How EU agricultural policy could contribute to climate protection

By Heike Nitsch and Jörg Schramek

More than 7 percent of the greenhouse gases released in Germany come from agriculture: from ruminant cattle, for example, and from nitrogenous fertilisers. In addition, there are emissions from drained organic soils or from rotting humus from ploughed-up grassland. Around 58 billion euros flow from the EU budget into European agriculture every year. This gives the federal and state governments many opportunities to do something for climate protection.

Trees in fields and pastures: Agroforestry systems increase the humus content of arable land and thus bind CO_2. They also improve groundwater recharge, create a humid microclimate in dry summers and protect against sun and wind. www.agroforst-info.de

The dangers of climate change are known, and climate protection targets have been adopted. We know where greenhouse gases come from and how they develop. Scientific investigations into where to start in order to reduce emissions have been going on for a long time. However, the implementation of the goals must take place through concrete instruments and measures.

To achieve the climate protection goals to which Germany has committed itself, agriculture must also contribute. The EU's Common Agricultural Policy (CAP) is of great importance for shaping agriculture in the EU due to its considerable budget and the large area it reaches, and thus also for climate protection in connection with this sector.

One focus of the work of the Institute for Rural Development Research at Goethe University (IfLS) is the analysis of the influence of agriculture on the environment. The IfLS uses scientific findings for the evaluation and further development of political steering instruments. The upcoming reform of the Common Agricultural Policy therefore prompted the IfLS to conduct a study that was financially supported by *Landwirtschaftliche Rentenbank* (Nitsch & Schramek, 2020). The study examined which options for climate protection are made possible by the support measures of the Common Agricultural Policy and the extent to which the federal states use them.

Greenhouse gas emissions from agriculture

In 2017, the agricultural sector accounted for 7.3 per cent of the total greenhouse gas emissions reported for Germany (UBA, 2019). These have not decreased significantly in recent years (see figure on page 102). The generation of emissions from agriculture is due, on the one hand, to the keeping of ruminants – cattle,

27 million pigs and 12 million cattle in Germany produce large quantities of liquid manure, which is spread on fields as agricultural fertiliser. The greenhouse gas nitrous oxide (N_2O) escapes from the manure while still in the stable.

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sheep and goats – which produce the greenhouse gas methane through natural microorganism activity in their rumen. In addition, nitrogen oxides (N_2O) escape into the atmosphere during the storage of farm manure such as slurry and due to nitrogen fertilisation. In addition to these 7.3 per cent, there are emissions of carbon dioxide (CO_2) from soils due to the decomposition of organic matter, especially the cultivation of peat soils and the ploughing up of grassland. With regard to the reported greenhouse gas emissions, it must be taken into account that energy use in agriculture as well as energy use in the production of fertilisers and associated emissions are not directly assigned to the agriculture sector. Emissions in other countries from which animal feed is imported are not reported either.

With regard to emissions from livestock farming, the most effective approach to climate protection would be to reduce the number of animals. However, if animal food consumption remains unchanged, this problem will merely be shifted to other regions of the world. However, demand for products and nutrition are not directly influenced by the EU's Common Agricultural Policy. This article focuses on climate protection measures on agricultural land. These are particularly related to the use of nitrogenous fertilisers and the storage of organic carbon in the soil.

Measures in the Common Agricultural Policy

The focus of the Common Agricultural Policy has changed in recent decades. While for many decades it served market and price policy, the largest share now goes to what are known as direct payments, which are granted to farms per hectare. Since 2005, these payments have been linked to compliance with standards in the areas of food safety, plant and animal health, environmental protection and animal welfare (cross compliance). In 2015, a greening component was also introduced, which, among other things, restricts the conversion of grassland. Agricultural enterprises receiving direct payments must comply with these minimum standards.

In addition, within the framework of the Common Agricultural Policy, there are support measures in which farms and other target groups can participate on a voluntary basis. The EU co-finances this support, and the Member States – or in Germany's case the Federal Government and the *Länder* – use state funds for the other part of the financing. The Länder present these support measures within in their rural development programmes (RDPs).

