HIGH STEAKS

How focusing on agriculture can ensure the EU meets its methane-reduction goals

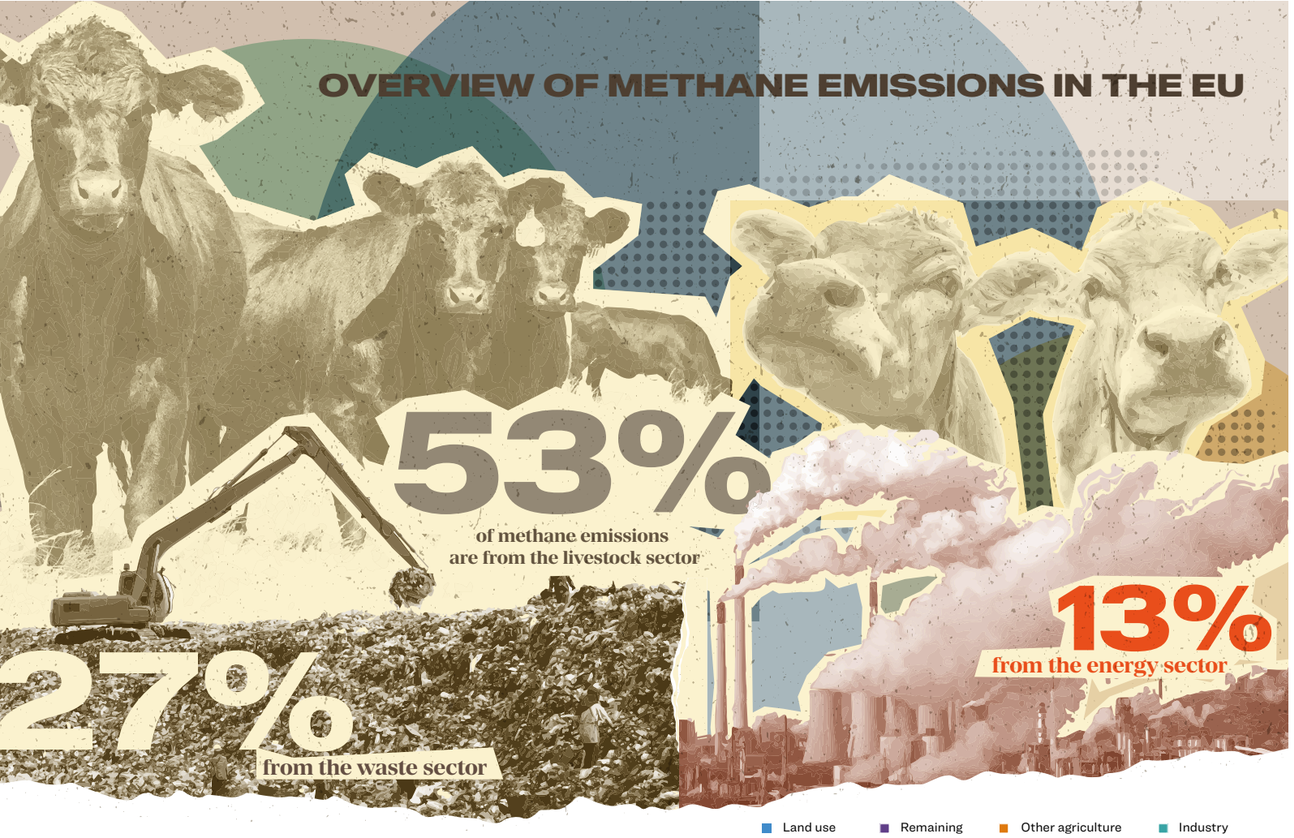
INTRODUCTION

A new study shows that the EU could cut as much as 68% of its domestic methane emissions by 2030 if it implemented all the available mitigation measures across high-emitting sectors.

The EU, as one of the instigators of the Global Methane Pledge, has committed to significantly reducing methane emissions by 2030. But a new study, undertaken by environmental consultancy CE Delft for the Changing Markets Foundation, concludes that it will be very difficult – if not impossible – to achieve this without introducing additional measures in the meat and dairy industries, which produce over half of domestic methane emissions.

The study investigates the potential of methane reductions across different EU sectors. It found that the biggest methane reductions – up to 36% – could come from tackling emissions in the agriculture sector.

