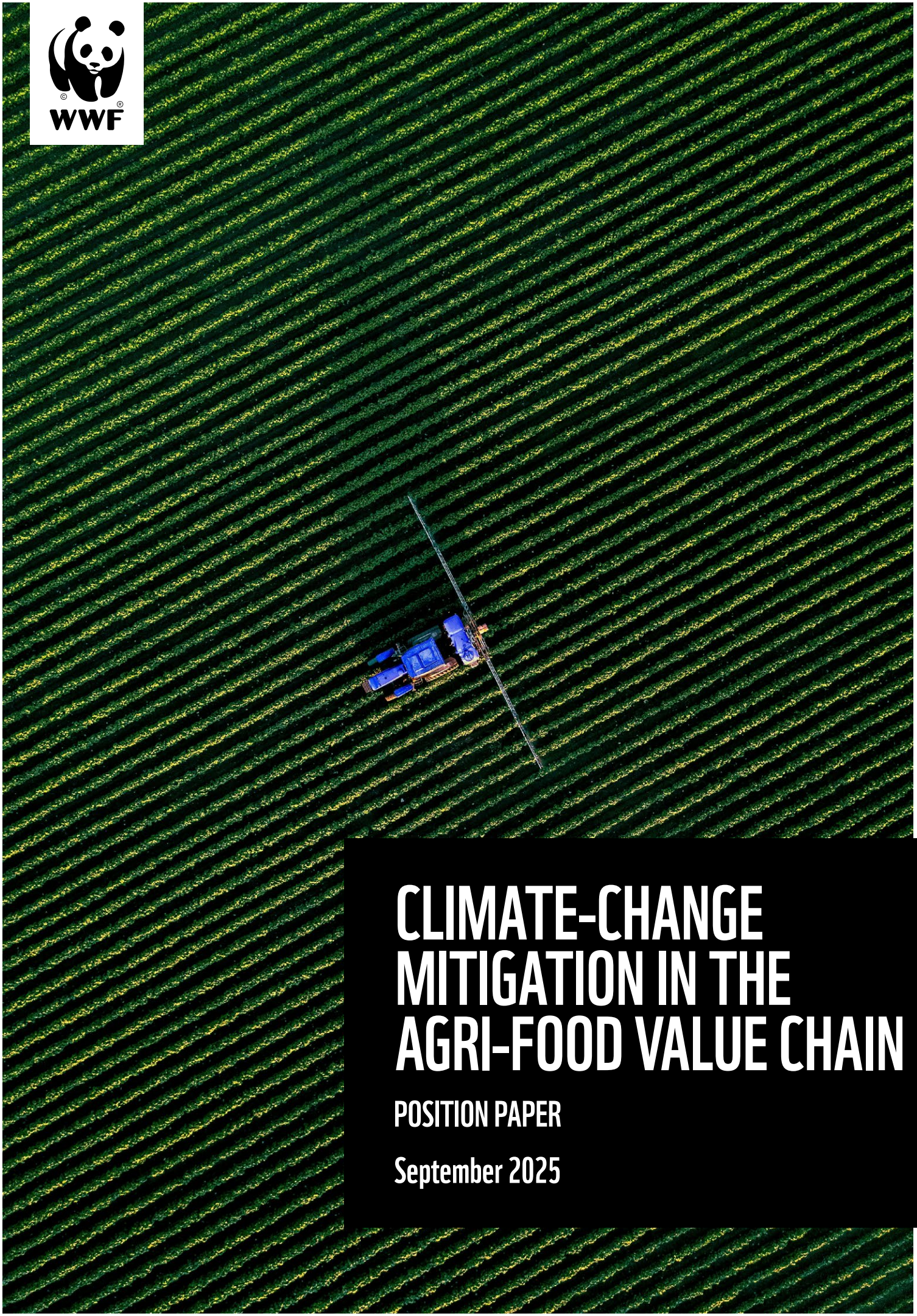

CLIMATE-CHANGE MITIGATION IN THE AGRI-FOOD VALUE CHAIN

POSITION PAPER

September 2025

Written by the WWF European Policy Office.

WWF is an independent conservation organisation, with over 38 million followers and a global network active through local leadership in over 100 countries. Our mission is to stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption

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EXECUTIVE SUMMARY

Agriculture plays a major role in contributing to climate change. In 2023, the agricultural sector was responsible for over 14% of total EU net emissions. The majority of these emissions come from methane (CH_4) and nitrous oxide (N_2O) emissions from livestock and fertilisers respectively, as well as carbon dioxide (CO_2) from organic soils. These emissions must be reduced if the EU is to meet its climate neutrality goal and avoid catastrophic environmental consequences.

While farmers are already facing increasing threats from climate impacts, such as extreme weather, changes in rainfall patterns, and increased risks from pests and diseases, the agri-food sector remains a major source of emissions and environmental degradation, exacerbated by geopolitical and economic vulnerabilities. Current EU legislation does not provide enough incentives for farmers to lower their agricultural emission. Overall emissions from the sector have mostly stagnated for the past two decades (since 2005), and projections show that under business as usual the sector will not achieve the reductions needed to align with limiting global warming to 1.5°C.

The livestock sector, particularly cattle farming, is the biggest source of agricultural emissions. This because cattle farming is a major producer of CH_4, a powerful, short-lived climate pollutant that has a global warming potential 27 times higher than a unit of CO_2 (GWP 100, this metric calculates the global warming potential of the gas over a 100-year period). Reductions in methane emissions from livestock are among the most impactful near-term climate actions.

However, technical mitigation[1] alone is insufficient; significant reductions in livestock numbers, and hence dietary changes, are also necessary. The EU's high meat consumption levels drive demand, and without changing consumption habits, emission reductions from supply-side measures risk being offset by imports. A reduction in livestock numbers also helps mitigate water pollution and land restoration, as it could free up land, including the land used for feed production, that can be used for carbon sequestration in ecosystems.

In addition to CH_4, N_2O emissions from synthetic fertilisers pose a long-term climate threat due to their high global warming potential. On top of that, reducing fertiliser use would also improve soil and water quality. Despite this, few effective policies currently exist to reduce N_2O emissions.

Peatlands are another important issue. Healthy and intact peatlands have been drained to make room for agricultural land in Europe. Once drained, peatlands are a major source of emissions, even though they only represent a small portion of EU agricultural land. Rewetting degraded peatlands offers a high-impact mitigation opportunity with numerous co-benefits, yet current climate action for peatland rewetting remains limited due to financial, regulatory, and practical barriers.

There is also great potential to store more carbon in farmland by using nature-based solutions and climate-friendly farming methods. Examples include agroforestry (e.g. planting fruit bearing trees among crops), cover cropping (crops benefitting soil and future crops rather than harvesting), and ecosystem restoration. The sector holds untapped potential for removals, but this requires robust monitoring and prioritisation of environmental integrity.

Lastly, none of these changes will be achievable without being rooted in just transition principles. Many farmers already face economic hardship, and changes in agricultural practices affect not only production but also community identity, employment, and land value. Policy shifts must therefore be socially inclusive, context-specific, and equitable. For this reason, we need a holistic approach that integrates environmental, social, and economic goals. Only through systemic, coordinated action across all levels can the transformation of the agri-food sector be both effective and fair.

