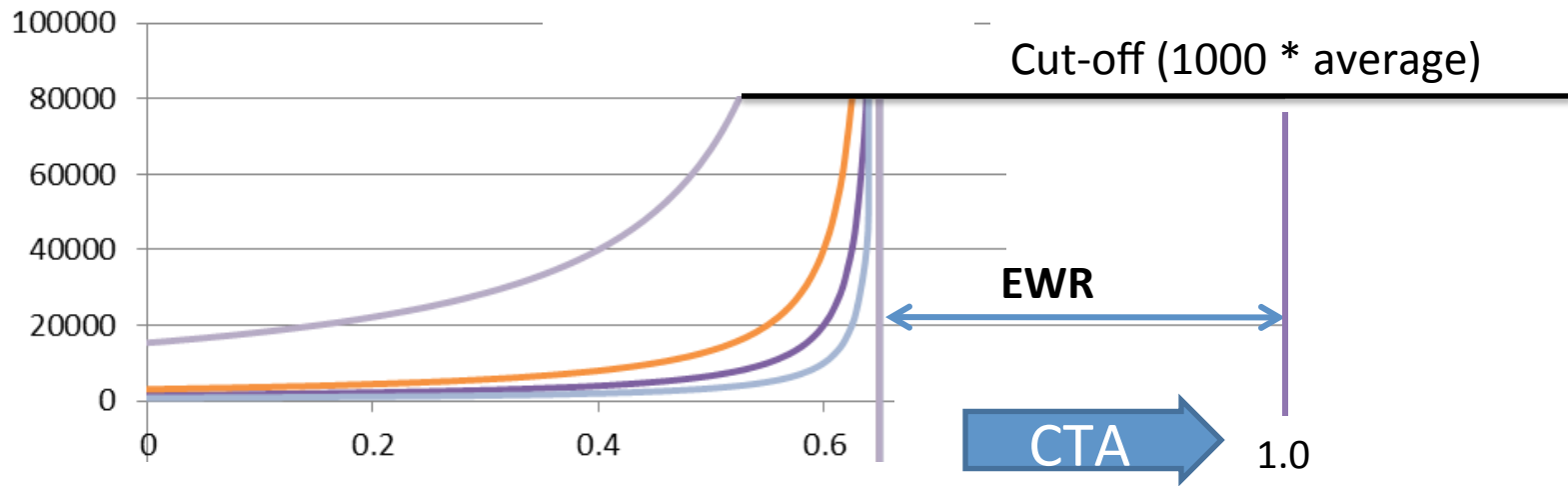
Functions

- **DTAx**
 - Linear relation to CTA
 - Area/A defines slope
 - EWR defines intersect



