Master thesis proposal:
Use of sewage sludge in agriculture – accounting for increased soil organic matter in life cycle assessment

Sewage sludge has long been seen as a waste, but is increasingly viewed as a source of nutrients, organic material and energy. Hygienised sludge is applied on arable land primarily in order to utilise its nutrients and replace the use of mineral fertilisers, but, depending on local circumstances, the organic material in the sludge can potentially also contribute to increased productivity of the soil and also provide other environmental benefits.

Life cycle assessment (LCA) is often used to assess systems in which sludge is used for agricultural purposes. In such assessments, the benefits related to the nutrients is commonly accounted for and large efforts have been made to better account for problems stemming from e.g. the content of heavy metals and organic micropolllutants in the sludge. However, potential beneficial effects of the organic material in the sludge that is put on land, such as the potential to capture carbon in the soil, increase water retention capacity or increase crop yields, are most often neglected.

The project “Improved life cycle assessment modelling of fertilisers – the case of sewage sludge”, is an academic research project aiming to improve LCA methodology and practice for assessing systems in which sludge is used in agriculture. Connected to the research in the project, a master thesis is proposed that aims to improve the assessment of potential benefits of the organic matter when applying sludge on land. The work is suggested to consist of 1) a literature review mapping effects related to the carbon or organic matter in sludge and on how to include them in an LCA, and 2) an LCA case study in which the methods for including benefits are tested and the importance of different types of effects are studied in a comparison between different scenarios.

The suggested project is to be conducted by a student with a large interest in environmental systems analysis and who is interested in cooperating with researchers in an ongoing academic research project. The student should have completed a course in life cycle assessment at master level (Chalmers course VTM081, BOM250 or equivalent). The thesis work will be performed at the division of Environmental Systems Analysis at Chalmers, Campus Johanneberg, during spring 2019.

Are you interested? If so, do not hesitate to contact us!

Dr. Sara Heimersson, supervisor (currently on maternity leave, back in January 2019)

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