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1 Technical mitigation is the application of technologies and management practices aimed at reducing greenhouse gas (GHG) emissions or enhancing carbon sequestration. These measures include improvements in crop and livestock management, manure handling, fertiliser use efficiency, and adoption of low-emission technologies.

POLICY RECOMMENDATIONS

1. **Ensure a fair and just transition:** Design participatory, territorial-based transition plans that support farmers and rural communities with tailored financial, technical, and accessible social measures.

2. **Reform the Common Agricultural Policy (CAP):** Redirect CAP funding to ensure a just transition of the farming sector by repurposing it towards environmental sustainability, equity, and agroecology, ending harmful subsidies and linking payments to measurable climate and biodiversity outcomes.

3. **Reform the Renewable Energy Directive (RED) bioenergy rules:** End all the incentives in the RED for bioenergy produced from dedicated crops; fully implement the cascading use principle (namely prioritising high-value uses of biomass over lower-value ones, the lowest being burning it); and ensure that the scarce biomass available for energy is used in sectors with no other options.

4. **Implement the Nature Restoration Regulation (NRR):** Require Member States to develop ambitious, well-funded restoration plans that enhance biodiversity and climate resilience.

5. **Strengthen the implementation and enforcement of the Land Use, Land Use Change and Forestry Regulation (LULUCF):** Reverse the decline of the EU's land carbon sink by implementing climate-friendly farming practices and nature-based solutions such as agroforestry and peatland restoration.

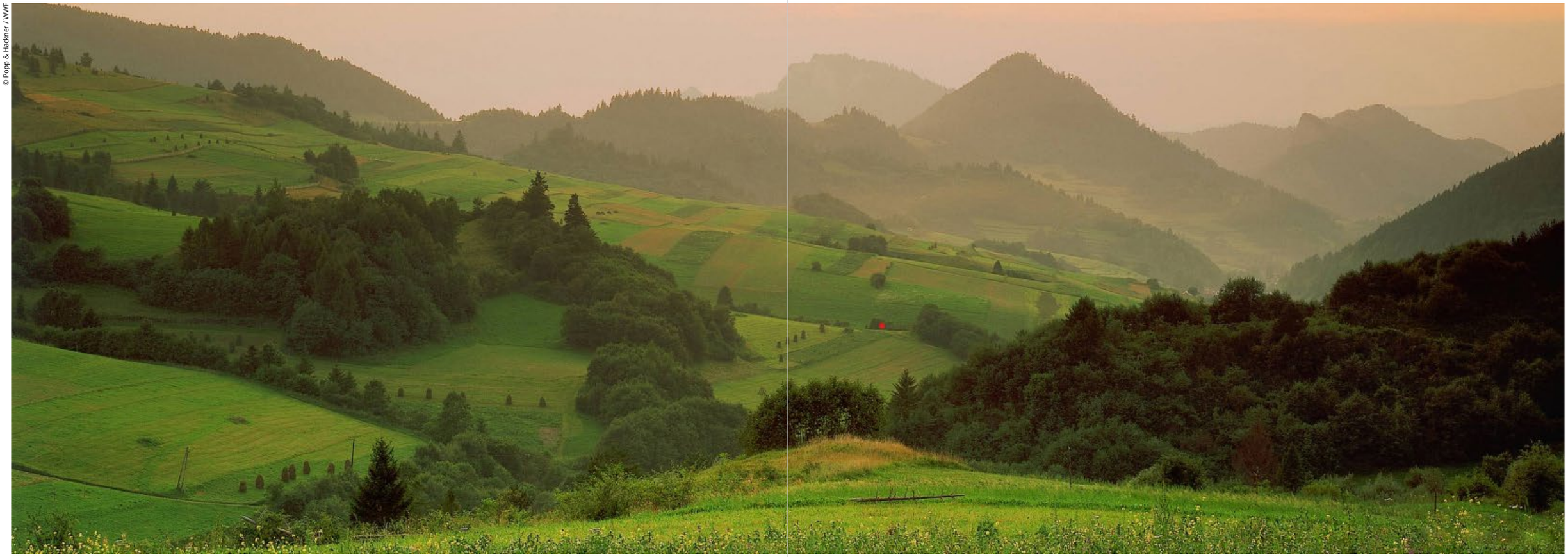
6. **Improve carbon removals governance**: Ensure that carbon farming and carbon removal credits meet strict environmental standards and are never used to offset emissions in compliance markets such as the Emissions Trading System (ETS).

7. **Set ambitious agriculture emissions targets:** Introduce a binding, standalone 1.5°C-compatible gross reduction target for agricultural non-CO_2 emissions.

8. **Introduce carbon pricing to operationalise the polluter pays principle:** Assess and implement socially just carbon pricing for agri-food emissions, with revenues reinvested in climate-positive practices.

9. **Develop a sustainable livestock strategy:** Promote extensification, high animal welfare, and reduced feed imports while supporting regional diversity and phasing out high-density industrial systems, especially in nitrate vulnerable zones.

10. **Promote a reduction in demand for animal products and incentivise healthy and sustainable diets:** Launch EU-wide actions to reduce meat and dairy consumption and increase consumption of low-impact plant-based proteins (e.g., wholegrains, beans, and local nuts), including fiscal measures, food labelling, and public procurement reforms.



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INTRODUCTION

To achieve the EU's climate neutrality goal and so help to save people and nature from catastrophic climate change impacts, reducing greenhouse gas emissions (GHGs) from the agri-food value chain is crucial.

Europe is facing escalating environmental crises, heatwaves, droughts, and floods that threaten food production and expose the fragility of the current food system. These extreme weather events already cause €28.3 billion of average annual loss, a figure projected to rise to €40 billion by mid-century.[2] Farmers and fishers face potential income losses of up to 16% by 2050.[3] While they bear the brunt of these impacts, science shows that intensive agriculture is a major contributor to biodiversity loss, climate change, and pollution. The war in Ukraine has further exposed the food system's reliance on fossil fuels and fertilisers, exacerbating living costs and vulnerabilities.

There is strong consensus among scientists, the public and major investors on the need to transform food systems to ensure long-term food security, environmental sustainability, and social fairness. Urgent mitigation and adaptation actions are needed. This effort should be carried out by adopting measures that simultaneously enhance climate resilience within the sector, improve air and water quality, and protect and restore biodiversity. The transformation of the sector should be carefully managed to be fair and just, with farmers, other agri-food sector workers and communities supported in the transition, and consumers enabled to access affordable and healthy food.

2 European Investment Bank, Insurance and Risk Management Tools for Agriculture in the EU (2025) https://www.fi-compass.eu/sites/default/files/publications/EAFRD_AGRI_Insurance_Risk_MA.pdf.

3 WWF, Carbon dioxide removals: recommendations for a European strategy (2025) https://wwfeu.awsassets.panda.org/downloads/cdr-policy-recom-final.pdf p. 6.