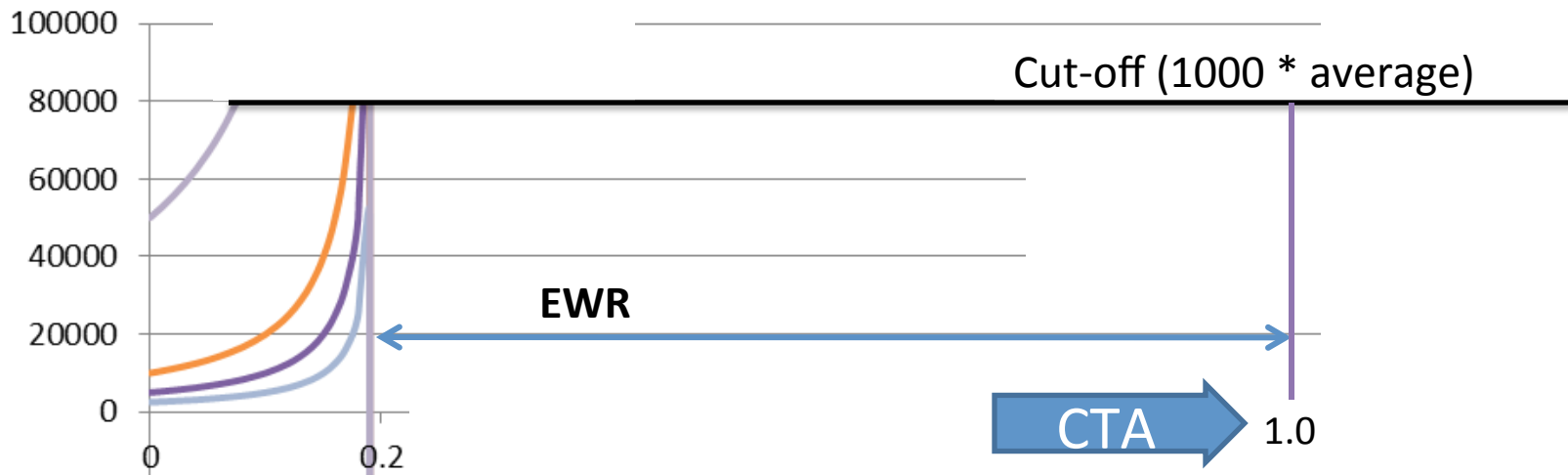
**EWR =
35%**

We used EWR ranging from 30-60%, based on Pastor et al. 2014



**EWR =
80%**

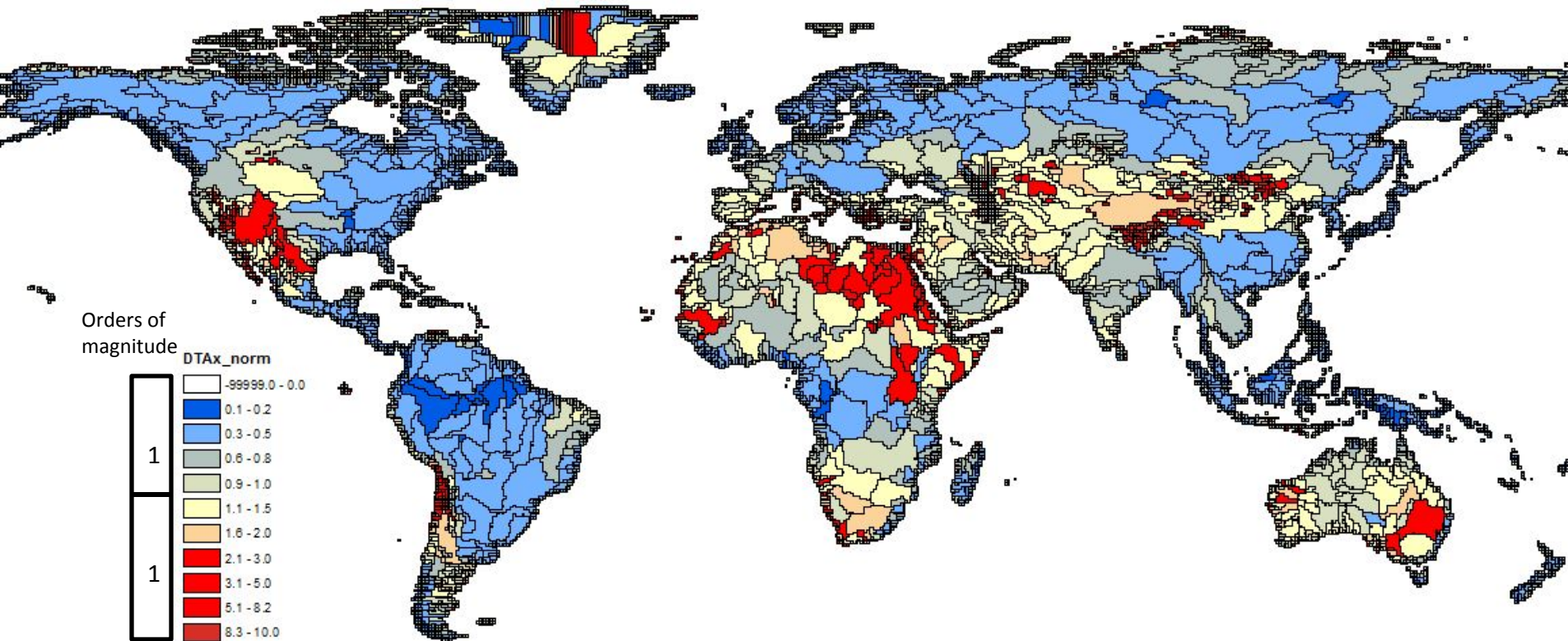
Richter et al. 2012 suggest 80% EWR



1

DTAx(0.34)

$$\text{DTAx} = \frac{\text{Demand}}{\text{Availability}} \times \left[\frac{\text{Area}}{\text{Availability}} \right]^{0.34}$$

