

A life cycle assessment framework combining nutritional and environmental health impacts of diet: a case study on milk - DTU Orbit (09/11/2017)

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Purpose While there has been considerable effort to understand the environmental impact of a food or diet, nutritional effects are not usually included in food-related life cycle assessment (LCA).

Methods We developed a novel Combined Nutritional and Environmental Life Cycle Assessment (CONE-LCA) framework that evaluates and compares in parallel the environmental and nutritional effects of foods or diets. We applied this framework to assess human health impacts, expressed in Disability Adjusted Life Years (DALYs), in a proof-of-concept case study that investigated the environmental and nutritional human health effects associated with the addition of one serving of fluid milk to the present average adult US diet. Epidemiology-based nutritional impacts and benefits linked to milk intake, such as colorectal cancer, stroke, and prostate cancer, were compared to selected environmental impacts traditionally considered in LCA (global warming and particulate matter) carried to a human health endpoint.

Results and discussion Considering potential human health effects related to global warming, particulate matter, and nutrition, within the context of this study, findings suggest that adding one serving of milk to the current average diet could result in a health benefit for American adults, assuming that existing foods associated with substantial health benefits are not substituted, such as fruits and vegetables. The net health benefit is further increased when considering an iso-caloric substitution of less healthy foods (sugar-sweetened beverages). Further studies are needed to test whether this conclusion holds within a more comprehensive assessment of environmental and nutritional health impacts.

Conclusions This case study provides the first quantitative epidemiology-based estimate of the complements and trade-offs between nutrition and environment human health burden expressed in DALYs, pioneering the infancy of a new approach in LCA. We recommend further testing of this CONE-LCA approach for other food items and diets, especially when making recommendations about sustainable diets and food choices.

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Authors: Stylianou, K. S. (Ekstern), Heller, M. C. (Ekstern), Fulgoni III, V. L. (Ekstern), Ernstoff, A. S. (Intern), Keoleian, G. A. (Ekstern), Jolliet, O. (Ekstern)

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