AGRICULTURE EMISSIONS & CLIMATE CHANGE

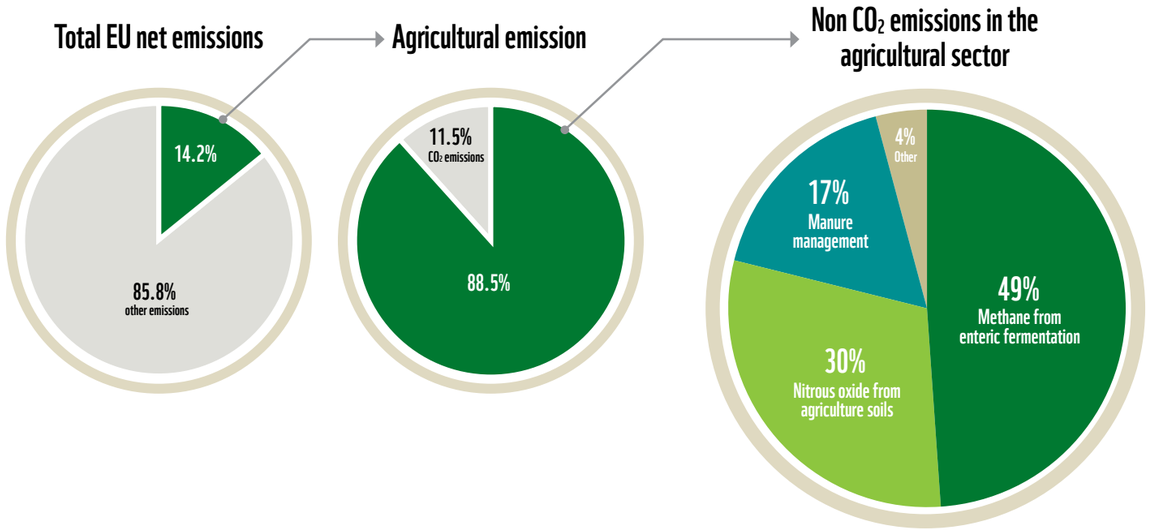
The European Environmental Agency (EEA) reports that in 2023 the agriculture net emissions amounted to 14.18% of the total EU net emissions. This percentage includes 12.55% of net emissions associated with non-CO_2 emissions, and 1.63% of net emissions associated with carbon dioxide (CO_2) emissions and removals from cropland and grassland.[4]

Within non-CO_2 emissions, the majority of agriculture emissions are represented by methane (CH_4) emissions from enteric fermentation (a natural digestive process of ruminant animals)[5] and nitrous oxide (N_2O) emissions from soils due to use of fertilisers. These are responsible for 49% and 30% of total non-CO_2 emissions in agriculture respectively.[6] Thereafter, CH_4 from manure management is the third most important source of GHGs emissions (17% of the total non-CO_2 emissions). Meanwhile, as already said above, most of the CO_2 emissions in the sector come from drained and degraded peatlands that have been converted from wetlands to cropland or grassland.[7]

Agriculture emissions in European legislation are covered at the highest level by the European Climate Law, which sets a target for climate neutrality by 2050 for the European bloc, with net negative emissions thereafter.[8] Under this main target, non-CO_2 emissions are covered in the EU Effort Sharing Regulation (ESR), while CO_2 emissions from organic soils (croplands and grasslands) are regulated under the Land Use, Land Use Change and Forestry (LULUCF) Regulation.

The ESR sets an annual target for each Member State for the period 2021-2030, aiming for a collective 40% emission reduction from several sectors, compared to 2005 levels.[9] However, under the ESR, agriculture emissions are grouped with other sectors where emissions reductions are normally easier, including buildings and transport, limiting the incentive for change.

This legislation is complemented by the LULUCF Regulation, which sets an EU-wide target for increasing the net sink to -310 $MtCO_2$-eq by 2030, requiring emission reductions from land used for agriculture.[10] However, again, in the LULUCF sector the incentive to reduce emissions from grasslands and croplands is limited, because their net positive emissions are more than offset by the significant net negative emissions associated with forest land, which is also included in LULUCF targets. Furthermore, the LULUCF currently allows Member States to offset emissions in the ESR with land-based removals in the LULUCF sector.



Source: European Environmental Agency

4 European Environmental Agency, Greenhouse gases - data viewer (2023) https://www.eea.europa.eu/en/analysis/maps-and-charts/greenhouse-gases-viewer-data-viewers. It has been criticised that emissions from organic soils are understated in the national greenhouse gas inventories, see for example Barthelmes, A. (ed.), Reporting greenhouse gas emissions from organic soils in the European Union: challenges and opportunities (2018) Greifswald Mire Centre https://greifswaldmoor.de/files/dokumente/GMC%20Schriften/18-02_Barthelmes_GMC.pdf.

5 Food and Agricultural Organisation of the United Nations, Livestock and Enteric Methane, https://www.fao.org/in-action/enteric-methane/background/en.

6 European Environment Agency, Greenhouse Gas Emissions from Agriculture (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-agriculture.

7 TJ Mattila, The role of peatlands in carbon footprints of countries and products, 947 Science of the Total Environment 174552 (2024) https://doi.org/10.1016/j.scitotenv.2024.174552. FAOSTAT, Emissions from drained organic soils (2023) https://www.fao.org/faostat/en/#data/GV.

8 Article 2(1) and Article 4(1) Regulation (EU) 2021/1119 European Climate Law.

9 Article 1 and 2(1) Regulation (EU) 2018/842 Effort Sharing Regulation.

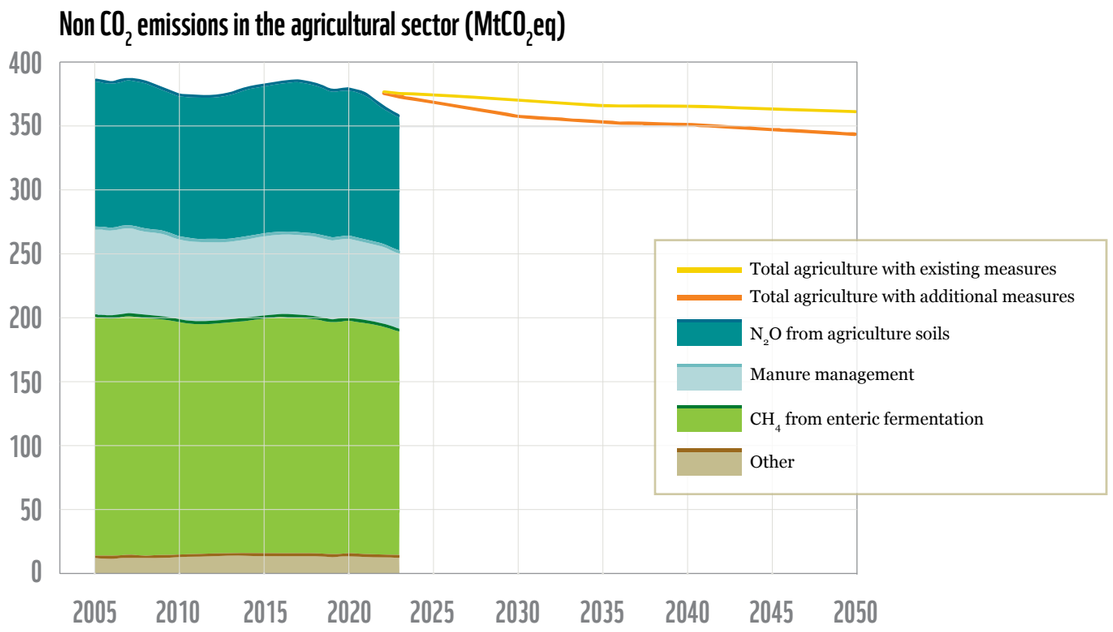
10 The LULUCF Regulation covers CO_2 emissions from the management of cropland, grassland, wetlands, forests, settlements, as well as changes in land use including afforestation (i.e., planting trees), deforestation, or draining of peatlands. Article 2 Regulation (EU) 2018/841 Land Use, Land Use Change, and Forestry.