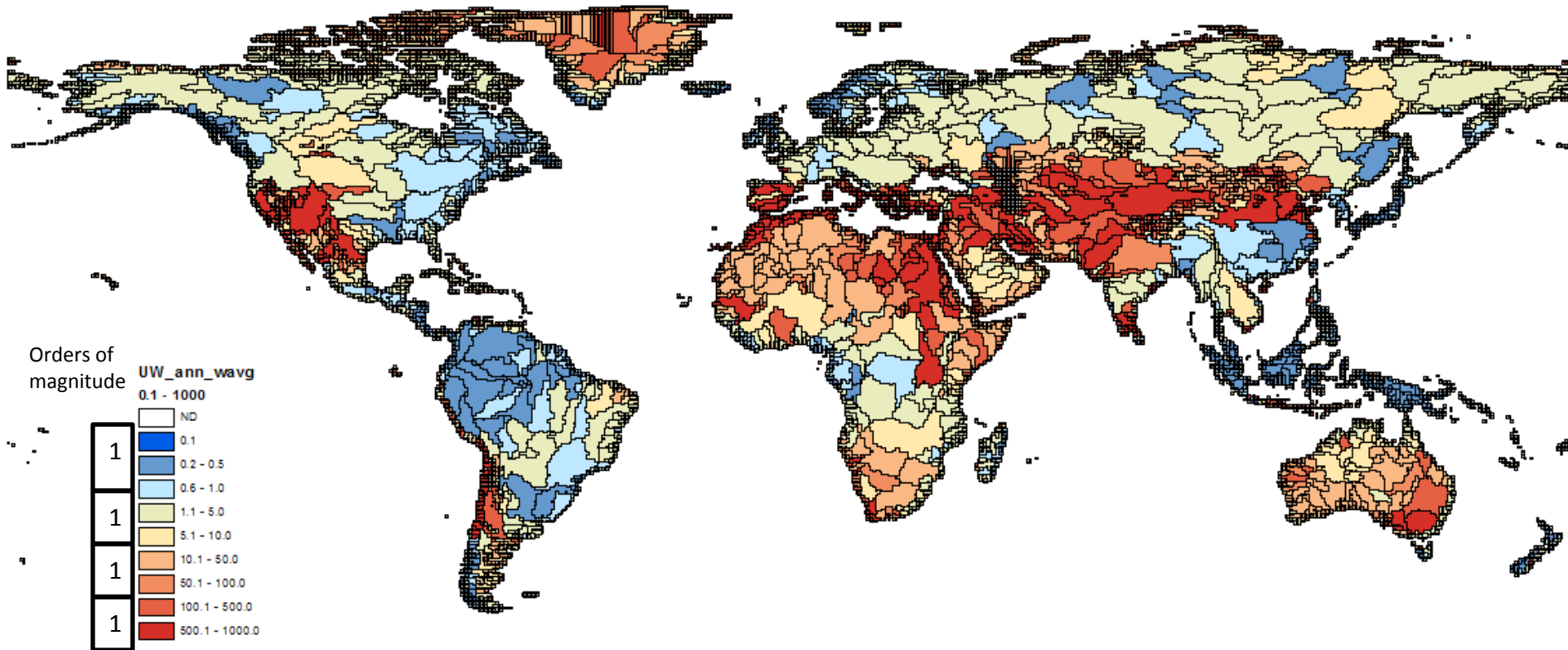


2

AWaRe – range 0.1 - 1000

$$= \frac{\text{Unused water (per area)}_{\text{world avg}}}{\text{Unused water (per area)}}$$

Unused water = Availability - Demand



Choices in both indicators

- Environmental water requirements implies a normative choice for “fair condition”
 - Varies from 30-60% in method chosen here
 - Aquatic ecosystems only (not terrestrial)
- Total human water consumption as demand



Evaluation Criteria

Criteria	1 - DTAx	2- AWaRe
Stakeholders acceptance (in p M P	Low (4/22)	Good (12/22)
Which one do we recommend?		
		replenishment)



No final recommendation yet

- 💧 Working group could not agree unanimously on single best method
 - 💧 Method developers & academics split between methods
 - 💧 Practitioners and experts favored AWARe
- 💧 Update of preliminary poll planned based on:
 - 💧 Draft paper and comments
 - 💧 Updated methods

