Quantitative method comparison
OUTLINE

• Project description
• Paper A: Methodology overview
• Paper A: Selected results
• Paper B: Methodology overview
• Paper B: Selected results
• Outcome and conclusion

Presented as the case study in one hour...
Project description

Water Use in LCA (WULCA)
UNEP/SETAC Life Cycle Initiative group

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Thesis Project
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Case study application
Quantis
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Project Description- 2 papers

- **Part A**: identification of the relevant modeling choices analyzing the main differences between water impact assessment methods (scarcity, stress and impacts on human health), and assessing of their overall spatial variability and model uncertainty.

- **Part B**: illustration of applicability of water footprint methods through a case study on a load of laundry and discussion of methods consistency, reliability and limitations for decision making. Sensitivity analyses on the case study are chosen based on the relevant modeling choices identified from part A.
Part A: Methodology overview

• **Methods compared:**
  
  • **Scarcity:** Swiss Ecoscarcity, Pfister et al WSI, Boulay et al (simplified), WFN Blue water scarcity
  
  • **Stress:** Veolia Water Impact Index, Boulay et al.
  
  • **Human health:** Boulay et al (marginal and distribution), Motoshita et al (domestic and agriculture), Pfister et al.
Socio-economic parameter

Impact on human health (DALY)

Water Inventory

Scarcity / stress

User’s Competition

m³ deprived for domestic users
m³ deprived for agriculture
Water deprived for fisheries

Domestic deprivation effect factor
Agricultural deprivation effect factor
Fisheries deprivation effect factor

m³ deprived causing HHD

Scarcity/stress

m³ unavailable to other users
Part A: Methodology overview

Direct model comparisons- complete CF and individual components comparison for:

- Scarcity
- Stress
- Domestic HH impacts- socio economic and effect factors
- Agriculture HH impacts- socio economic and effect factors

Specific modeling choices:

- Temporal resolution scale
- Water source (ground, surface or not specified)
- Regional resolution scale
- Quality aspect
- Scarcity modeling choices (WTA vs CTA, model algorithm and data source)
- Human user deprived (fisheries, domestic, source of data)
- Inclusion of trade effect

Uncertainty associated with choice of model
Part A: Methodology overview

Analysis – for each comparison or choice analyzed:

- Difference (mean difference coefficient)
- Consistency of model response (Rank Correlation Coefficient)
- Geographical difference (Maps with difference)
Part A: Selected results
Difference between scarcity models

More results on comparison and modeling choice of scarcity indicators presented on Tuesday, 12:10, room Dochart
Part A: Selected results

Model difference between impacts from domestic deprivation
Part A: Selected results

Model difference between impacts from agricultural deprivation
Part B: Case Study

- Case study performed on one load of laundry
- Goal: illustrate how different water-related methods can be applied within a water footprint study of a laundry detergent and discuss their applicability
- Water footprint profile presented at midpoint and endpoint
- Details presented in the case study section (in half hour)
Outcome and conclusion

- Step towards harmonized methodology: understanding of important modeling choices and building blocks of indicators
- Case study in line with current ISO DIS 14046 on Water Footprint and applicability discussion
- Papers submitted on May 6th (timeline limited by PhD)
- WULCA to approve the papers as WULCA papers, and input from remaining model developers to occur during review process