One of the declared objectives of the EU's Common Agricultural Policy in the current funding period (2014 – 2020) as well as the

Common Agricultural Policy after 2020 is to contribute to climate protection. And the Climate Protection Programme 2030 (BMU, 2016) for Germany emphasises that the national design of the Common Agricultural Policy of the EU offers Member States comprehensive opportunities to increase the level of environmental and climate protection.

Climate-relevant measures by the Länder

Agri-environmental and climate measures (AECM) of the Common Agricultural Policy, which remunerate certain management requirements, and the promotion of organic farming are central measures in the current funding period that are intended to contribute to the reduction of greenhouse gas emissions from agricultural land use. Throughout Germany, however, only individual agri-environmental and climate measures are primarily assigned to climate protection. This applies above all to the low-emission application of manure and the conversion of arable land to grassland. In some *Länder* there are further agri-environmental and climate measures for grassland that are aimed at organic soils and thus mostly at conserving soil carbon. Usually, these are measures that support adapted management even at elevated water levels and can thus accompany rewetting or counteract possible intensification or drainage. Beyond these measures, climate protection is a side effect of activities that primarily serve other goals. This is the case, for example, with organic farming, the promotion of diverse crops in arable farming with a minimum proportion of nitrogen-fixing legumes such as beans, clover or lucerne, the cultivation of catch crops and undersown crops, and various measures for the extensification of grassland. Individual *Länder* promote techniques of targeted and demand-oriented nitrogen use in order to reduce losses in fertilisation.

Financial support for investments, for example in equipment for low-emission slurry spreading or in gas-tight covers for slurry stores, also contributes to reducing greenhouse gas emissions and is widely offered. Investments for peatland protection may also be part of the support.

Forestry support measures go beyond agricultural land use and are expected to contribute in particular to carbon storage and the provision of renewable energy. However, they play a minor role in the budget of rural development programmes compared to measures on agricultural land. Increased energy efficiency, which was also not a focus of this study, can be part of support for investments in farms, for example in connection with the conversion of stables, greenhouses or in the context of processing and marketing.

Knowledge transfer and advisory services as well as studies and planning are supported as flanking, preparatory or indirect measures. Pilot projects can also promote the development of innovative, resource- and environmentally-friendly products and processes in the area of climate protection. In addition, the promotion of joint concepts or cooperation can be relevant and is used accordingly in individual *Länder*, e. g. to support the regional cooperation necessary in the rewetting of peatland.

It must be taken into account, however, that the rural development programmes only represent a portion of the funding measures offered in Germany. Other measures are promoted outside these programmes using only *Land* resources or other funds. This applies, for example, in part

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Around 80 per cent of organic soils in Germany are used for agriculture and forestry, such as this meadow near the Verden Moor in Lower Saxony. For this purpose, peatland areas are drained, which leads to the decomposing peat releasing large amounts of CO_2.

IN A NUTSHELL

- The EU's Common Agricultural Policy (CAP) must contribute to climate protection. There are several approaches it pursues.
- In the voluntary support measures offered so far, such as the agri-environmental and climate measures, climate protection is usually more of a side effect.
- In future, the conditions for receiving funding should take greater account of climate protection effects.
- Based on an exchange of experience, the *Länder* should optimise voluntary climate protection measures and offer them more widely, also taking into account newer approaches, such as the adapted use of rewetted organic soils.

