The road to regenerative agriculture

Danish Agriculture & Food Council

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Preface

Regenerative agriculture is a means of more sustainable food production and offers potential for the environment, farmers and society as a whole.

Demand and interest in regeneratively grown raw materials and products is growing – particularly from food companies and consumers.

The term is used broadly and there is no fixed definition. In fact, it may not make much sense to seek a narrow definition – as long as there is transparency and sustainability in the supply chain.

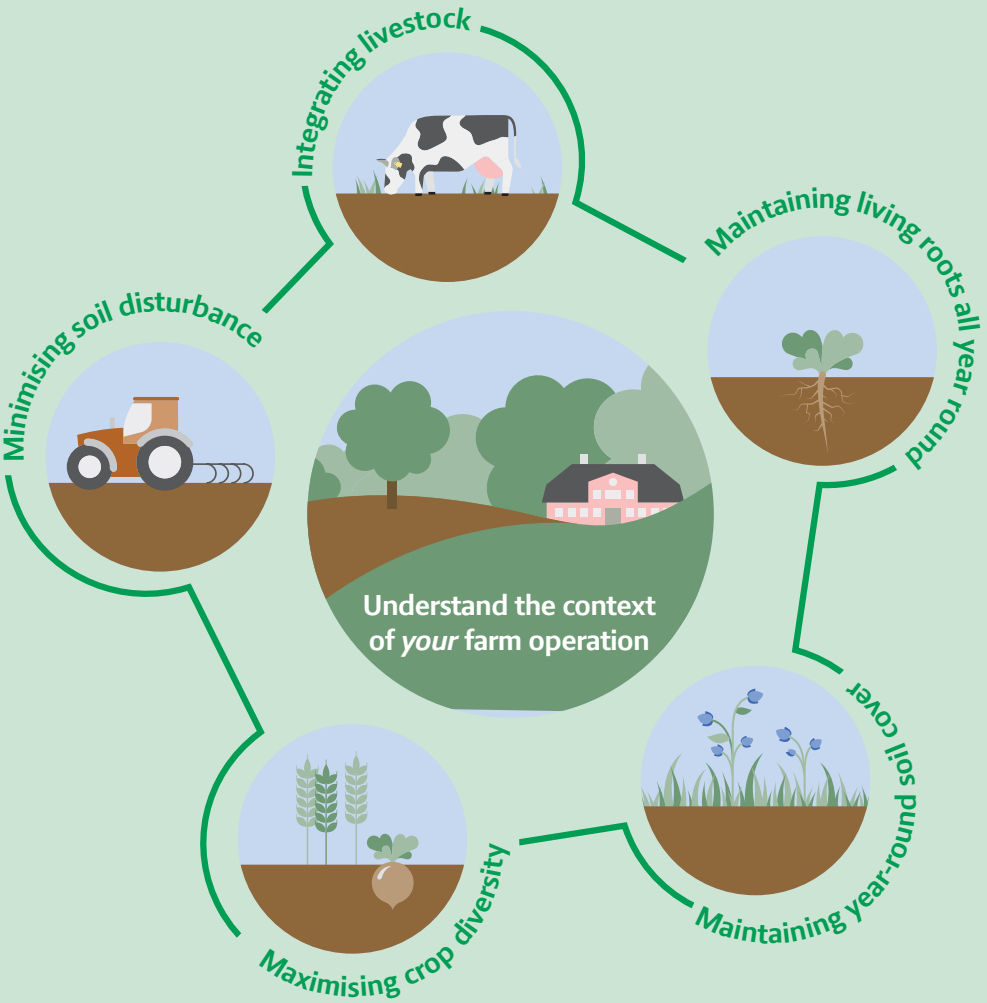
Rather, it is a holistic farming system with a set of principles designed to improve soil fertility, carbon sequestration, and biodiversity – above and below the ground. Regenerative agriculture can thus create more robust agricultural systems that are able to withstand climate change.

The principles can be met by deploying various agricultural methods, taking into account local conditions. In one field, it may be beneficial to plough less while the neighbouring field may need more catch crops.

In this publication, the Danish Agriculture & Food Council focuses on regenerative agriculture and the guidelines we believe are pertinent to the continued development of regenerative agriculture.

