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T2 Global ecosystem service flows

Identifying the global impacts of land use on ecosystem services in the life cycle of a product

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The life cycle assessment (LCA) method, used to assess the environmental burden of a product, relies on representing its whole production system, with the processes that compose it and their inputs and outputs. An input that potentially has strong impacts on the provision of ecosystem services worldwide is land use. Methods have been developed recently to assess this impact in LCA. However, as they do not assess changes in ecosystem services' provision based on actual conditions, they do not take into account the rebound-effect of these changes and the indirect land use changes induced through the disruption of global services flows. Hence, it is not possible to evaluate how environmental burdens associated with land use are shifted from a location to another, when the use of a resource in a given place ultimately causes a pressure on land and populations elsewhere. In this study, we propose a revision of existing LCA cause-effect chains to assess land use impacts on ecosystem services on the basis of an actual reference state. As it relates to the modelling of land use mechanisms and the concepts of ecosystem services' balance and land scarcity, its design tackles several problematic that are relevant outside the scope of LCA too. To evaluate the potential impacts of land use in globalised production systems on the provision of ecosystem services to the World's populations, a global multi-scale integrated model for ecosystem services, based on a multi-region input-output rationale, is applied in the framework of life cycle impact assessment.

Keywords: Land use, Life cycle assessment, Integrated model, Multi-scale, Multi-regional input-output