Annual meeting
SETAC Europe, Basel, Switzerland
May 15\textsuperscript{th}, 2014
Outline

Introduction to WULCA
Framework and Consensual indicator Project

Work progress:
• Human Health subgroup
• Ecosystem subgroup
• Stress subgroup

Updates:
• activities, publications, website, press release
PRESENTATION OF PARTICIPANTS

Name
Organisation
Type of member
1- Introduction to WULCA
WULCA Working group

Water Use in LCA - International initiative for LCA (2007)

Goal

– Guide the scientific development of a **consensual and operational method** which shall be in line with both the **ISO Water Footprint Standard** and the **LCA principles**

– Provide **guidance to practitioners** and **researchers** in their understanding of comprehensive water footprinting.

– **Represent the scientific voice on water footprinting**
  
  • Provide scientific support and guidance to the ISO 14046 TR
  • Influence international initiatives, present in conferences and trainings
WULCA Working group

Water Use in LCA

Specific Task for the Flagship Project on LCIA Guidance on indicators:

Develop a consensual method for a subset of impact pathways assessing *water use in LCA* with priority to midpoint indicators and an area of protection showing sufficient scientific maturity.
Timeline and progress of work

Framework on how to assess water use in LCA (Bayart et al, 2010)

2008

Development of several new methods

2012

Quantitative comparison of existing methods (Boulay et al, 2014, under review)

2013

Development of a consensual method (2015)

Qualitative comparison of existing methods (Kounina et al, 2013)
WULCA Phase 3

• Transition into Phase 3 and official acceptance from Life Cycle Initiative in Spring 2013
• Identified in Glasgow as a Flagship category from the Global Guidance Flagship categories from UNEP SETAC Life Initiative

Anne-Marie Boulay
Project Manager, Chair

Stephan Pfister
Deputy Manager, Co-Chair

www.wulca-waterlca.org
Membership

Active (~25 members) approx. 1 day/month
• Involved in water-related methodology development or plan to be
• Contribute to the outcome and deliverables of the working group
• Included in all communications with respect to on-going work and progress

Expert (~35 members) approx. ½ day/month
• Knowledgeable on the topic of water and LCA
• Contribute their expert judgment to the outcome of the working group
• Included on communications that are relevant for their expertise

Observer (~35 members) no time investment
• Not necessarily an expert or do not have enough time to invest
• Kept informed of the progress of this working group and its deliverables

Sponsors (8-9 sponsoring companies)
• Provide 10’000 USD/yr for 2 years
• Individual from sponsoring companies can act as an active, expert or observer member
Sponsorship serve in financing industrial contribution to Mitacs (for fellowship), organize workshop, dissemination, WULCA participation to conference and events (e.g. SETAC, World Water Week, etc) and other operational costs (website, softwares, etc).
Link with ISO water footprint process

There is no official link between ISO DIS 14046 on Water footprint and WULCA, however:

- The convener and several delegates of the ISO working group are members of WULCA
- The work of WULCA has served as a basis in the development of the DIS
- The current DIS does not propose one specific method, but rather Principles, Requirements and Guidelines
- **WULCA can propose this method as the result of a consensus** which could be integrated in the next review of the standard
Link with LCIA global guidance flagship project
Goal of the flagship project

- Establish a consensual set of environmental impact category indicators
- For use in
  - Environmental product information schemes
  - Corporate reporting of multinational companies
  - International and/or national environmental policies
  - Common LCA work commissioned by governments and companies
General outline

- **Task 1: Scoping phase** (2012-2013)
  Establish short list of impact category indicators and themes for first and second stage
  → Yokohama 2012 & Glasgow 2013 scoping workshops
  → Stakeholder feedback at events worldwide

  → Pellston workshop 1 (with output being an agreement)

  → Pellston workshop 2

- **Task 4: Dissemination** (2018)
Global Guidance on LCIA indicators
Chairs: Olivier Jolliet and Rolf Frischknecht

- Consensus on global warming indicator
- Consensus on water use indicator
- Consensus on other indicators

WULCA
Chair: Anne-Marie Boulay
Co-chair: Stephan Pfister

- Education and training
- Scientific support to other initiatives and events (e.g. ISO TR 14073)
- Guidance to practitioners and researchers
Consensual indicator Project
Laying the ground work

Framework on how to assess water use in LCA

Development of several new methods

Quantitative comparison of existing methods

2009  2012  2013

Development of a consensual method

Qualitative comparison of existing methods
Consensual method: Methodology

**Step 1:** Agree on which point of the impact pathway to focus on and on its position in the midpoint-endpoint framework (midpoint, endpoint, AoP -specific or generic)

→ Write Goal and Scope document*
→ Write agreement and disagreements document*

**Step 2:** Using a review and comparison of existing models, develop a list of assessment elements and aspects to be considered in the resulting consensual model.

