

German Testing Ground Circular Bioenergy for Soil Health

Location

This Testing Ground takes place in Germany, in the Flensburg Area.

Goal

To improve soil health while supporting the long-term viability of dairy farms through a circular bioeconomy approach. By connecting dairy farming, biogas production, composting and nutrient recycling, it aims to reduce emissions, enhance carbon storage and strengthen regional cooperation.

Innovation

It lies in the way existing agricultural, energy and biomass resources are reorganised into an integrated regional system, by connecting different aspects of soil, carbon and energy management

Soil Health Challenge

land managers generally have little incentive to invest in healthy soils, as they cannot sufficiently capture the value generated by these ecosystem services



SHBM Description

It is an agricultural cooperative that primarily transforms manure and other local organic resources into biogas. This renewable energy is then commercialized, while the residues from the anaerobic digestion process are valorized as compost and soil amendments. In this way, SHBM aims to strengthen regional nutrient cycles, improve soil fertility, and support more sustainable agriculture.

Actor Network

- Participating farmers
- Lead farmer and project initiator
- Thünen Institute
- Biogas actors
- Regional representatives
- Public agencies
- advisers

The model is based on a diverse network of actors who collaborate around a central biogas and composting facility to promote renewable energy production, nutrient recycling, carbon management, and improved soil fertility.



Value Creation Mechanism

The SHBM creates value by collecting manure from local dairy farms and converting it, together with maize and other biomass, into biogas that can be sold as renewable energy. The remaining digestate is further processed into compost, creating additional value through nutrient recycling and soil improvement and reducing cost for farmers.

As the initiative grows, a more formal cooperative structure is being developed to strengthen governance and long-term value creation.



Dominant Value Rationales



Green

Improving soil health through increased organic matter, better water management, and reduced nutrient losses, while preserving the natural areas that supply the biomass.



Industrial

Is visible in the concern with permissions, plant operation, funding applications, and the technical requirements of making the model work at a larger scale.



Domestic

solutions should be built within the region, creating regional circular flows rather than relying only on external inputs or centralised solutions



Market

Maintaining the economic viability of dairy and biogas farming through biogas revenues, cut expenses on external inputs, and potential income from climate-related services.



Civic

Strengthening regional resilience by connecting different stakeholders around shared goals related to climate action.

Main Results

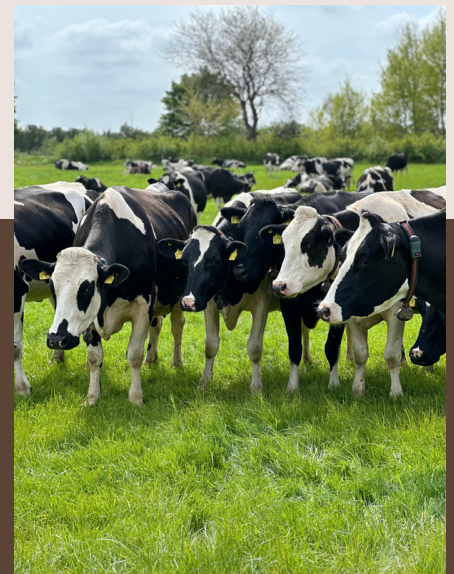
Connecting dairy farming, biogas production, composting and biomass management into a more circular regional system and has strengthened cooperation between stakeholders, while promoting soil health, nutrient recycling and carbon management

Barriers and Challenges

The complexity of coordinating actors across agriculture, energy and policy sectors, as well as administrative, communication and regulatory barriers. The initiative also relies heavily on a small number of key individuals, making long-term stability and scaling more difficult.

Lessons Learnt

- Credibility, Trust, local ties have been essential to this initiative.
- Rethinking and connecting existing ideas and infrastructures, not introducing entirely new technologies.
- Strong trust-based cooperation, clear benefits for farmers, Knowledge sharing, training and stakeholder engagement are key to the model's success



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Contact
<https://soilvalues.eu/>
info.soilvalues@kuleuven.be

Erik Mathijs, Project Coordinator: erik.mathijs@kuleuven.be