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SUSTAINABILITY ASSESMENT OF BIORESOURCE MANAGEMENT SYSTEMS (BMS)- A DANISH CASE STUDY

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ABSTRACT

This presentation shows the results of LCA and Ecological Network Network analysis as tools for assessing the consequences of changing existing biowaste management systems towards increased biogas and biofertilizer production using different biowastes (manure, organic household waste, sludge and macroalgae biomass) as feedstock. Focus is on analysis of climate mitigation capacity through increased soil carbon stock as a result of a gradual implementation of closed loop bioresource management systems. Sustainability assessment was performed using life cycle assessment for assessing the environmental sustainability performance of the reference 2011 scenario compared to a 2020 scenario in which organic household waste is reallocated from combustion to manure- and sludge-based bioenergy and fertilizer production systems. Ecological network analysis was applied to study the efficiency of carbon flows from the compartments to the soil (output analysis), while tracing the fate of nitrogen and phosphorous (input analysis). The latter concerns the assessment of the sustainability of local supply that could substitute otherwise imported mineral phosphorous and nitrogen fertilizers (total dependency analysis), resulting in a reduction in the net local loss of resources to air and water. Lastly, the cadmium exchange between compartments and their contribution to the total amount of cadmium that reaches the soil is identified and discussed.



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