Germany

Innovative approaches to incentivize soil health for sustainable production and climate change mitigation and adaptation

Context

Healthy soils offer a wide range of ecosystem services. They sustain agricultural production by providing water and nutrients to crops, regulate the water circle, constitute an uncaptured reserve of biodiversity, and play an essential role in climate change adaptation and mitigation. In this regard, the build-up and conservation of organic matter through sustainable management practices is essential. Protecting and increasing carbon storage in soils is a central element of Germany's path to carbon neutrality. However, there is no one-size-fits-all solution and sustainable soil management decisions need to be context specific, considering the agroecological conditions and farming systems. There is a significant interest among both conventional and organic farmers to engage in healthy soils. However, knowledge exchange between science and practitioners is so far insufficient to support decisions on farm-specific, economically viable and site-appropriate humus (soil organic and mineral content) management. In addition, further proof of concept regarding the effectiveness of different management approaches as well as the economic viability of adapted land management is still needed.

Rationale

Preserving and, where necessary, improving the generally high fertility of soils in Germany is a primary concern for the German government. Hence, various approaches regarding regulation, incentives and research are being followed, e.g., through the national implementation of the EU common agricultural policy, fertilizer regulations, or investments in modern technology which support less invasive and more resource-efficient cultivation. To expand the adoption of agricultural practices targeting the build-up and conservation of organic matter, Germany launched the "Federal Humus Programme" in 2022. Furthermore, Germany is invested in long-term soil monitoring, e.g., through its survey of the state of Germany's agricultural soils.

Approach

The Federal Humus Programme entails research projects, as well as several model and demonstration initiatives, which focus on testing on-farm practices. Participating farmers are in close exchange with the federal research institute to optimize management approaches for the agroecological as well as socioeconomic conditions of each farm. At the same time, data is generated to check the effectiveness of management practices as well as the added value for farm enterprises. The project further aims to expand promising approaches by disseminating knowledge and experiences created in the course of the project. One approach is to foster peer-to-peer learning in “humus clubs”, where participating land managers meet on a regular basis to discuss experiences and develop solutions. Another approach is the Humus Climate Network. This major initiative, launched in 2022, engages 150 farm enterprises and is jointly implemented by the German Farmers’ Association and the German Organic Food Industry Association.

Sound data is required for informed decision-making and reliable reporting on the effects of changing management practices on the organic carbon stocks of agricultural soils. Therefore, Germany is investing in long-term monitoring of the state of its soils. From 2011–2018, the Thünen Institute conducted the first uniform inventory of agriculturally used soils, analysing physical and chemical soil properties which influence organic carbon stocks in the soil as well as information on management practices. The survey will be repeated in the years 2023–2027 to identify potential changes to the carbon stocks over time. The results will feed in to national climate reporting to the United Nations Framework Convention on Climate Change.

Experience and results achieved

The Humus Climate Network has been well received by both organic and conventional farm enterprises. A first broad evaluation of carbon stock changes on participating farms will take place after five years.

The survey of the state of Germany’s agricultural soils provided reliable information on the condition and potential developments of humus stocks in agricultural soils in Germany. The results of the upcoming survey will play an important role for the validation of area-wide modelling of carbon stocks, which further increases the reliability of national emission reporting.