Organic agriculture as a climate mitigation strategy – the challenge of lack in organic data

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Organic production has been pointed out as a national and international strategy to mitigate climate change. In Denmark, the government is expecting, that doubling the organic production will contribute to a national reduction of 0.5 tons CO2 equivalents by 2030 (cf. Landbrugsaftalen 2021). The reduction potential is assessed based on a lower animal density, a lower supply of fertilizers and changes in crop rotations. These assumptions are, however, dependent on a range of variables; if conversions will be 1:1, e.g., that a conventional pig farmer will convert to organic pig farming; what the assumed fertilizer supply in organic farming is; and are norm data and emission factors representative of organic farming. Currently the climate effect of increasing the agricultural area under organic production, is calculated using IPCC 2006 emission factors. IPCC 2019 guidelines recommend differentiated emission factors for mineral and organic fertilizers, which will affect the calculated climate effect of organic agriculture.

Most of the knowledge that is utilized to account for emissions in the agricultural industry in e.g., LCA analyses has been compiled and recorded based on the framework of the conventional agricultural system, which implies that activity data, norm data and emission factors are often based on conventional systems. This is especially true for the livestock sector, where activity data, norm data and emission factors, are based on conventional animal housing systems and intensive livestock production. Also, carbon footprint of feed for livestock is based on conventional feed, e.g., as in the GFLI database. Thus, there is an urgent need to optimize the knowledge foundation for farm specific calculations of greenhouse gas emissions from free-ranged and organic production systems, so that emissions and carbon storage in organic systems are evaluated on a fair and justifiable basis. If the organic production systems and food products are to continue to have their legitimacy in the future agricultural landscape, it is a necessity that the data basis as well as the calculation methods for estimating the carbon footprint are accurate and correct and consider the framework that organic systems work within, which differs from the conventional systems.

It is of great importance to have accurate primary activity data, such as feed intake of livestock, degree of self-sufficiency in feed, crop rotations and fertilizer use when projections are made about the climate mitigation potential of organic farming. The calculation basis is currently done using generic background and activity data for e.g., fertilizer use and crop yields, which are not necessarily accurate. Furthermore, there is a large diversity in organic farms, e.g., regarding feeding of livestock and fertilizer use, where some organic farms have an intensive production and others are more extensive. This will influence the calculated carbon footprint of the organic production system greatly, both at farm level and at product level. Therefore, using actual activity data is necessary to accurately calculate the climate mitigation potential of organic farming (Mogensen et al., DCA-rapport 200, 2022).

In 2023 the Innovation Centre for Organic Farming will together with AU and other relevant actors be identifying needs for collection of primary data from organic systems for analysis and improvement of the database, as well as identifying the need for method optimization with the aim of improving activity data, emission factors and norm data for organic production systems.

The poster will contain results of calculations of the climate effect of organic agriculture, using actual activity data, and show the effect of different scenarios for conversion to organic.