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From food to energy: a spatialization continuum to assess the environmental impacts of collective biogas plants

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An issue: Spatial issues for Territorially Anchored Systems (TAS) LCA

LCA presents limits to assess environmental performances of Territorially Anchored Systems (TAS). Indeed, such systems show many interactions with the territories/regions where they take place and operate. The framework of LCA is not suitable to use System Spatial Characteristics (SSC).

A solution: the spatialization continuum concept

The spatialization continuum is an innovating conceptual framework which allows the consideration of SSC throughout the LCA approach. It consists in the account of the interactions between the studied system and the territory where it takes place and operates in a homogenous and continuous way all over the four LCA methodological steps. For each LCA methodological step, the practitioner should integrate required SSC: the consideration of the needs and constraints of the territory to define the most relevant function of the system, the localization of the life cycle stages, spatialized characterization factors and therefore impacts results.

LCA of a collective biogas plant – A case study for spatialization continuum with a focus on eutrophication

Biogas plant aims to realize the anaerobic digestion of organic residues and produce renewable energy (biogas) and an organic fertilizer (digestate). Due to the local characteristics of organic residue deposit, renewable energy consumption, digestive spreading and nitrogen and phosphorous emissions, the eutrophication potential of this case study turns out to be highly territorially/regionally dependent.

Conclusion and outlooks

Spatialization continuum is a relatively new mind creation in a perspective of advanced LCA to the LCM of a system/territory couple. It requires some research years and many applications to be judged doable and robust.

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