This briefing summarises the main findings of the study and highlights key policy priorities that the EU should adopt now in the agriculture sector in order to realise significant methane reductions in line with its climate commitments.



METHANE EMISSIONS IN THE EU

In the EU, domestic anthropogenic sources of methane emissions amount to 15.2 megatonnes (Mt) per year. This is roughly equivalent to the total emissions from 100 coal-fired power plants.[A]

The majority of methane emissions come from three sectors. In 2019, 53% of emissions came from the **agricultural sector** (largely from meat and dairy production as cattle contribute a disproportionate proportion of these emissions), 27% from the **waste sector** and 13% from the **energy sector**. While the EU contributes 5% to global methane emissions, the Impact Assessment of the EU's 2030 Climate Target Plan concluded that reducing all greenhouse gases (GHGs) to 55% by 2030 would require an accelerated effort to tackle methane emissions.[1]

> **The year 2021 was the fifth-hottest year in the past 52 years, while the last seven years rank as the hottest on record overall. Europe saw its warmest summer ever, and record precipitation across Belgium, Germany and eastern France, which contributed to extreme flooding.[2] At the same time, greenhouse gas concentrations continued to rise in 2021 and are at their highest levels on record, with the increase of methane being particularly large.[3]**
>
> – **EU Copernicus Climate Change Service**

A This was calculated through the US EPA's website, which uses a 100-year conversion factor of the Global Warming Potential (GWP) 25 - from the IPCC's Fourth Assessment Report. This is less than the current IPCC's understanding of methane (GWP 27–30), and is considered a very conservative estimate. Furthermore, it makes more sense to calculate methane emissions over a 20-year basis, as this is the crucial time frame for climate action. For more information, see: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Using the EU Reference Scenario 2020, the CE Delft study shows that, under a business-as-usual scenario, by 2030 the EU's methane emissions will fall by just 13.4%. The smallest reductions across methane-intensive sectors (-3.7%) will happen in agriculture, despite it being the biggest methane-emitting sector.

In 2020, the EU adopted a Methane Strategy, in which it set forth some measures across the three methane-emitting sectors; but these fall short of what is needed according to both the science and the EU's international commitments. In particular, the Methane Strategy was adopted before the EU signed up to the Global Methane Pledge, which collectively obliges signatories to cut their methane emissions by 30% compared to a 2020 baseline.

WHY FOCUS ON METHANE?

In recent years, scientists have emphasised that climate policies should prioritise tackling methane – the second-most important GHG (after carbon dioxide (CO_2), responsible for about 0.5°C of warming today.[4] Because methane is a very potent but short-lived gas, the swift reduction of methane emissions is a key opportunity to slow the rate of warming.[5,6]

Cutting CO_2 emissions alone will not be enough to meet current targets. Simultaneously slashing other short-lived but potent pollutants, such as methane, could cut the rate of global heating by half between 2030 and 2050, significantly improving chances of remaining below the 1.5°C target.[7] In its landmark Global Methane Assessment (GMA) in April 2021, the UN Environment Programme (UNEP) concluded that 'global methane emissions must be reduced by between 40–45% by 2030 to achieve least-cost pathways that limit global warming to 1.5°C this century' and could avoid 0.3°C by 2040.[8] This is why efforts to cut methane must complement other urgent measures to cut more long-lasting CO_2 emissions.

The EU, alongside the United States, spearheaded the Global Methane Pledge (hereafter 'the Pledge'), which aims to 'reduce global methane emissions by at least 30% from 2020 levels by 2030'.[9] Launched at the 2021 UN Climate Conference (COP26) in Glasgow, more than 110 countries have committed to the Pledge so far. But while it represents an important milestone by committing signatories to collectively reducing global anthropogenic methane emissions across all sectors, the Pledge falls 10–15% short of the cuts needed to ensure consistency with the 1.5°C target.[10]

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KEY FINDINGS

CE Delft designed three scenarios, representing different levels of ambitions in terms of EU methane-reduction targets, and identified the mitigation measures that would be needed to achieve them:

- **The Pledge scenario** calculates what would be needed to reach a 30% reduction, as per the Global Methane Pledge. It concludes that a reduction of 26–34% is achievable by combining various methane-mitigation measures, distributed among the three sectors. In the agriculture sector, 10% of EU consumers would need to switch to a diet that aligns with recommended dietary guidelines, with lower meat and dairy consumption, and measures relating to better manure management and anaerobic digestion would need to be implemented. In the waste sector, measures would need to include separation and use of organic waste (as covered by the EU Waste Framework Directive) and abatement of emissions from wastewater. In the energy sector, all three measures in the European Commission's proposal for methane reduction in the energy sector (COM 2021/805) would need to be adopted.