The Danish Agriculture & Food Council hopes that this publication will provide inspiration and motivation for adopting regenerative agriculture practices so together, we can support a development whereby sustainable food production and biological diversity go hand and hand.

Morten Boje Hviid
CEO, Danish Agriculture & Food Council


Integrating livestock
Maintaining living roots all year round
Minimising soil disturbance
Understand the context of *your* farm operation
Maintaining year-round soil cover
Maximising crop diversity

What is regenerative agriculture?

Regenerative agriculture is an international concept that has gained traction in recent years – including in Denmark. Regenerative agriculture covers a range of principles that aim to boost soil fertility and carbon sequestration as well as increase biodiversity – both above and below ground. It therefore has interesting potential for nature, climate and the environment.

In recent years, the concept has gained more popularity across the agricultural value chain, both with large national and international food companies.

Although a few foreign certification schemes are in operation, there is no jointly established definition of regenerative agriculture. It can therefore encompass different ways of cultivating the soil, and the specific cultivation techniques that produce the best results will vary from region to region. Regenerative agriculture is therefore dependent on local soil and climate conditions.

Common to regenerative agriculture, however, are a number of principles that several international sources – and SEGES Innovation – describe as:

- Minimising soil disturbance
- Maintaining year-round soil cover
- Maximising crop diversity
- Maintaining living roots all year round
- Integrating livestock

Greater recycling of nutrients and reduced use of pesticides are an integral element of the principles.

Regenerative agriculture covers the entire cultivation system and not the cultivation of a specific crop. The regenerative principles underpin a range of cultivation practices that are adapted to local conditions and the circumstances of the individual farm. Cultivation practices that are aimed at ensuring a more living soil include minimising soil cultivation, the use of catch crops, compost and manure, and crop rotation with many different crops and biodiversity at field level.


19 %
of Denmark's agricultural area cultivated with catch crops
25 %
of Denmark's agricultural area under no-till farming

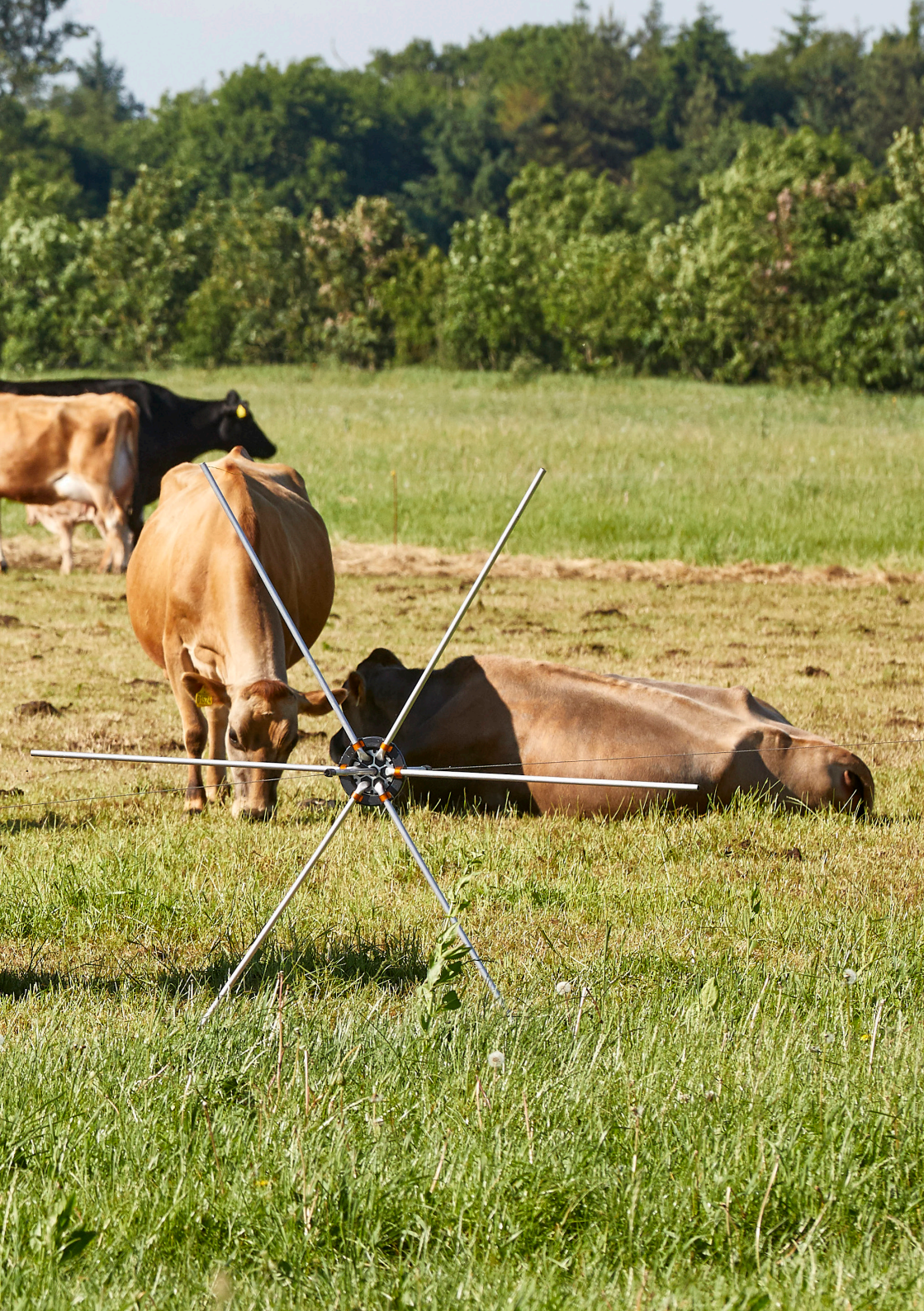
Spread of regenerative agricultural practices

