

Application and interpretation of the new life cycle impact assessment methodology IMPACT World + that considers regionalisation

Cécile Bulle, École Polytechnique of Montreal, Canada
Manuele Margni, CIRAI, Canada
Olivier Jolliet, University of Michigan, USA
Sebastien Humbert, Quantis, Switzerland
Ralph Rosenbaum, IRSTEA, France

Abstract

Most of the impacts modelled in life cycle impact assessment (LCIA) are regional or local impacts. However, LCIA methodologies currently offer generic characterization factors (CFs), not allowing to account for the spatial variability of impacts. Some LCIA methodologies have partially addressed regionalisation (IMPACT 2002+, ReCiPe, LIME, or LUCAS), but all only cover a restricted region of the world. When characterizing a life cycle inventory over a global economy with e.g. a European LCIA methodology, it implies the underlying assumption that all the emissions occur within the reference region of that methodology, e.g. in Europe, which is not necessarily a better assumption than applying global or generic CFs. This short course aims to provide an overview how to address regionalisation when assessing global scale life cycle inventories.

This short course is strongly based on the outcomes from the development of IMPACT World + globally regionalised LCIA method. The following elements will be treated during the course:

- Modeling spatially differentiated characterisation factors (CFs);
- Choosing the most relevant geographical scale per impact category (toxic impacts, eutrophication, acidification, respiratory impacts, water use, land use);
- Archetypes vs. geo-referenced approach;
- Weighting based aggregation upon current geographical emission distribution or emission proxies to lower resolution scale: country, sub-continent or global generic;
- Determine uncertainty and variability of characterization factors;
- Examples of application and interpretation: how to apply spatially differentiated CFs for a practitioner

Finally, this short course will give a large part to the application of the methodology to different case studies and interpretation of the results.

Course objectives

The participant will be able to:

- understand the midpoint-damage framework
- understand the major limitations of current LCIA methodologies regarding regionalization
- understand how spatially differentiated or archetype-based CFs are calculated
- correctly interpret the relevance and the uncertainty associated with regional CFs

- perform a LCIA addressing regionalization of available LCI
- correctly interpret the results of the application to different case studies

Course level

Intermediate