* Required from the Global Guidance on Indicator Project
Consensual method: Methodology

**Step 3**: For each element, identify which are mature for consensus and which ones require further research. For each of these categories, a decision is made on the preferred way to address these aspects.

→ *Consult with experts*

**Step 4**: Build a model prototype and calculate preliminary characterization factors worldwide.

**Step 5**: Evaluate the method prototype based on correlation with reported data, comparison with previous models and its application to selected case studies.
Consensual method: Methodology

**Step 6:** Elaborate the version 1.0 of the model

→ *Present to Pellston Workshop*

**Step 7:** Elaborate Guidance document intended for practitioners and disseminate the results

* Required from the Global Guidance on Indicator Project
## Time Planning

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</thead>
<tbody>
<tr>
<td>1- Indicator/framework</td>
<td>2- Modeling aspects</td>
<td>3- Aspects Consensus</td>
<td>4- Prototype</td>
<td>5- Evaluation</td>
<td>6- First Version</td>
<td>7- Document and dissemination</td>
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### Events:
- **SETAC BASEL** in May 2014
- **LCA FOOD** in October 2014
- **PELLESTON WORKSHOP** in June 2015
Working process

MEETINGS:
- One working meeting with all active members every month
- Sub-group meetings with specific task groups
- Minutes, videos and presentations available on the website

DECISION MAKING
- Performed during the meetings and registered in the minute
- If an absent member disagrees, an email needs to be sent to the chairs and the topic may be re-opened no later than the following meeting (with notice in advance)
Current General Framework

Inventory

Midpoint impacts

Endpoint Impacts

Inventory from compensation processes

Compensation processes

Volume of water unavailable to other users

Volume of water deprived causing health damages

Volume of water to be obtained through compensation

Impact on human health

Impact on Ecosystems

Impact on Resources

Water Inventory (Surface water, renewable groundwater, fossil groundwater)

Scarcity

Disruption of water balance

Socio-economic parameter

Water related diseases effect per m$^3$ deprived (dom)

Malnutrition effect per m$^3$ deprived (agri)

Malnutrition effect per m$^3$ deprived (fish)

Terrestrial species loss per m$^3$ deprived

Aquatic species loss per m$^3$ deprived

Loss of water quality

Overuse of renewable water bodies

Overuse of fossil groundwater depletion

Change in flow quantity

Change in groundwater table level

Change in flow regime

Disruption of water balance

Distribution of water deprivation

Water deprived for domestic users

Water deprived for agriculture

Water deprived for fisheries

Impact on human health

Impact on Ecosystems

Impact on Resources
Water Inventory (Surface water, renewable groundwater, fossil groundwater)

Volume of water to be obtained through compensation

- Human health specific midpoint
  - Impact on human health
- Ecosystem specific midpoint
  - Impact on Ecosystems
- Resource specific midpoint
  - Impact on Resources

Compensation processes

Inventory from compensation processes

Human health specific midpoint

Stress-based generic midpoint
Generic stress-based midpoint

- No true common midpoint for human health and ecosystems

- It is not possible to obtain a midpoint indicator that provides a consistent (proportional) result with the endpoint indicators
  - Regionalization affects both midpoint and endpoint models

- Desire to develop a stress-based indicator
  - not necessarily correlated to HH and EQ,
  - Provides a simple single indicator to support decision
  - In compliance with ISO 14046

Update on progress from this group presented at LCA Food, San Francisco, October 2014
Generic stress-based midpoint

\[
\text{Scarcity}_{\text{Anthropocentric}} = F_n\left(\frac{\text{human water use}}{\text{water availability}}\right)
\]

\[
\text{Scarcity}_{\text{Ecocentric}} = F_n\left(\frac{\text{human water use}}{\text{water availability} - \text{ecosystem water requirement}}\right)
\]

\[
\text{Scarcity}_{\text{Hydrocentric}} = F_n\left(\frac{\text{Total water demand}}{\text{Renewable water availability}}\right)
\]
Anthropocentric scarcity

Ecocentric scarcity

Rank correlation: 99%
Hydrocentric scarcity approach

Rank correlation with anthropo- or ecocentric: 84-85%
Generic stress-based midpoint

Work to be pursued:

- Research on better data source for Ecosystem water demand (aquatic and terrestrial)
- Possible inclusion of green water
- Neutrality between human demand and ecosystem demand (actual? pristine?)
- Modeling function, limits and thresholds
- Temporal and geographical resolution
Questions, comments, feedbacks on these preliminary results?
## Human Health