Denmark has a good basis upon which to develop regenerative agriculture because regenerative agricultural practices are already widespread in the country. In order to qualify for subsidies, farmers must comply with the EU's requirements for Good Agricultural and Environmental Conditions (GAEC). The nine requirements encompass plant cover, prevention of soil erosion and crop rotation to ensure that the soil's cultivation potential is maintained.

Due to the absence of a common definition of regenerative agriculture, no comprehensive statistics yet exist on how widespread this form of cultivation is in Denmark.

Statistics Denmark calculated that the area under no-till farming, also known as reduced tillage, amounted to 667,000 hectares in 2023, corresponding to 25% of the production area. In 2016, it was 11%. No-till cultivation was practised on 20% of farms in 2023 and is most widespread in Zealand.

Since 1987, cultivation of catch crops has been an option for farmers in order to meet the requirement for winter green fields. Since 1999, there has been a legal requirement for a proportion of catch crops on individual farms. The catch crop area has been increasing and in 2022, amounted to 19% of the cultivated agricultural area (Denmark's National Inventory Report 2024).



Potential of regenerative agriculture

Regenerative agriculture can benefit the environment, biodiversity and the climate while building and improving the soil. The potentials most frequently highlighted are:

1. Environmental and climate effects

It is an important priority for Danish agriculture to limit the leaching of nutrients from fields into waterways and fjords.

To a large extent, the regenerative system uses catch crops, which help absorb excess nitrogen. At the same time, regenerative agriculture is associated with the application of smaller amounts of nitrogen fertiliser, which, all else being equal, also contributes to reduced nutrient leaching. Research shows that reduced tillage improves the structure of the soil, which reduces surface runoff and erosion, which can result in phosphorus loss. This indicates that regenerative agriculture has the potential to create positive environmental effects, although the precise extent requires further research.

It is often argued that regenerative agriculture can sequester CO_2 in the soil and reduce greenhouse gas emissions. Healthier soil with higher organic content functions as a carbon store and contributes to climate stabilisation.

However, it is difficult to document the effect of regenerative agriculture and there are no calculations of the climate and environmental impacts under Danish conditions. Therefore, this is a production method that requires further study.

Aarhus University has preliminarily assessed that cultivation methods with practices similar to regenerative ones can have positive climate effects through the gradual build up of carbon in the soil and the biomass. However, carbon sequestration will decline as the soil becomes saturated with carbon, which means that the effect will decrease year by year.

2. Improved biodiversity

By promoting natural ecosystems and reducing the use of pesticides, regenerative agriculture can improve what is known as functional biodiversity, i.e. the diversity of living organisms that benefit a farmer's production.

