

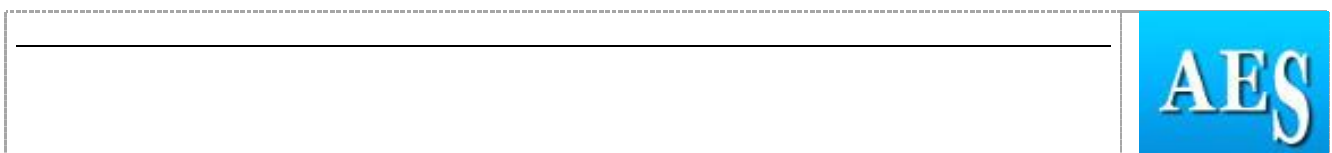
Extended Abstract

Please do not add your name or affiliation

Paper/Poster Title	Co-designing new business models for soil organic carbon sequestration. First insights from a German case study.
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Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	<i>200 words max</i>
<p>Healthy soils play an important role in climate change mitigation and require continuous investments from farmers to be kept in a good condition. Within the scope of international and national climate protection goals, the expansion of renewable energies has been determined with specified targets in Germany and the EU. Biogas production from manure from dairy farms in our testing ground in the Northern part of Germany may represent an additional energy source for producing heat and electricity for the region. Furthermore, with the application of compost, the level of soil organic carbon (SOC) increases. Higher SOC contents result in higher soil porosity and improved aggregation. In our multi-actor project SoilValues we explore how to enhance the conditions for developing successful soil health business models (BM). With building BM, farmers adopt practices that should lead to a net increase in desirable ecosystem services. In the long run operational costs may decrease due to an improved soil health.</p>	
Keywords	Sustainable agriculture, soil economics, value chains
JEL Code	Q1 see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	<i>100 – 250 words</i>
<p>Healthy soils play an important role in climate change mitigation and require continuous investments from farmers to be kept in a good condition (Don et al., 2023). Soils are also important for society as a whole, generating ecosystem services such as clean water, carbon sequestration and biodiversity (Gomez-Baggethun et al., 2010). But benefits of healthy soils are still insufficiently captured in value chains and too little recognised by the public, resulting in underinvestment in soil health. In our multi-actor project SoilValues we explore how to enhance the conditions for developing successful soil health business models (BM). In testing grounds across Europe we analyse BM covering different mechanisms, including socially accepted price premium, risk compensation, cost reductions and combined public and private incentives, and their supportive environment. The poster focuses on the BM in the testing ground in Germany on promoting soil health by enhancing the circularity of agricultural systems with efficient nutrient management and strong regional embeddedness. In the German testing ground it is foreseen to decrease the use of mineral fertilizer. Instead, animal manure is first used in decentralized biogas plants to produce heat and electricity for several households. The potential GHG emissions savings in the testing ground due to the production of biogas have the potential to</p>	



reach around 8 t/ha of carbon sequestration, including both substitution of fossil fuels and appropriate management of animal manure. The composted manure will be used afterwards as fertilizer on the fields. The aim of this business model is to gain private and social returns with investments in soil health.

Methodology

100 – 250 words

The development of the soil health business models uses participatory action research directly involving a wide set of stakeholders (including farmers, advisors, value chain actors, NGOs, policy makers, financial institutions, and researchers) in the testing grounds with several feedback loops to initiate the co-design process. Stakeholder analysis and mapping is applied to identify key actors and to improve the understanding of their interest in, and influence on, the design of the BM. In co-designing the soil health business models we apply the Flourishing Business Canvas. The Flourishing Business Canvas is a visual collaborative tool that considers the interdependencies of soil health business models with economy, society and environment, contributes to shared learning about co-creating values and outcomes in soil health business models and facilitates reflections upon co-design processes with all relevant stakeholders.

Results

100 – 250 words

Farmers in the German testing ground use resources and adopt practices that should lead to a net increase in desired ecosystem services with decreasing GHG emissions and increasing soil health. The net positive effect of these farming activities on ecosystem services must be demonstrated and verified, taking into account possible trade-offs between ecosystem services. Farmers can be financially compensated for the provision of ES through various incentives through implementing a value chain for producing biogas. Value chain actors (e.g. municipality, companies, consumers and citizens using the energy and heat) providing a fair and just price premium for soil health benefits including reduction of GHG emissions and carbon sequestration. The realization of a district heating concept becomes of higher relevance with increasing costs for fossil energy in Germany since the Ukrainian war. By offering a better concept with providing electricity and heat with a better use of animal manure as efficient organic fertilizer, biogas technology is able to become a well promising concept.

Preliminary insights into key issues for co-designing soil health BM highlight the importance of i) tailored, contextualised strategies and approaches to motivate, facilitate and support collaboration between stakeholders; ii) recognising different perceptions, patterns of interactions between stakeholders and the roles of influencers; iii) allowing for flexibility in composition of participants at workshops and to enable a plurality of perspectives; iv) providing an open space for sharing practical experiences and lessons learnt in developing soil health BM.

Discussion and Conclusion**100 – 250 words**

The term “soil health” is of high interest for government and farmers. However, soil health is neither a perfectly quantifiable nor measurable ecosystem service. Through implementing value chains for producing biogas there is an option to provide a price premium for soil health benefits including the reduction of GHG emissions and increasing soil carbon sequestration. On the basis of several testing grounds accessed knowledge on successful business models will be identified for scaling up action on soil health. Our poster will present more details about the German testing ground and first insights how to establish this co-design with stakeholders.

Literature:

Don A, Seidel F, Leifeld J, Kätterer T, Martin M, Pellerin S, Emde D, Seitz D, Chenu C (2023) Carbon sequestration in soils and climate change mitigation-Definitions and pitfalls. *Global Change Biology*:e16983. doi: 10.1111/gcb.16983

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