### List of modeling aspects and choices

<table>
<thead>
<tr>
<th>Fate (Scarcity)</th>
<th>Exposure</th>
<th>Effect</th>
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<tbody>
<tr>
<td>1. use to availability ratio</td>
<td>9. Domestic user deprivation</td>
<td>15. Malnutrition</td>
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<tr>
<td>2. indicator modeling</td>
<td>10. Agricultural water deprivation</td>
<td>16. Water-related diseases</td>
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<tr>
<td>3. upper and lower values</td>
<td>11. Fisheries water deprivation</td>
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<td>4. Surface and groundwater</td>
<td>12. Socio-economic parameter</td>
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<td>5. Quality integration</td>
<td>13. Trade effect</td>
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<td>7. Temporal resolution</td>
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<td>8. Source of data</td>
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Questions, comments, feedbacks on human health modeling?
Identification of the impact pathways leading to Ecosystem Quality within a consistent framework

Ongoing work on overlaying existing methods, identifying gaps, and proposing characterisation structure

Set the mathematical framework through consistent intermediary parameters

In depth comparison of identified model with quantitative results
Impacts pathways for water works

- Consumptive use of water
  - Groundwater consumption
  - Surface water consumption

- Water works (dams, reservoirs, canals, etc.)
  - Watershed or downstream surface water flow regime alteration
  - Groundwater table change
  - Saline intrusion
  - Upstream surface water flow regime alteration
  - Water flow disruption

- (Physical) degradative use of water
  - Thermic pollution of water

- Modification of average flow rate, volume, area or depth of a water body.
  - Alteration of flow variability, and drought or flood intensity or occurrence

- Habitats modifications
  - Artificial barrier to migration

- Water quality alteration
  - Surface water temperature alteration

- Impacts on terrestrial ecosystems (plants, worms, mammals, etc.)
- Impacts on aquatic ecosystems (plants, fishes, etc.)
Impacts pathways for physical degradation of water

Consumptive use of water
- Groundwater consumption
- Surface water consumption

Groundwater consumption
- Soil moisture change
- Groundwater table change
- Watershed or downstream surface water flow regime alteration
- Saline intrusion
- Upstream surface water flow regime alteration
- Water flow disruption

Water works (dams, reservoir, canals, etc.)

(Physical) degradative use of water
- Thermic pollution of water

Constrained water consumption
- Habitat modifications
- Artificial barrier to migration

Impacts on terrestrial ecosystems (plants, worms, mammals, etc.)
- Impacts on aquatic ecosystems (plants, fishes, etc.)

Water quality alteration
- Surface water temperature alteration

Modifications of average flow rate, volume, area, or depth of a water body.
- Alteration of flow variability, and drought or flood intensity or occurrence

Impacts pathways for physical degradation of water
Questions, comments, feedbacks on ecosystem impact pathways?
Updates: Activities

Recent

- UNEP Water Footprint training events (Botswana, Malaysia, South Africa)

Up-coming

- Hydro-Vision (July, Nashville)
- World Water Week (September, Stockholm)
- LCA Food & LCA XIV (October, San Francisco)
Updates: Publications

Publications

- Quantitative comparison papers (A and B) re-submitted: under review
- LCA Food 2014: Progress paper on scarcity indicator
Updates

Website and intranet

New Design, go visit: www.wulca-waterlca.org

Press release – April 28th

Canadian news feed and Sponsors networks

Eight industry leaders partner with WULCA experts to develop a consensual method to assess water use in life cycle assessment

MONTRÉAL, April 28, 2014 /CNW Telbec/- Water use and freshwater depletion are key global issues. The United Nations Water Programme reports that water scarcity already affects almost every continent and over 40 percent of the people on Earth. Clear and consensual methods to quantify water footprints are needed to meet this global challenge. WULCA experts and eight industry leaders have therefore joined forces to develop a consistent approach to address the potential environmental impacts of water use throughout the life cycle of products and processes, taking into account resource extraction, processing, manufacturing, transportation, use and final disposal or treatment.

WULCA is an international working group that brings together one hundred experts from 21 countries focused on water use impact assessment from a life cycle perspective. Founded in August 2007 under the auspices of the United Nations Environment Programme (UNEP)/Society for Environmental Toxicology and Chemistry (SETAC)’s Life Cycle Initiative, WULCA’s main goal is to provide practitioners from industry and academia with a consensual and harmonized framework to assess, compare and disclose the environmental performances of products and operations as they relate to freshwater use. Key method developers and stakeholders have been called upon to take part in this international collaborative effort.
THANK YOU FOR YOUR PARTICIPATION