In their knowledge synthesis on regenerative organic agriculture, Aarhus University also concludes that less soil disturbance promotes soil fauna. Microorganisms and wildlife – earthworms, beetles, insects, etc. – under the soil contribute to greater soil health and fertility.

Reduced use of insecticides promotes the living conditions of pollinators and beneficial insects, which are essential for agricultural production. Constant plant cover also improves the living conditions of a wide range of animals above ground.

3. Improved soil fertility

Healthier soil can increase nutrient availability and boost the soil's water retention capacity. Fewer soil disturbances and more diverse crop rotations can increase the amount of organic matter in the soil and the size of the soil's pores. This can make fields more resistant to drought and reduce the need for irrigation. It can also ease field operations as the soil becomes easier to cultivate.

4. Economic potential

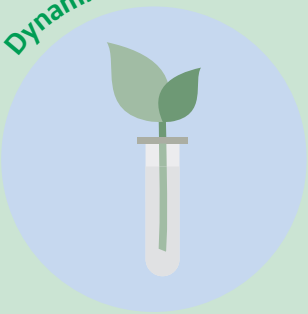
Typically, the farmer will have lower production costs (e.g. machine time, diesel oil, commercial fertiliser, pesticides, etc.) as fewer resources are used in regenerative production. When switching to more regenerative methods, the farmer will often experience an operating loss. It is claimed that a more stable yield and a more cultivable soil will be achieved in the long term. If regenerative agriculture is to gain ground, it must make sense economically in terms of production and be a market driven demand for all types of crops under regenerative agricultural practices. A recent report from the Frej think-tank concludes that there is not yet enough data to draw conclusions on its economic potential.

Danish Agriculture & Food Council's guidelines

The Danish Agriculture & Food Council has drawn up six principles – both commercial and political - that are important to bear in mind when embarking on regenerative agriculture.

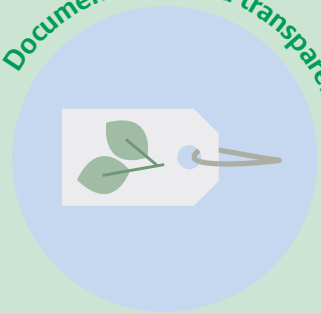
Knowledge-based

Dynamic



Value chain-based

Documentation and transparency



Market-driven

European perspective

Regenerative agriculture must be:

Knowledge-based

More and improved knowledge is needed about the impact of cultivation practices, especially about the overall effects of the cultivation system under Danish conditions. The Danish Agriculture & Food Council requires scientific methods to measure and monitor the ongoing health of the soil and the effect on the environment and climate of the various practices that are to be included in regenerative cultivation in Denmark.

Regenerative agriculture must be:

Dynamic

Becoming a regenerative farm is a dynamic process. Further consideration must be given to the concept of regenerative agriculture and how it can be adapted to a Danish context. Conversion to a more regenerative cultivation system takes time for individual farms. There is a need for training, advice, as well as the development and testing of regenerative methods that take into account local soil conditions.

Regenerative agriculture must be:

Value chain-based

It is important that the entire value chain is involved in discussions about regenerative agriculture and that the individual value chains collaborate as regenerative agriculture encompasses the entire farm and all agricultural products produced on it. A sustainable economy is required for the entire food system – not just for selected products or actors.

Regenerative agriculture must provide:

Documentation and transparency

If products are to be marketed as regenerative or cultivated using regenerative methods, this must be documented and verified to avoid greenwashing. This will require compliance with the specific criteria for regenerative agriculture.

Regenerative agriculture must be:

Market-driven

Regenerative agriculture must provide value for the entire value chain. A business model and economic viability must exist for the farmer, the food company and the retailer. The farmer must be able to share the risk or achieve a premium that reflects a lower expected yield. Regenerative agriculture can thus support a market-driven development, where all parts of the food system are taken into account and where there is also a focus on the demand side.

Regenerative agriculture must have:

A European perspective

Any standards and regulations in relation to regenerative agriculture must, at a minimum, be at a European level and must be integrated into the negotiations for a new European agricultural policy from 2028. The Danish Agriculture & Food Council is positive about the inclusion of regenerative agriculture/practices in future targeted green subsidy schemes.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