- **The science scenario** calculates how to achieve a 45% reduction of EU methane emissions, as recommended by the UNEP Global Methane Assessment. It concludes that a reduction of 38–47% is achievable. In the agriculture sector, 50% of EU consumers would need to switch to a diet that aligns with dietary guidelines, with lower meat and dairy consumption, while only measures relating to manure management would need to be implemented. Two methane-reduction measures from the waste sector are included in this scenario, in addition to measures found in the Pledge scenario: reduction of food waste, and loss and stabilisation of organic waste before landfilling. Measures in the energy sector would be the same as those in the Pledge scenario.

- **The maximum potential scenario** is a scenario in which all methane-mitigation measures are included to calculate their maximum potential. Here, 100% of EU consumers would need to switch to a diet that aligns with dietary guidelines, and all the other technical measures across the three sectors would need to be implemented. This scenario would lead to a reduction of 49–68% in the EU's annual methane emissions – as much as 7.5 to 10.3 Mt per year.

	Maximum scenario	Pledge scenario	Science scenario
Livestock agriculture			
Healthier consumer diets	**100%**	**10%**	**50%**
Animal feed changes and additives	✕		
Selective breeding	✕		
Animal health management	✕		
Anaerobic digestion of manure	✕	✕	✕
Other manure management	✕	✕	✕
Energy sector			
Leak detection and repair (LDAR)	✕	✕	✕
Replacement of existing devices	✕		
Installation of new devices	✕		
Reduction of venting and flaring in oil and gas production	✕	✕	✕
Coal mine methane management	✕	✕	✕
Waste sector			
Reduction of food waste and loss	✕		✕
Separation of organic waste	✕	✕	✕
Stabilisation of organic waste before landfilling	✕		✕
Methane recovery at landfills	✕		
Mitigation at wastewater treatment plants (WWTPs)	✕	✕	✕
EU methane reduction potential (Mt/year)	**7.5-10.3**	**4.0-5.2**	**5.7-7.2**
EU methane reduction potential (%)	**49-68%**	**26-34%**	**38-47%**

Table 1: Overview of measures included in all three scenarios

Crucially, none of these scenarios can be realised without implementing policies that drive the uptake of measures in the livestock agriculture sector. The adoption of healthier consumer diets alone could reduce EU methane emissions by 15–19%, if new policy initiatives incentivised consumers to switch to a diet that aligns with dietary guidelines, with lower meat and dairy consumption.

Livestock methane: Offering huge potential

The agricultural sector is the largest source of methane emissions in the EU, emitting 8 Mt per year. This is equivalent to the total emissions from 50 coal-fired power plants.[B] Most of the sector's emissions (82%) are caused by the digestive systems of ruminants, known as enteric fermentation, with cattle being by far the largest culprit (responsible for 86% of these emissions). The remaining 18% of the sector's emissions are caused by manure.

Yet agriculture is also the sector that current EU policies neglect the most. From now to 2030, a mere 3.7% reduction of non-CO_2 emissions (including methane) in the agriculture sector is expected under current policies and developments (known as business-as-usual trends). The recently released Industrial Emissions Directive (IED) proposal,[11] which includes livestock farms that have over 150 livestock units, could lead to an additional 2–4% of reductions from technical measures (such as manure management); but these reductions might come too late, as proposals will only be implemented from 2027 onwards and farmers will have 3.5 years to comply. Farms covered by IED represent 43% of EU's livestock methane emissions.[12]

Looking at a set of technical and behavioural measures, CE Delft estimated the total (theoretical) methane-reduction potential in EU livestock agriculture at 38–67% (2.9–5.2 Mt/year) by 2030 if all of them were to be implemented (see Table 2). The latter figure of 5.2 Mt/year is over one-third of overall EU methane emissions.