Literature

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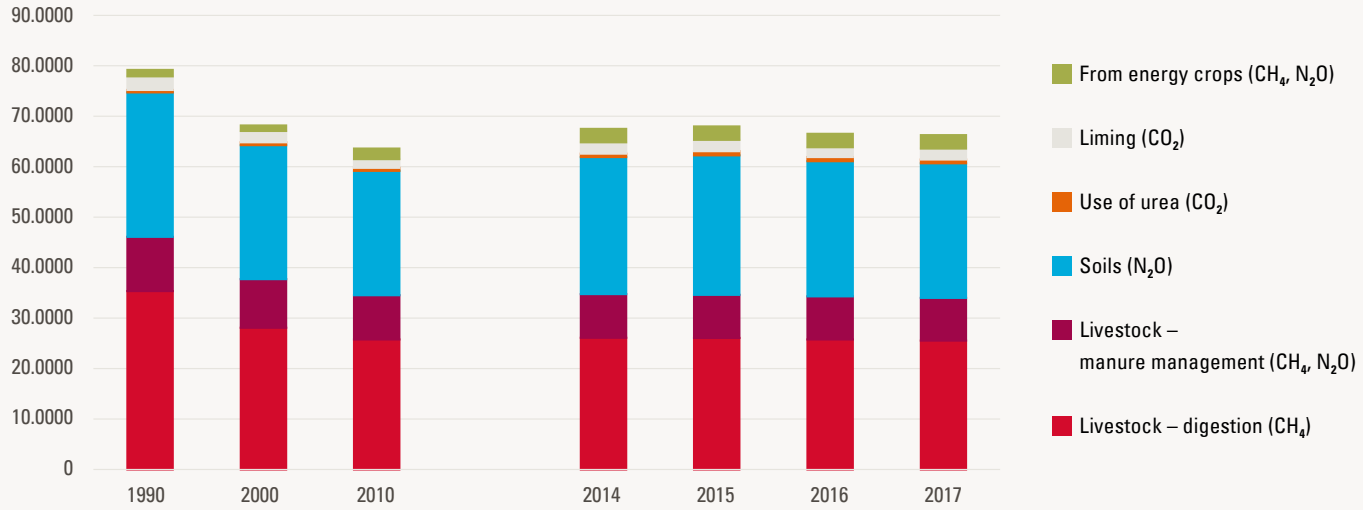
Greenhouse gas emissions from German agriculture and changes in relation to 1990 in percent



Starting points for climate protection measures in agricultural land use

(for a more detailed presentation and literature sources see Nitsch & Schramek, 2020)

- **Increase the efficiency of nitrogen fertilisation:**
  Improved nitrogen utilisation through better nutrient balancing and fertiliser planning and the use of appropriate crop rotations and emission-reducing techniques in the storage, treatment and application of fertilisers can reduce nitrogen losses and consequently N_2O emissions as well.

- **Protection of agriculturally used organic soils:**
  The key measure for climate protection is raising the water level on drained sites. Rewetted areas are taken out of production, can be grazed or maintained as wet meadows, or can continue to be used in the future for the production of animal feed or substrates for material or energy use with the help of wetland-loving plants such as cattails, reeds or alders as »paludiculture«.

- **Protection of permanent grassland:**
  Avoiding the conversion of permanent grassland prevents greenhouse gas emissions due to the resulting humus depletion. This is particularly important on humus-rich soils (especially peatlands).

- **Conversion of arable land into permanent grassland:**
  Provided that the resulting grassland is maintained in the long term, there is an accumulation of organic carbon in the soil. However, the increase is much slower than the loss in the case of grassland conversion.

- **Preservation and promotion of humus content in arable soils:**
  Organic fertilisation, the incorporation of crop residues and the increased cultivation of crops with intensive root penetration or of woody biomass can increase the humus content and thus contribute to CO_2 storage. However, the contribution to climate protection via these measures is fraught with great uncertainties, is limited in time and without lasting guarantee. While the use of pyrolysed biochar can be expected to fix carbon in the long term, there is still a need for research on further effects.

- **Organic farming:**
  In terms of area, organic farming results in lower greenhouse gas emissions due to higher stocks of soil organic matter and lower nitrogen surpluses. However, this advantage is relativised when it is related to yield.

Many of these measures result in synergies with other environmental objectives such as water and biodiversity protection, soil fertility and adapting to climate change.