THE TRAJECTORY OF AGRICULTURE EMISSIONS

The non-CO_2 emissions of the agricultural sector have largely remained unchanged since 2005.[11] The EEA routinely publishes emission trends and has found that between 2005 and 2022, agriculture emissions only fell by 5%; and estimates indicate that these emissions fell an extra 2% between 2022 and 2023.[12] However, trends vary depending on the Member State.[13] Zooming in on CH_4 emissions, between 1990 and the early 2000s, CH_4 emissions from the agricultural sector decreased, but since 2010 they have stagnated.[14]

Likewise, any attempts to reduce agricultural CO_2 emissions in the LULUCF sector have not made much progress and the overall LULUCF sink has been declining over the past decade, mainly due to human activities, suggesting that the regulation has not been fully successful.[15] This has mostly been due to increased harvesting of forests.[16]

Current progress indicates that further action is needed to reduce emissions in the sector.[17] The most recent EU Climate Action Progress Report, published in 2024, finds that the national 2030 targets require each Member State to increase its climate ambition and implement additional agriculture and forestry policies.[18] WWF conducted an assessment of the current agriculture emissions projections regarding progress towards the 2030 and 2050 targets in its 'The 2040 Horizon Report' and confirmed that the decrease of non-CO_2 emissions projected by 2050 is not compatible with 1.5°C compatible pathway requirements.[19] Likewise, zooming in on the current progress of corporates in the value chain, recent reports from the Institute for Agriculture and Trade Policy[20] and Carbon Market Watch[21] indicate that there are some concerns over transparency and the use of nature-based sequestration to offset emissions from livestock; and that the current actions by companies will not lead to the structural emissions reductions needed.



Source: European Environmental Agency, Greenhouse Gas Emissions from Agriculture (2024).

11 European Scientific Advisory Board on Climate Change, Towards EU Climate neutrality target: progress, policy gaps and opportunities (January 2024) p.153.

12 European Environment Agency, Greenhouse Gas Emissions from Agriculture (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-agriculture.

13 The European Environmental Agency reports that emissions increased in 11 Member States, and decreased in 16 Member States. Agriculture emissions fell by more than 10% in Croatia, France, Greece, Italy, Romania, and Slovakia - while they grew by more than 10% in Bulgaria, Estonia, Ireland, and Latvia. See ibid.

14 European Environmental Agency, Methane, climate change and air quality in Europe: exploring the connections (2025) https://www.eea.europa.eu/en/analysis/publications/methane-climate-change-and-air-quality-in-europe-exploring-the-connections#:~:text=In%20Europe%2C%20anthropogenic%20methane%20emissions,anthropogenic%20methane%20emissions%20in%20Europe Figure 2. Despite the emissions reductions in Europe, methane concentration in the atmosphere is increasing, see Figure 3.

15 See European Environmental Agency data visualisation, EU Emissions and removals of the LULUCF sector by main land use category (2023) https://www.eea.europa.eu/data-and-maps/daviz/eu-emissions-and-removals-of-2#tab-chart_2.

16 Satellite data shows more than 82% of forest disturbances coming human interventions, see A Korosuo, The role of forests in the EU climate policy: are we on the right track? (2023) Carbon balance and management https://cbmjournal.biomedcentral.com/articles/10.1186/s13021-023-00234-0. Timber harvest is the most significant disturbance in Europe, accounting for 83-86% of all the forest area losses from 2001 to 2019, followed by storms (6-7%), fires (3-5%) and bark-beetles (less than 3%) based on the data from two independent studies. See F Ritter et al., Alarming decline in the carbon sink of European forests driven by disturbances (2025) Research square https://www.researchsquare.com/article/rs-3671432/v1 Figure 1C.

17 To note that the LULUCF Regulation target is also not expected to be met seen current trends, see European Environment Agency, Greenhouse Gas Emissions from Land Use, Land Use Change, and Forestry in Europe (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land.

18 ‹Report from the Commission: EU Climate Action Progress Report 2024, COM(2024) 498 final, p. 24 See also European Scientific Advisory Board on Climate Change, Towards EU Climate neutrality target: progress, policy gaps and opportunities (2024) p. 153.

19 WWF, The 2040 Horizon Report: assessing the EU's climate targets and policies against 1.5°C degree scenarios (2025) pp. 36-37.

20 Institute for Agriculture and Trade Policy, New paint old barns (2025) https://www.iatp.org/new-paint-old-barns-corporate-insetting.

21 Carbon Market Watch, Corporate climate responsibility monitor 2025: food and agricultural sector deep dive (2025) https://carbonmarketwatch.org/publications/food-and-agriculture-deep-dive-corporate-climate-responsibility-monitor-2025/.

CARBON DIOXIDE REMOVALS IN AGRICULTURE

The European Advisory Board on Climate Change (ESABCC), in its recent carbon dioxide removals report,[22] underscores the urgent need to halt and reverse the decline of the EU's land sink, a concern echoed by the EEA[23] and the Joint Research Centre (JRC).[24] CDR in the agricultural sector corresponds to activities to enhance soil carbon content e.g., agroforestry, soil management techniques (cover cropping, certain crop rotation changes and enhanced grassland management), peatland rewetting, floodplain restoration and other types of wetland restoration. At the moment, EU agricultural soils emit more CO_2 than they remove; and most of this comes from organic soils, even though they represent only 2% of the total EU agricultural area.[25] The carbon losses from soil cultivation and drainage are exacerbated by climate change, notably due to increasing drought frequency and decreasing water resources.[26]

As a major user of land, the EU agricultural sector can and should contribute to removals. However, it should be noted that data and monitoring challenges remain for soil carbon losses and sequestration potential. There are also risks of reversibility associated with land-based removal activities (for example due to natural disasters or changes in land management). Therefore, such activities cannot be treated tonne-for-tonne as an equivalent currency to fossil CO_2 or non-CO_2 emissions.

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22 ESABCC, Scaling-up carbon dioxide removals - recommendations for navigating opportunities and risks in the EU (2025) p. 136 onwards.

23 European Environment Agency, Greenhouse Gas Emissions from Land Use, Land Use Change, and Forestry in Europe (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land.

24 Joint Research Center, The State of Soils in Europe (2024) https://publications.jrc.ec.europa.eu/repository/handle/JRC137600.

25 European Environment Agency, Greenhouse Gas Emissions from Land Use, Land Use Change, and Forestry in Europe (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land. ESABCC, Scaling-up carbon dioxide removals - recommendations for navigating opportunities and risks in the EU (2025) p. 153.

