clean air farming

Reducing Ammonia and Methane Emissions from Agriculture

Methane mitigation in the EU's agricultural sector

Position paper

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The EU must reduce methane in agriculture quickly and substantially

Methane (CH_4) is the **second most important greenhouse gas** after carbon dioxide (CO_2). Over a period of 20 years, it has 83 times more of an impact on the climate than CO_2. According to the Intergovernmental Panel on Climate Change (IPCC), CH_4 has been responsible for around 0.5 degrees Celsius of global warming since the beginning of industrialisation. The gas is also a **precursor of tropospheric ozone** (O_3) which is harmful to human health, biodiversity and agricultural productivity. In the European Union, this air pollutant led to 16,800 premature deaths in 2019. [1]

Methane mitigation is crucial to achieving the **Paris climate target** (1.5°C)[2] and can make a **short-term difference in climate protection**. CH_4 is a short-lived climate pollutant (SLCP) thus only stays in the atmosphere for a comparably short period of 12 years. The reduction of CH_4 emissions therefore has a slowing effect on climate change in the short-term and can prevent irreversible **tipping points in the climate system** from being reached. At the same time, **reducing methane concentrations** in the atmosphere has **additional benefits:** It reduces crop losses, pressure on ecosystems, risks to human health, and associated health costs.

While the global methane concentration in the atmosphere rose at an unprecedented rate in 2021[3], IPCC scientists emphasise in their **policy recommendations for the AR6 report** of April 2022 that the extent to which methane emissions are reduced by 2030 and 2040 will determine **how low the peak of global warming can be kept**. It also determines the need for undesirable technologies to generate net negative CO_2 emissions if the Paris climate target is exceeded (overshoot).[4]

[1] EEA (2021)
[2] Shindell (2021)
[3] NOAA (2022)
[4] IPCC AR6 WG III (2022)

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According to the **Global Methane Assessment** (GMA) of the United Nations Environment Programme (UNEP)[5], staying below 1.5°C would require a **45% reduction in global methane emissions** across all sectors by 2030. This would avoid 0.3°C of global warming by 2040.

With the launch of the **Global Methane Pledge**, initiated by the European Union (EU) and the USA, more than 110 countries have committed themselves to reducing global methane emissions by at least 30% by 2030. The EU must now take the lead in reducing methane emissions and implement the commitment from the Global Methane Pledge. This is a first step and must be seen as a starting point, as it will be necessary for countries to increase their ambition to a 45% reduction in order to protect our climate.[5]

In the EU, the **biggest share of anthropogenic methane emissions** derives from **agriculture** (55%).[1] Livestock farming, in particular cattle and dairy production, is responsible for the bulk of agricultural methane emissions: 80% comes from enteric fermentation in ruminants, 18% from manure management, and 1% from rice cultivation.[6] Hence, **methane mitigation in agriculture is a crucial element** of the EU's contribution to climate protection and compliance with the Methane pledge.

Almost 60% of agricultural non-CO_2 emissions (about 90% of which is methane) derives from **farms with more than 100 livestock units** (LSU).[7] Consequently, targeting 'super-emitters' holds great potential for methane reduction. Furthermore, mitigation measures in the agricultural sector must **always consider animal welfare and strive to create synergies** with other environmental goals such as combating ammonia (NH_3) or nitrate pollution.

Measures are available to reduce methane emissions in agriculture

In global agriculture until 2030, a maximum reduction of cumulative methane emissions of around 20% compared to the baseline can be achieved by implementing technical measures.[8] The measures available include:

- **Breeding.** Selective breeding can promote races with a naturally smaller methane output. Dual-purpose breeds can reduce methane emissions while improving animal welfare. Using more robust and long-lived breeds with diverse traits can complement this strategy.
- **Herd management.** Extending the productive life of dairy cows reduces relative methane emissions per product unit.
- **Feeding strategies.** Optimised feeding by improved feed conversation ratios of animals or using different feeds can reduce methane emissions. This includes also influencing microbial action through feed additives. However, we only recommend their use within a narrowly defined framework as some products display negative side effects and long-term reduction potential is unknown. There is evidence that despite the regular administration of a feed additive, the effect wears off over time due to the adaptive capacity of the microbiome of ruminant stomachs.[9] Further research is necessary to verify the potential.
- **Manure management.** Planning the manure management from stable to field, including the introduction of measures such as the airtight storage of fresh manure and digestate as well as continuous manure removal systems in stables and efficient manure application techniques on fields has advantages for emission reduction.
- **Biogas plants.** Biogas plants can catch emissions and produce biogas through fermentation, which can be converted into useable energy. Increasing the proportion of manure in the substrate for biogas plants brings benefits for biogas production. In small-scale farming it is advisable to operate biogas plants collectively, e.g. through farmers' associations. In any case, the treatment

[5] UNEP Global Methane Assessment (2021)
[6] EEA greenhouse gases – data viewer (accessed May 2022)
[7] IIASA-GAINS model (2021)
[8] Stevanovic et al (2017)
[9] Schilde et al (2021)

of manure in biogas plants must not become an incentive for the continuation and expansion of intensive livestock farming.

These measures should be implemented and **become the standard in European agriculture**. However, since their methane mitigation potential is limited further reduction must be achieved by **reducing the production and thus the consumption** of meat and dairy products.

Compared to intensive production, **pasture farming has various advantages**, including emission-reducing effects. NH_3 and CH_4 emissions from manure are lower in grazing systems compared to stables. This is due to the fact that less material needs to be collected in manure stores. Pasture farming has additional benefits for example for animal welfare, animal health and biodiversity.