The largest potential comes from policies driving a switch to healthier diets. This does not mean a vegetarian or vegan diet, but rather a diet with reduced meat and dairy consumption.[C] If EU consumers on average halved their consumption of pork and beef, and reduced their milk consumption by 25%, this would theoretically lead to a 29–37% reduction in the sector's methane emissions – a reduction of 15–19% of the EU's total methane emissions (almost half of the 45% reduction goal set by the Global Methane Assessment). The CE Delft study assumes that EU meat and dairy exports would stay the same, as the switch to healthier diets would not have an impact outside of the EU. Reducing consumption of meat and dairy is also estimated to have a small impact on the reduction of food waste.

B Calculated with: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

C The required reduction is based on an average calculated using EU Member States' national dietary health guidelines and EU consumers current intake of meat and dairy products (in calories).

THE HEALTH BENEFITS OF REDUCING OVERCONSUMPTION OF MEAT AND DAIRY

A strong body of evidence shows a clear link between high intake of red and processed meats and a higher risk for heart disease, certain types of cancer, diabetes and premature death.[13] The CE Delft study found that EU consumers would need to cut their red-meat consumption (beef and pork) by around 50% to align with dietary guidelines. Reducing overconsumption of processed and red meat (such as beef) should therefore also be perceived as a priority from a public health perspective, which could also lead to significant reduction in public health spending in many EU countries.

CE Delft also investigated the methane-reduction potential of various technical measures in livestock agriculture, which have been identified in the scientific literature. These measures have been divided into two categories: measures related to feed and animal-health management, and measures related to manure. The first could yield reductions of 4–23% if interactions with other measures (especially the reduction of livestock numbers due to healthier diets) are taken in account. On their own, they could achieve a 6–37% reduction in livestock agriculture. This wide range between low and high estimates is largely a reflection of the level of uncertainty associated with the effectiveness of these measures[14] and their associated costs, which could undermine their adoption rate.[15]

	Estimation (low)	Estimation (high)
Individual measures*		
Healthier consumer diets	**29%**	**37%**
Animal feed changes and additives	**1%**	**12%**
Selective breeding	**3%**	**8%**
Animal-health management	**0%**	**3%**
Anaerobic digestion of manure	**2%**	**3%**
Other manure management	**2%**	**4%**
Sector-level		
Total reduction percentage	**38%**	**67%**
Total reduction volume (Mt/year)	**2.9**	**5.2**

** Reduction potential of individual measures relative to sector emissions in 2030. Overlap between measures has been considered when estimating reduction percentages.*

Table 2: EU methane reduction potential in livestock agriculture between 2020 and 2030

Measures related to manure management could lead to a 4–7% reduction in methane emissions. Without accounting for interactions with other measures (such as demand reduction due to healthier diets), they could yield an 8–14% reduction. Several methods to alleviate emissions from manure exist. These are mostly relevant to the storage of manure from large intensive farms, and include decreasing manure storage time, storage of manure at rest, cooling of manure, solid–liquid separation, better manure storage covering, composting of manure, a switch to dry manure management and manure acidification.

EU policies are increasingly turning to fostering anaerobic digestion of manure in digestion units. This allows manure to be converted into biogas, which, once upgraded to biomethane by removing CO_2 and other gases, has a gas composition similar to that of natural gas. The sooner manure is digested, the lower the methane emissions from manure storage. However, methane emissions are also released from the digestate, and methane leakages occur during the digestion process, which is why a limited methane reduction was estimated for these measures. It is worth noting that anaerobic digestion, because of the economic incentive from biogas production, can have the perverse effect of increasing livestock production, and therefore methane emissions overall (especially because livestock's enteric fermentation contributes far more than their manure).