26 ibid ESABCC.

VISION FOR THE SECTOR

WHAT IS THE POTENTIAL OF THE SECTOR?

The potential for the sector's reduction of GHGs emissions in line with the Paris Agreement's 1.5°C temperature goal is explored in some scientific literature. The EU-level pathways examined by the ESABCC suggest that a reduction of around 30% below 2005 levels by 2050 could be achieved largely through supply-side measures, and around 60% in the most ambitious pathways featuring additional demand-side action.[27] Similarly, the European Commission Impact Assessment scenarios find that through the implementation of technical measures it is feasible to achieve an emission reduction ranging from -19% (Scenario 2)[28] to -27% (Scenario 3)[29] compared to 2022 levels; but that demand-side measures are needed to achieve a much higher level of emission reduction (from -44% to -56% compared to the 2022 baseline, LIFE scenario).[30] A similar number is confirmed by another recent report by Agora Agriculture, which identifies a potential of 60% reduction of GHGs emissions from agriculture and agriculture peatlands by 2045, compared to 2020.[31]

In terms of real world changes, to achieve a sustainable transition of the agricultural sector, the following need to take place simultaneously within the agricultural sector:

1. A reduction in livestock emissions

Addressing livestock emissions means looking at the methane (CH_4) emissions from enteric fermentation[32] and CH_4 and nitrous oxide (N_2O) emissions from manure management. 79% of EU agricultural CH_4 emissions come from enteric fermentation; and the ongoing intensification of livestock production has led to increasing volumes of manure that can increase GHG emissions. Cattle are the biggest source of emissions: 85% of total enteric CH_4 comes from cattle (beef and dairy); 9% comes from sheep, 2% from pigs, and 3% from other livestock;[33] 47% of manure management CH_4 comes from cattle; 46% comes from pigs.[34] CH_4 emissions from livestock manure depend on the amount of manure that is produced and the portion of the manure that decomposes anaerobically (in turn depending on the type of manure management system and climate e.g., temperature).[35]

CH_4 emissions are responsible for around 30% of the rise in global temperature since the industrial revolution. The Intergovernmental Panel on Climate Change estimates that CH_4 has contributed 0.5°C of global warming since 1850-1900.[36] The implication for global warming of CH_4 emissions as opposed to CO_2 emissions is different. CH_4 is a short-lived climate pollutant: it stays in the atmosphere for around 12 years, compared with centuries for CO_2.[37] But per molecule in the atmosphere, CH_4 has a stronger global warming impact than CO_2, 27 times higher compared to a unit of CO_2 (GWP 100, this metric calculates the global warming potential of the gas over a 100-year period).[38] Reductions in CH_4 emissions lead to quick lowering of atmospheric GHG concentrations and therefore global temperatures.[39]

The maximum technical mitigation potential based on assumptions made by the JRC in the CAPRI modelling system[40] are approximately 25% for addressing direct emissions from

27 European Scientific Advisory Board on Climate Change, Towards EU Climate neutrality target: progress, policy gaps and opportunities (January 2024) p.153.

28 Scenario 2: at least 85% corresponding to a range of 85-90% reduction.

29 Scenario 3: at least 90% corresponding to a range of 90-95% reduction

30 Ecologic & Oeko-Institut, EU 2040 Climate Target: the role of agriculture (2024) https://www.oeko.de/fileadmin/oekodoc/EU2040_Sector_Paper_agriculture.pdf.

31 Agora Agriculture, Agriculture, Forestry and Food in a Climate Neutral EU (2025) https://www.agora-agriculture.org/publications/agriculture-forestry-and-food-in-a-climate-neutral-eu-summary pp. 11-12.

32 Enteric fermentation takes place in the digestive systems of animals, in particular ruminant animals. CH_4 is produced in the rumen by bacteria as a by-product of the fermentation process.

33 Trinomics, Pricing agricultural emissions and rewarding climate action in the agri-food value chain (2023) https://ieep.eu/wp-content/uploads/2023/11/Pricing-agricultural-emissions-and-rewarding-climate-action-in-the-agri-food-value-chain-IEEP-2023.pdf p. 20.

34 ibid p. 22.

35 Trinomics, Pricing agricultural emissions and rewarding climate action in the agri-food value chain (2023) https://ieep.eu/wp-content/uploads/2023/11/Pricing-agricultural-emissions-and-rewarding-climate-action-in-the-agri-food-value-chain-IEEP-2023.pdf p. 22.

36 European Environmental Agency, Methane, climate change and air quality in Europe: exploring the connections (2025) https://www.eea.europa.eu/en/analysis/publications/methane-climate-change-and-air-quality-in-europe-exploring-the-connections. International Energy Agency, Methane and Climate Change, https://www.iea.org/reports/global-methane-tracker-2022/methane-and-climate-change. IPCC, Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf p.4.

37 ibid International Energy Agency.

38 IPCC, Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf p.4. There is an ongoing debate regarding the most appropriate accounting methodology for CH_4. However, it's clear that CH_4 has a role to play in the climate action fight; and any application of the metric used in the accounting leading to the conclusion that stabilising CH_4 emissions is a desirable outcome is dangerous in practice. See for example, M Persson, GWP*:Methane, metrics, and confounding science and policies (2020) https://www.tabledebates.org/essay/gwp-methane-metrics-and-confounding-science-and-policy.

39 European Environmental Agency, Methane, climate change and air quality in Europe: exploring the connections (2025) https://www.eea.europa.eu/en/analysis/publications/methane-climate-change-and-air-quality-in-europe-exploring-the-connection. IPCC, Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf.

40 CAPRI Modelling System: Common Agricultural Policy Regionalised Impact analysis. CAPRI is frequently used for ex-ante impact assessment of agricultural, environmental and trade policy options. See pp. 20 and following of JRC, Modelling environmental and climate ambition in the agricultural sector with the CAPRI model (2021) https://publications.jrc.ec.europa.eu/repository/handle/JRC121368.

livestock.[41] However, this reduction must be coupled with demand-side measures and by lowering livestock numbers.

Reducing livestock numbers would bring co-benefit by reducing pressure on the nitrogen balance and water pollution, and by increasing the sequestration potential of land. As much as 71% of total EU farm land is dedicated to meat and dairy production;[42] and approximately 60% of EU cereal production is used in animal feed.[43] The reduction in livestock numbers therefore also holds significant potential to free up land, including the land used for feed production, that can be used for carbon sequestration in ecosystems or less intensive agriculture land uses. It would also bring benefits beyond our borders, such as curbing imported deforestation for animal feed production.

