



WULCA
A LIFE CYCLE
INITIATIVE PROJECT



WULCA EQ meeting

July 22nd, 2015

Content

- **Structure of the paper**
- **Some discussion points**
- **Next steps**



Structure of the paper

1. Introduction

- Midpoint: limitations of the scarcity indexes to describe the cause-effect mechanism that damage ecosystems
- Endpoint: lack of compatibility of existing methods to assess EQ damage (Bouchard et al, to be submitted soon)
- Objective: develop a framework to structure the EQ AoP within the water use impact category to overcome problems mentioned above



Structure of the paper

2. Materials & methods

- Cause-effect pathway coverage scheme: as comprehensive as possible. Includes description of impacts of water consumption, of water use, and of specific pathways of impact categories with strong link to water (eg, land use changes on the hydrological cycle). From all the pathways, the **focus of the paper is on water consumption**
- Structure of the CFs: justification of the approach selected based on a sequence of sub-factors that mechanistically links the LCI to the EQ AoP
- LCI and CF matrix framework for impacts of water consumption: justification of the adoption of matrices to structure CFs and calculate impacts of water consumption



Structure of the paper

2. Materials & methods

- LCI: how to express the inventory flow in matrices?
- Fate factor: definition, water compartments included in the matrix, meaning of the components of the matrix, spatial and temporal resolution. FF matrix now (data already available) and future improvements
- Exposure factor: definition, biodiversity potentially exposed (surface water bodies, soil, aquifers...), meaning of the components of the matrix. XF matrix now (data already available) and future improvements
- Effect factor: definition, biodiversity aspects included (richness, vulnerability...), non-linearities, meaning of the components of the matrix. EF matrix now (data already available) and future improvements
- Damage factor: definition, DF matrix now (data already available) and future improvements

Structure of the paper

3. Results

- Hypothetical example of applicability of the LCI and CF matrices

4. Discussion

- Change in paradigm
- Adaptability and applicability of the framework to the HH and Resource AoP
- Inclusion of information on water quality
- Fill in with existing methods
- ...



Some discussion points

- **Cause-effect pathway coverage scheme**
 - That would mean we « give up » the eutrophication and toxicity categories as individual categories and include them here as well ? → they are included in the scheme because the aim is to show all types of water use related impacts but they preserve their own impact categories and LCIA models
- **Structure of the CFs: justification of the approach selected based on a sequence of sub-factors that mechanistically links the LCI to the EQ AoP**
 - Which factors ? FF and EF? XF and DF?
- **LCI and CF matrix framework for impacts of water consumption: justification of the adoption of matrices to structure CFs and calculate impacts of water consumption**
 - LCA is a huge matrix calculation. What is the point that is new?



Some discussion points

- **Fate factor**
 - How to consider consumption for a short time period? (withdrawal and release in the same compartment)
 - Temporal resolution : time horizon? Steady-state? Inter-annual as well?
 - Where to include rainwater harvesting, inter-basin water transfers and other technical solutions? → there are 2 options:
 - Inclusion in the background information in the LCI through the water mix this allows eg having new inter-basin transfer pipes in the future that will change the water mix
 - Inclusion in the FF matrix: hard wire, less flexible structure, as if new pipe in the future FFs will have to be changed.

Some discussion points

- **Fate factor**
 - Will you consider precipitation as a compartment? In this case, your definition of water consumption as withdrawal - release might not work since ET is the consumption and the release → water balances to be done from each compartment's perspective (For ET, from a non-irrigated plant, soil's perspective is that water is withdrawn from the soil and a portion goes back to the soil (release). The remainder goes to the atmosphere (=consumption). From the atmosphere's perspective, there is only a new flow entering the compartment (release))
- **Exposure factor**
 - Identify the different strategies of biodiversity to adapt to a lack of water (displacement, pipes bring in water, other)
 - CpA of Francesca
- **Effect and damage factor**
 - Follow recommendations of the ongoing work of the biodiversity group (Francesca)

Next steps

- Identify relevant water compartments of the water cycle, their boundaries, flows from/to other compartments.
- Define spatial resolution of the compartments and provide guidance on the temporal resolution of the flows

Water compartment	Relevant literature	Description	Flows in and out
Soil	(FAO/IIASA/ISRIC/ISS-CAS/JRC 2009) Soil-water content . Includes... . Omissions/simplifications (eg, amount of soil layers?) ...	→in: .precipitation from atmosphere ... →out: .evaporation from soil ...
Shallow aquifer	(Fan et al 2013)	→in: infiltration and flows from upstream ... →out: artesian and other wells, exfiltration to surface waterbodies direct evaporation through soil, evapotranspiration through plants
Deep aquifer	TO BE COMPLETED	TO BE COMPLETED	In: infiltration from above Out: exfiltration
Surface water bodies	TO BE COMPLETED	TO BE COMPLETED	In: precipitation, surface run-off/melt, exfiltration Out: infiltration into soil, evaporation, plant uptake, human abstractions
...TO BE COMPLETED	TO BE COMPLETED	TO BE COMPLETED	TO BE COMPLETED

A dynamic splash of clear water against a light blue background, with numerous bubbles and droplets captured in mid-air.

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Thanks