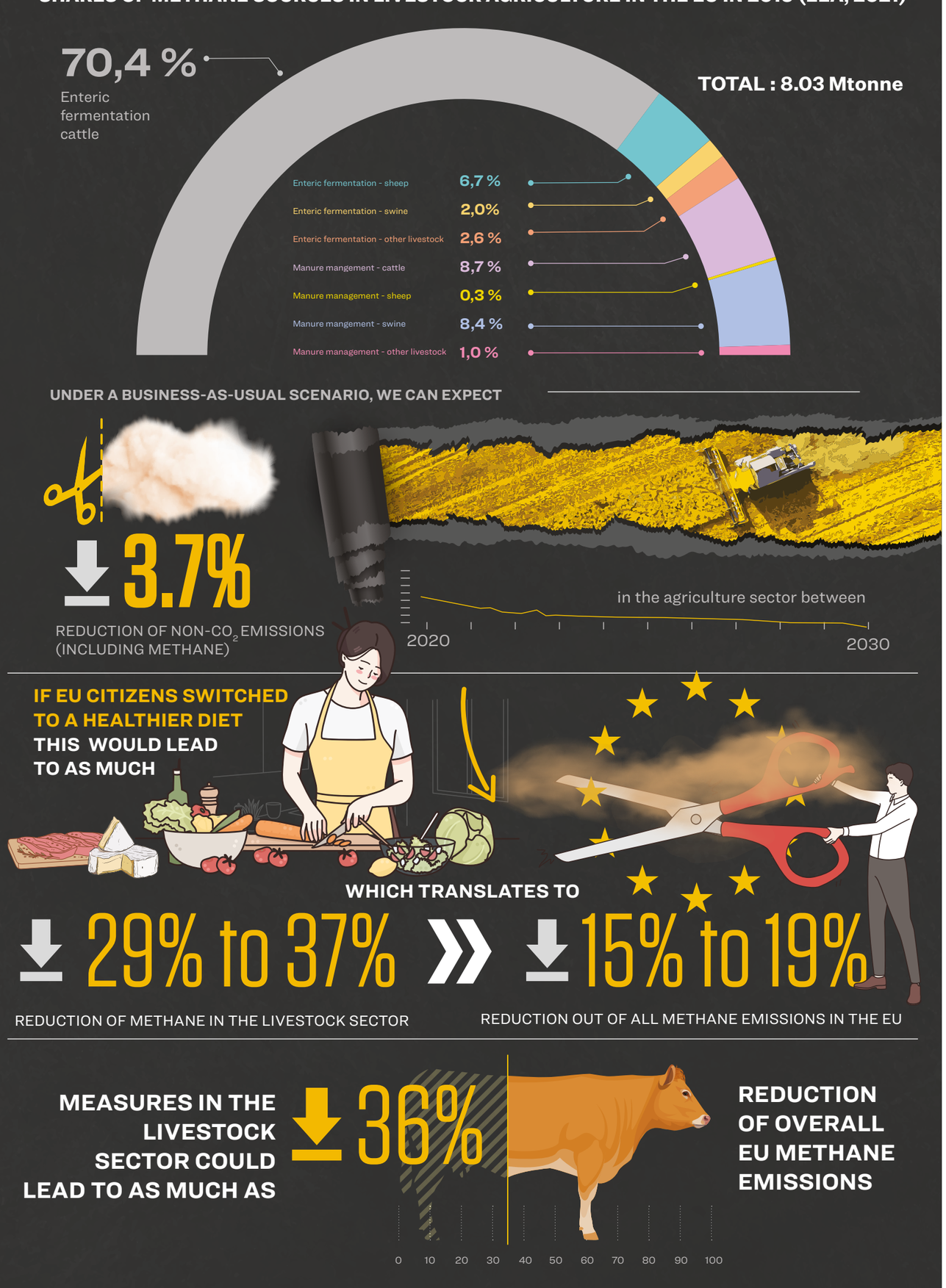
Taken together, implementing technical measures at a farming level, better manure management and a reduction of meat and dairy consumption could yield a 21–36% reduction in the EU's total domestic methane emissions. In comparison, the domestic energy sector could only yield a 4–6% reduction. This highlights the huge potential of the livestock sector for reducing methane emissions.

The blind spot of EU policies

As an integral part of the European Green Deal, which commits the EU to reducing GHG emissions by 55% by 2030 (compared to 1990 levels), EU decision-makers have placed reduction of methane emissions high on the agenda. In 2020, the EU Methane Strategy was adopted,[16] which sets out plans to cut methane across all three high-emitting sectors (energy, agriculture and waste). The European Parliament welcomed this and, in October 2021, called on the European Commission to propose a fair, comprehensive and clear legislative framework, setting binding measures and methane-reduction targets across all sectors.[17] The EU is also an instigator of the Global Methane Pledge, and must therefore set an example by adopting ambitious policies to drive methane reductions across all three sectors.