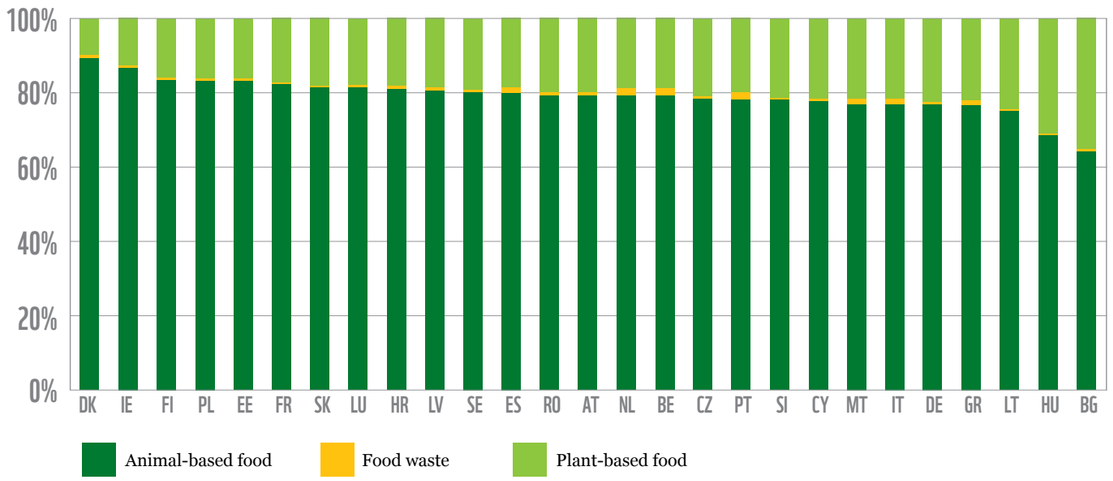
When pursuing emission reductions in the agricultural sector, it is important to keep the broader environmental picture in mind. Emission reductions should be a part of a wider transition of our agricultural sector, a holistic approach that is based on agroecology, and does not therefore drive further intensification of animal rearing, or require increasing synthetic inputs.[44] Crucially, reductions in livestock numbers need to be accompanied by a reduction in meat and dairy consumption, discussed later in this paper, so that domestically produced animal products are not simply replaced with imports.

All these considerations need to be taken into account in the European Board on Agriculture and Food discussions on the future of agriculture and food, including the forthcoming Livestock Strategy announced by the European Commission in its Vision for the sector.[45]

2. A shift in EU dietary habits towards healthier and more sustainable diets

In order to enable the reduction in livestock numbers and thereby reduce emissions from the agricultural sector it is crucial to rebalance EU dietary habits. Currently, in the EU, we consume on average 102kg of meat per capita every year.[46] The agriculture industry is a demand-driven sector and without changing consumption patterns it would be difficult to achieve any effective positive results on emissions reduction from the sector, as the benefits coming from a potential decrease of internal supply would probably be offset by an increase in imported products. In addition, red meat consumption contributes to the increase of incidence of Non Communicable Diseases and decrease in consumption would therefore bring significant benefits to the public health system as well.[47] A shift in diets should be achieved as a multi-level effort, including food retailers, EU institutions but also national and local governments, which hold several legal competences to induce such behavioural change, ranging from taxes to education.[48]

Food production shares, net shares 2021, (1000 t D.M.)



Source: JRC, EU Biomass supply, uses, governance and regenerative actions (2025) p. 68.

41 Ecologic and Oeko-Institut, EU-2040 climate target: contributions of the agricultural sector (2024) https://www.ecologic.eu/sites/default/files/project/2024/60028-EU2040-Sector-Paper-agriculture.pdf p. 10-11. Agora Agriculture, Agriculture, Forestry and Food in a Climate Neutral EU (2025) https://www.agora-agriculture.org/publications/agriculture-forestry-and-food-in-a-climate-neutral-eu-summary Figure 5.

42 Greenpeace, Feeding the Problem: the dangerous intensification of animal farming in Europe (2019) https://www.greenpeace.org/eu-unit/issues/nature-food/1803/feeding-problem-dangerous-intensification-animal-farming/

43 ibid. Trinomics, Pricing agricultural emissions and rewarding climate action in the agri-food value chain (2023) p. 21.

44 WWF, EEB, Birdlife, Greenpeace, Growing the future: a roadmap for agri-food transition https://wwfeu.awsassets.panda.org/downloads/joint-recommendations-for-vision-vfinal-.pdf p.5. WWF, Omnibus on Agriculture: another blow to vulnerable farmers and nature (2025) https://www.wwf.eu/what_we_do/agri_food/?18185366/Omnibus-on-agriculture-another-blow-to-vulnerable-farmers-and-nature. WWF, EEB, Birdlife, Greenpeace, time for farmers and nature to thrive: a proposal for a performance-based policy to drive the transition of Europe's food and farming sector. https://wwfeu.awsassets.panda.org/downloads/cap-vision-post-2027---birdlife--eeb--greenpeace--wwf-eu--compressed.pdf

45 Communication from the Commission: a vision for agriculture and food, COM(2025) 75 final.

46 Our World in Data, Per capita meat consumption by type (2022) https://ourworldindata.org/grapher/per-capita-meat-type?country=CHN~USA~IND~ARG~PRT~ETH~JPN~GBR~BRA~Europe+%28FAO%29~OWID_EU27.

47 Reducing for example the risk of cardiovascular diseases, cancer, diabetes, and obesity, see European Commission Staff Working Document: Impact Assessment Report, Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society SWD/2024/63 final Part 1/5 pp. 48-49.

48 AgoraAgri and IDDRI, Towards food policies that support healthy and sustainable consumption - Country case studies and teh role of the Eu food policy (2025) https://www.agora-agriculture.org/fileadmin/Projects/2024/2024-03_national_food_strategies_SWu/A-AGR_364_Towards_food_policies_that_support_sustainable_and_healthy_consumption_WEB.pdf. EU Commission: Chief Scientific Advisors (independent scientific advice for policy makers), Towards sustainable food consumption, Scientific Opinion (2023) https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/9f582c41-1565-11ee-806b-01aa75ed71a1.

In its 2040 Impact Assessment, the European Commission has considered a complementary variant scenario (LIFE)[49] that looks at the sensitivity of the analysis to key societal trends related to more sustainable lifestyles resulting from changes in consumer preferences, circular economy measures related to the use of energy and materials, and changes in mobility and the food system.[50] The scenario estimates that a change towards more sustainable diets and a reduction of food waste would lead to an additional reduction of agriculture GHG emissions; and it creates more available land for carbon farming and high-diversity practices such as set aside and fallow land with natural vegetation through land-use change on grassland and cropland.[51] The comparison shows a big difference in GHG emissions between the LIFE case and other scenarios: emissions from agriculture are 62MtCO_2-eq lower and removals from the LULUCF sector (including croplands and grasslands) are 43MtCO_2-eq higher than the most ambitious supply-side measures pathway considered by the Commission (S3 in the table below). It is clear that demand-side measures are necessary to see significant reductions in agricultural GHGs emissions.