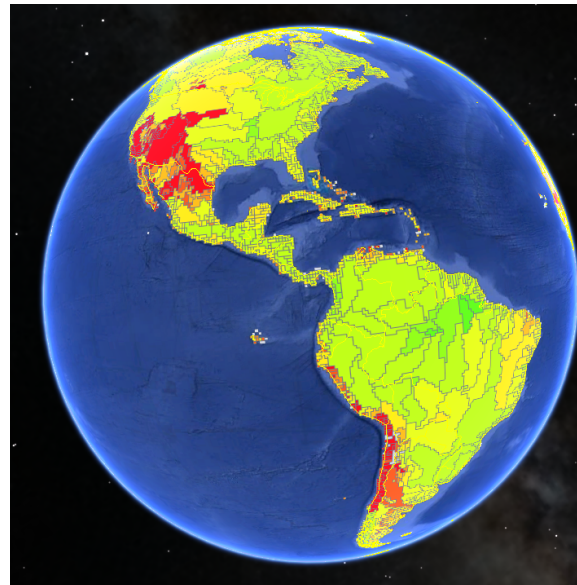


Preliminary recommendation

- 💧 The working group could not agree on single best method yet
 - 💧 Preliminary recommendation **AWaRe**
 - 💧 based on the larger agreement by stakeholder
 - 💧 All methods are still in draft status
 - 💧 **only use for testing**
- 💧 UNEP-SETAC harmonization efforts:
 - 💧 **AWaRe and DTAx** should be currently tested to support decision

Download characterization factors

- Preliminary characterization factors download for AWaRe and DTAx methods:
- <http://www.wulca-waterlca.org/project.html>
 - Available on country and watershed levels (google earth layer)



Regional / temporal resolution

- Indicators calculated at the **sub-basins scale**, available also at the **country scale**
 - Indicators calculated at the **monthly scale**, available also at the **annual scale**
- Aggregation made to represent agricultural use or industrial/domestic uses (one value for each, as well as a default value, aggregating both)



Next steps

- Address scaling of the indicator
 - Should it be directly applied?
- Apply indicators to common case study within UNEP-SETAC consensus work
- New poll on indicators among experts
- Pellston workshop in January 2016
 - Final recommendations (End of phase 1 of Flagship project)

www.wulca-waterlca.org



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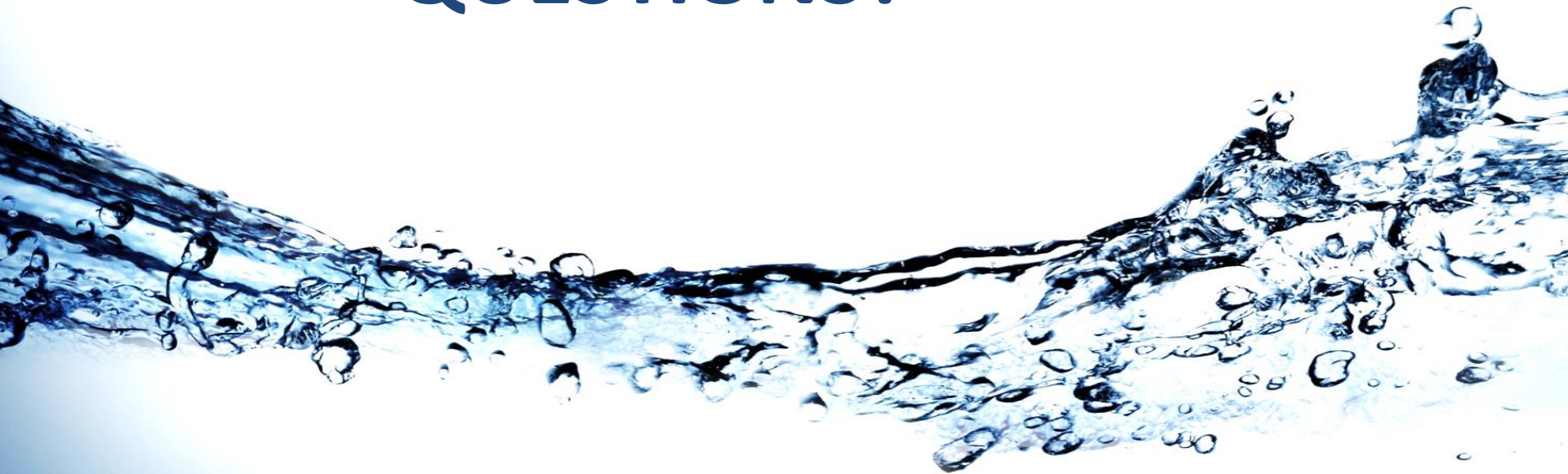




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INITIATIVE PROJECT



QUESTIONS?



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