Shifting to grazing systems must go along with a **reduction in livestock numbers.** This measure is the **most effective way to reduce methane emissions in agriculture**. For any type of farming, animal numbers must be linked to available farmland. This will also relieve animal hotspots and have a positive effect on ammonia pollution. A **sustainable target is two livestock units (LSU) per hectare** (1.4 LSU/ha in environmentally sensitive areas).

Almost 60% of the land in German agriculture is used for growing animal fodder[10], which is similar to the situation in EU agriculture[11]. Reduced numbers of animals can also take pressure off arable land and provide more land for food production. This can **contribute to food security**.

Economic instruments can drive this change in the livestock sector. In particular, they should target farms that have a disproportionate ratio between the number of animals and the available farmland or cause disproportionate amounts of methane emissions. For instance, this can be achieved by making **farmers paying a fee from a threshold of animal numbers in relation to their available land**, while channelling back revenues to the producers, which they can invest in environmental measures. In general, especially small and medium-sized farmers with sustainable livestock to farmland rations should be economically supported rather than burdened.[12]

Reducing production must be accompanied by a **decrease in consumption and food waste** within the EU. A European diet with less meat has also benefits for the health of citizens and reduces health care costs. **Labelling of animal husbandry systems** on products and the reduction of meat products from lower husbandry levels is a first step. Germany is already planning to implement this measure. However, it must be introduced at EU level to prevent distortions of competition.

Changing consumption behaviour can be achieved by **increasing the prices of meat and dairy products**, e.g. by raising taxes or abolishing subsidies. As an additional incentive, taxes on plant-based products can be reduced. In this context, it is necessary to make the reasons for price shifts **transparent for consumers** in order to increase acceptance. DUH considers a contribution from all market participants in the value chain to be appropriate.

Furthermore, too much **food waste continues to be produced** in Europe. This is particularly problematic for methane-intensive foods such as beef and dairy products, as not only are resources wasted on production, but a lot of **methane is also emitted unnecessarily**. In German households alone, an amount of meat that equals 230.000 cows is thrown away every year.[13]

Reducing global consumption and waste of animal products by 50% can lead to a decrease in cumulative methane emissions of around 20% compared to the baseline until 2030.[8]

How the EU must shape policies to tackle agricultural methane emissions

To date, there is no binding national or international agreement to reduce agricultural methane emissions. The Global Methane Pledge constitutes an important signal and starting point and must be transposed into binding European legislation. The **EU methane regulation,** which will be adopted in 2022, is a first step towards methane reduction in the energy sector. Unfortunately, it does not set methane

[10] Destatis (2019)
[11] Greenpeace (2021)
[12] Environmental Action Germany (DUH) (2021)
[13] Heinrich-Böll-Stiftung (2014)

reduction targets for the agricultural sector. The **EU must develop an appropriate reduction framework for agricultural methane.** The following opportunities can be used to address methane emissions in EU agriculture:

- The European **Effort Sharing Regulation (ESR)** is under revision in the first half of 2022. Here, concrete reduction targets for greenhouse gases must be defined particularly for the agricultural sector. In addition to carbon dioxide, all relevant greenhouse gases such as methane must be given specific reduction targets. Only the consistent inclusion of SLPCs will ensure that the previously described effect of slowing climate change in the short-term can be brought about. The minimum is a specific target for the bundle of climate relevant non-CO_2 emissions from the agricultural sector must be addressed with a specific target.
- The revision of the **Industrial Emissions Directive (IED)** offers another opportunity to address methane emissions from agriculture. The aim of the directive is to reduce pollution from industrial plants. Currently, cattle farming is not included, although it is the largest source of anthropogenic methane in Europe. Consequently, the revised directive must include this important industry.
- The **Gothenburg Protocol**, which is a specification of the UNECE's Convention on Long-Range Transboundary Air Pollution (CLRTAP) on the reduction of harmful air pollutions, will be revised in 2022. The Protocol was converted into EU law via the National Emission Ceilings Directive (NEC directive). Although methane is a precursor of harmful tropospheric ozone, neither the Convention nor the EU Directive cover this gas. This is why the EU must work for the inclusion of methane in the Gothenburg Protocol.
- Since the first proposal of the **Methane Regulation** from the EU Commission does not set binding methane reduction targets for agriculture yet, Member States must be encouraged to take the initiative for their methane reduction efforts under the regulation and go beyond the energy sector. In addition, the Commission must commit itself to completing the regulation for the agricultural sector in the next revision and take the necessary steps for this already now.

Furthermore, methane mitigation in agriculture must not be impeded by negative developments in other policies such as during the **revision of the LULUCF Regulation**. The sectors of land use, land use change and forestry (LULUCF) are an important building block for the EU to meet its commitment to become climate neutral by 2050 and to reduce its climate-damaging greenhouse gases by at least 55 percent by 2030 compared to 1990 levels. In July 2021, the EU Commission presented its proposals for the amended LULUCF Regulation as part of the Fit for 55 climate package. The aim is to sharpen this already existing legislation and to adapt it to the new climate targets for 2030 and 2050.

However, the proposal foresees to **merge the agricultural and the LULUCF sectors from 2031 onwards** in order to use natural sinks to offset emissions from agriculture. This should be rejected as it **carries several risks**. The sink function of different types of land use must not be overestimated. Sinks such as forests and peatlands are affected by climate change, which is why it is not certain to what extent they will be able to fulfil their sink function in the future. Furthermore, established sinks can be reversed and degraded at any time. Moreover, the intended merger should neither justify nor lead to "business as usual" in agriculture and hinder methane mitigation efforts. Emissions from agriculture, especially methane, must be accounted for with separate and binding targets.

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