Other studies are also looking at the policy option of dietary shifts as a way to increase the feasibility of 1.5°C pathways in line with the Paris Agreement. The IPCC itself estimated an indicative global mitigation potential of sustainable healthy diets to reach 7GtCO_2-eq per year by 2050 (corresponding to about one-third of total food system emissions) if land-use change and re-/afforestation of freed up land are considered in addition to lower methane (CH_4) and nitrous oxide (N_2O) emissions from agriculture.[52] Moreover, a shift in diets could also considerably lower the impacts of food production on water, nitrogen, and biodiversity.[53] Dietary shifts have a huge potential in limiting global temperature because, as discussed above, the GWP100 of one unit of CH_4 is 27 times higher compared to one unit of CO_2, and its reduction has short-term benefits for the climate system.[54]

3. A reduction of food waste

Lastly, dietary shifts should be paired with food waste avoidance measures because of its significant GHG emissions-contribution. A report from WWF estimates that 1.2 billion tonnes of food is lost on farms globally. This is equivalent to 15.3% of food produced.[55] This corresponds to 2.2GtCO_2-eq of carbon footprint of farm-stage food waste. Meat and other animal products represent the biggest contribution of GHG emissions from food waste.

European Commission 2040 impact assessment

MtCO2-eq	2040			
	S1	S2	S3	LIFE
Net GHG emissions	1051	578	356	353
of which from the land sector*	133	-45	-46	-150
of which from agriculture	351	302	271	209
of which from energy and industry**	918	593	402	503
Carbon capture	86	222	344	278
Carbon removal	-222	-265	-391	-387
of which industrial removals	-4	-49	-75	-27
of which LULUCF net removals	-218	-316	-317	-360

Note: *Emissions from agriculture and net removals from the LULUCF sector.
**Includes other non-land sectors like waste management, as well as industrial carbon removals.

Source: European Commission, Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society SWD/2024/63 final Part 1/5. [56]

49 LIFE evolves around a dietary change from consumers, the implementation of the Farm to Fork Strategy and Biodiversity Strategy for 2030, and food waste reduction. Food diets can change in a comparably short time and recent history underlines the potential for widespread changes, including on more diverse and healthier diets.

50 European Commission Staff Working Document: Impact Assessment Report, Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society SWD/2024/63 final Part 1/5 p. 30.

51 ibid. p. 33.

52 IPCC, Summary for Policymakers in Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2022) https://www.ipcc.ch/report/ar6/wg3/.

53 F Humpenoder et al.., Food matters: dietary shifts increase the feasibility of 1.5 pathways in line with the Paris Agreement (2024) https://www.science.org/doi/10.1126/sciadv.adj3832.

54 ibid.

55 WWF, Driven to waste: the global impact of food loss and waste on farms (2021) https://wwf.panda.org/discover/our_focus/food_practice/food_loss_and_waste/driven_to_waste_global_food_loss_on_farms/.

56 See also European Commission Staff Working Document: Impact Assessment Report, Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society SWD/2024/63 final Part 3/5 pp. 110 and following.

4. A reduction in nitrous oxide emissions

Nitrous oxide (N_2O) emissions from soils are mainly related to the use of synthetic fertilisers and only in a small part to manure management.[57] Direct emissions of N_2O are a major concern because of its long atmospheric lifetime (about 116 years), higher global warming potential, i.e., 310 times that of carbon dioxide (CO_2).[58] In addition, nitrogen surplus from excessive application of fertilisers and excessive manure application has significant negative effects in terms of soil degradation and water pollution, which should be considered when tackling emissions reduction from the agricultural sector. Reducing fertiliser application will come with several co-benefits including lowering water and soil pollution, reducing farmers' costs[59] of production and strengthening the EU's strategic autonomy, by reducing the EU's high dependency on imports of fertiliser feedstocks. Limiting N_2O that land can sustain would also help limiting the amount of animals that a certain area can sustain.

The use of nitrogen fertiliser should be reduced drastically to achieve significant emissions reduction**.** Technical actions to reduce N_2O emissions include improved timing and correct amounts of fertiliser application, and of different nitrogen forms, including nitrification inhibitors, where a range of actions to improve nitrogen use efficiency (NUE) reduces the fraction of nitrogen lost as N_2O.[60] To achieve a significant reduction of N_2O it is also necessary to upscale the application of practices rooted in agroecological principles, such as crop rotation, planting of native and nitrogen fixing crops, fallow land, etc., and to boost the support from independent advisory services.

Current EU reduction plans for net-zero are focussed on carbon equivalents (CO_2-eq), and use carbon sinks to offset N_2O emissions. Instead, we need a tailored-approach to deal with N_2O because the global warming potential of each of the GHG is very different, as discussed before. We need increased attention to measures focused on sustainable nitrogen management. Currently there are very few policies looking at incentivising a reduction in synthetic fertiliser application: among those, the Common Agricultural Policy's nitrogen measures, that should be strengthened,[61] and the Nitrates Directive, which should be fully implemented.[62]

5. A reduction in emissions from agriculture peatlands

The majority of peatlands in Europe have been drained to make room for agricultural land. Peatlands hold thousands of years' worth of accumulated carbon, which is released into the atmosphere when they are drained. Peatlands can be found in almost all EU Member States, with a concentration in Northwestern, Nordic and Eastern European countries. They cover an area of approximately 350,000km², of which more than 50% (about 5.8Mha of EU27+UK) have been drained for use in agriculture and forestry and for peat extraction.[63] Germany, Finland, Poland, Ireland, Romania, and Sweden are among the main contributors to GHG emissions from drained peatlands.[64] Overall, Europe is the second largest emitter of GHG from drained peatlands in the world.[65]

This process can be reversed through rewetting, turning drained peatlands once again into a carbon sink rather than an emission source. On a per hectare-basis, peatland restoration is a highly effective mitigation action.

In order to stop peat decomposition, soil subsidence and carbon dioxide emissions from peatlands, peatland restoration always requires full rewetting by raising the water level to near the surface. Only in this way can peatland degradation be stopped and the remaining peat carbon stock saved.[66] Besides GHG emission reduction, rewetting will prevent soil subsidence, potential flooding, and saltwater intrusion in coastal areas. It will lower the risk of peat fires, soil erosion, and desertification; have a positive effect on water availability, and provide essential regulating ecosystem services.[67]

Rewettting of peatlands is already incentivised in some EU legislation, for example, under the CAP there are some incentives for farmers to restore peatlands (under the agri-environmental climate measures (AEC) and eco-schemes). However until now that has had very limited success. Peatlands are also included in the LULUCF Regulation, but as mentioned above their emissions are often offset in terms of accounting at Member State level by removals on forested land.[68] From current data, it is possible to deduce that restoration measures face several challenges, such as financial barriers, commercial reasons (land owners might be reluctant to rewet peatlands, as it might reduce the productivity of the land), competing land use interests, and so on. These incentives for rewetting and restoring peatlands should be strengthened.

6. Increased carbon sequestration by ecosystems via a prioritisation of nature-based solutions

Nature is slowing down global warming, it has absorbed 54% of human-related carbon dioxide emissions over the past 10 years: 31% is removed by the terrestrial ecosystems, including in plants, animals and soils. The other 23% is taken up by the ocean.[69] In the EU, the land use sector is a net sink, although a decreasing one.[70] Agricultural land accounts for 38% of total EU land use, and has significant potential for carbon sequestration through improved soil management.[71] The agricultural sector can support biogenic sequestration via nature-based CDR (or 'carbon farming' removal activities as defined in the CRCF) that seeks to enhance soil organic carbon. The agricultural sector can also support removals by freeing up agricultural land for land uses with high mitigation potential, for example wetland restoration (which initially drives emissions reductions and over time CDR) and close-to-nature reforestation.[72] Another example would be the maintenance of sustainable grazing areas to preserve grasslands as a carbon sink.