However, the European Commission's current efforts to reduce methane emissions in the agricultural sector lack ambition and urgency, despite significant potential. While the revision of the IED (and inclusion of large cattle farms) is a step in the right direction, it will have very limited impact until 2030. In addition, the IED proposal foresees a "lighter permitting regime" and many exclusions from general obligations and enforcement rules under the IED which create significant loopholes. Strategies laid in the REPowerEU plans to increase biomethane production from manure also have limited impact.

Equally, strategies to include the agriculture sector in Land Use, Land Use Change and Forestry, so as to balance emissions with carbon sinks and 'reach climate neutrality by 2035', risk hiding true emissions from the agricultural sector post-2031 and will fail to incentivise absolute reduction in methane emissions from animal farming.[18]



The implementation of the Farm-to-Fork strategy, on the other hand, through the adoption of the Sustainable Food Systems Framework Law has true potential to lay a framework that promotes a transition towards consuming less and better meat and dairy in the EU – which has the potential to deliver the highest methane reductions. This is also a crucial first step to move away from intensive factory farming, which is the approach that would yield the greatest methane and also the EU's overall GHG emissions from agriculture.[19]

The policies driving lower intake of meat and dairy products should also be accompanied by policies transforming the EU's food-production system, moving from intensive farming to agroecology: a farming model that promotes the application of ecological and social concepts and farming practices that restore ecosystems, increase biodiversity and mitigate climate change while supporting farmers and rural communities. Previous studies have demonstrated that an agroecological system in the EU would enable the provision of healthy and culturally diverse food for Europeans, while also maintaining export capacity and reducing GHG emissions from the agricultural sector by as much as 40%.[20] The CE Delft study does not calculate the GHG benefits that would come from freeing up large areas of land to improve food-production systems and capture carbon through nature restoration, but these could be significant co-benefits from the reform of current intensive meat and dairy-farming systems.

RECOMMENDATIONS

To meet its climate goals and commitments made under the Global Methane Pledge, the EU and its Member States need to step up existing ambitions to tackle methane emissions from the agricultural sector. They should:

1. Set methane emission-reduction targets

- The European Commission should set an EU-wide methane-reduction target in the agriculture sector that aligns with the science.
- Member States should have specific national targets for their agricultural methane emissions, which should be separate from other GHGs and other sectors.

2. Promote healthier diets with less and better meat and dairy

- Under the umbrella of the upcoming Sustainable Food Systems Framework Law, the EU and its Member States should implement policies to make healthier and plant-rich foods more accessible, affordable and convenient – with special attention paid to more vulnerable groups. This should be at the heart of the EU's proposals implementing the Farm-to-Fork Strategy.
- Member States should incorporate elements of sustainability into their national dietary health guidelines (countries such as Germany, the Netherlands and Sweden are already taking the lead), and must adopt strategies for their implementation. For example, public procurement can be instrumental in deploying demand for plant-based products.
- Member States should consider fiscal measures, from incentives (rewards of monetary value, such as subsidies or vouchers) for healthy and sustainable foods to disincentives (such as taxes) for meat products.

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3. Regulate EU companies to reduce their emissions

- The European Commission must propose binding measures relating to methane for corporations with headquarters or operations in the EU, including methane-reporting and -reduction targets. Binding measures should require these major emitters to report on all their emissions, as well as to report their methane emissions separately, as stated in the EU Methane Strategy.
- In addition, companies should establish climate targets based on the science and time-frames aligning with a 1.5°C maximum temperature increase target, and develop specific action plans for reducing their methane emissions. In their emissions-reporting and -reduction plans, they must include emissions from their supply chains ('scope 3 emissions') and disclose concrete investments to meet their reduction targets.
- Member States should consider imposing national targets for meat-sales reduction in supermarkets, which could also lead to positive outcomes such as the reformulation of products and rules on marketing and promotion of meat products.

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The main findings and emission reduction figures in this briefing are based on the study commissioned to the independent consultancy CE Delft.
The full study 'Methane reduction potential in the EU, between 2020 and 2030' is available at: http://www.changingmarkets.org/portfolio/growing-the-good/


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