Nature-based CDR should be prioritised, ensuring no harm to biodiversity, and ideally supporting its recovery. Synergies between restoration and carbon sequestration should be sought wherever possible. Restoring carbon-rich ecosystems is crucial for enhancing climate resilience, biodiversity, and sustainable livelihoods. This should be done through an ecosystem-based approach, ensuring the right conditions for restoration. The timely implementation of the Nature Restoration Regulation (NRR) will help achieve this objective.

7. A fair and just transition

The planning and implementation of measures that will bring about the necessary reduction in agri- and food-related emissions will need to be done in a way which minimises social harm. Many farmers and other agricultural and food sector workers are already facing economic challenges; average farm income is significantly below average income in the rest of the economy.[73] The funding made available under the CAP is unevenly distributed and used in an incoherent way, with larger, more profitable farms receiving a greater proportion of support which drives farm consolidation and intensification that slows down generational renewal in the sector.

Changes to land-use or agricultural practice also have wider impacts on landscape, local economics, employment and demography, community dynamics and identity. A change in type or intensity of agricultural production or farming approach has implications not only for farmers and their households, but also other workers (including seasonal workers), related businesses (e.g. in the food processing value chain, veterinary services, and so on), and the wider local economy. A shift in farm-related activity can have impacts on employment opportunities, skills required, demographics, tourism and more. There are already fewer job opportunities in general in rural areas compared to urban locations and the farmer-workforce is ageing; the link between agricultural reform and overall local development therefore poses acute challenges for rural populations. The variety in profile of agriculture across the EU (including size, type and economic viability of farms in different Member States) means that impacts of overarching EU policy frameworks will be asymmetric. Tailored place-based approaches will be needed to take into account different capacities, barriers and aspirations of farmers and other agricultural stakeholders.

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57 Manure Management, AgLEDX Resource Platform. https://agledx.ccafs.cgiar.org/emissions-led-options/sources-sinks/manure/

58 Fagodiya, R. K. et al. Global temperature change potential of nitrogen use in agriculture: A 50-year assessment (2017) Scientific Reports https://www.nature.com/articles/srep44928.

59 Fertliser prices, latest update 2025 https://agridata.ec.europa.eu/extensions/DashboardFertiliser/FertiliserPrices.html.

60 Nitrogen: finding the balance towards a comprehensive approach to nitrogen in the UK (2021) https://www.wwf.org.uk/sites/default/files/2022-02/Finding_the_balance_report.pdf p.20.

61 Focusing on some of its rules, the CAP (2023-2027) requires farmers receiving direct income support to preserve the soil potential through crop rotation (GAEC 7), or maintain soil cover (GAEC 6) or retaining landscape features and a share of non productive land (GAEC 8). However these provisions are often subject to exemption or derogations, in particular after the changes introduced by the simplification package launched in February 2024. Commission proposes targeted review of the Common Agricultural Policy to support EU farmers https://ec.europa.eu/commission/presscorner/detail/en/ip_24_1493.

62 Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC). Member States are lacking behind in implementing action programs to reduce nitrate pollution in High Vulnerable Areas and the EU Commission often agree to derogations, see European Environmental Bureau's response to the public consultation on the evaluation of the Nitrates Directive, https://eeb.org/wp-content/uploads/2024/03/EEB-comments-to-Nitrates-Directive-evaluation.pdf. European Commission, Nitrates Directive implementation report (2021), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A1000%3AFIN&qid=1633953687154 p.9.

63 Trinomics, Pricing agricultural emissions and rewarding climate action in the agri-food value chain (2023) https://ieep.eu/wp-content/uploads/2023/11/Pricing-agricultural-emissions-and-rewarding-climate-action-in-the-agri-food-value-chain-IEEP-2023.pdf p. 24. WaterLANDS, Higher ambition for peatlands in the EU Nature Restoration Law Proposal (2022) https://cdn.sanity.io/files/34jdpbeg/production/7dd1e602fec7d271269f42312a1bc525e095750f.pdf 4.

64 WaterLANDS, Higher ambition for peatlands in the EU Nature Restoration Law Proposal (2022) https://cdn.sanity.io/files/34jdpbeg/production/7dd1e602fec7d271269f42312a1bc525e095750f.pdf 4.

65 EurActive, Large-scale peatlands restoration necessary for climate and biodiversity (2023) https://www.euractiv.com/section/eet/opinion/large-scale-peatland-restoration-necessary-for-climate-and-biodiversity/.

66 WaterLANDS, Higher ambition for peatlands in the EU Nature Restoration Law Proposal (2022) https://cdn.sanity.io/files/34jdpbeg/production/7dd1e602fec7d271269f42312a1bc525e095750f.pdf p. 6.

67 ibid p. 8.

68 Article 2 Regulation (EU) 2018/841 Land Use, Land Use Change, and Forestry.

69 WWF, Our climate's secret ally: uncovering the story of nature in the IPCC sixth assessment report (2022)https://wwfint.awsassets.panda.org/downloads/wwf_our_climates_secret_ally_uncovering_the_story_of_nature_in_the_ipcc_ar6.pdf.

70 European Environmental Agency, GHG emissions from land use, land use change and forestry in Europe (2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land#:~:text=The%20land%20use%2C%20land%20use,EU's%20annual%20greenhouse%20gas%20emissions.

71 ESABCC, Scaling-up carbon dioxide removals - recommendations for navigating opportunities and risks in the EU (2025) p. 137.

72 ibid, p. 153

73 European Commission data, DG AGRI, Income support Explained see https://agriculture.ec.europa.eu/common-agricultural-policy/income-support/income-support-explained_en?utm_source=chatgpt.com.

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THE NEED FOR A HOLISTIC APPROACH

To bring about the real-world changes we aspire to see in the agricultural sector, and to ensure that this transformation is sustainable over the long term, it is essential to implement a comprehensive set of carefully coordinated policy measures. These measures must be aligned and consistently geared toward achieving shared goals, particularly those related to climate, environmental, economic, and social sustainability. Establishing strong synergies with other legislative frameworks and policies will amplify their collective impact, helping to avoid contradictions and ensure consistency across sectors. Equally important is the ongoing, meaningful engagement of all stakeholders, including farmers, policymakers, industry representatives, and civil society. Their active participation and collaboration are critical to shaping practical solutions, building trust, and ensuring that the transition is both inclusive and effective.

With a clear understanding of the need for a holistic approach, the next step is to translate these principles into concrete policy recommendations. The following recommendations are grouped into four key areas: 1) ensuring a fair and equitable approach, 2) identifying existing policies that require change, 3) highlighting existing policies that have yet to be fully implemented or are not strongly enforced, and 4) introducing novel policy ideas to address emerging challenges and opportunities.

ENSURING A FAIR APPROACH

Ensuring a fair and just transition towards European agricultural systems which fit within planetary boundaries requires careful participatory planning and targeted support in order to share both costs and opportunities. The following measures will need to be embedded into policy development and implementation at EU, national and regional levels:

- Extensive and meaningful stakeholder engagement, especially at local level, to establish a shared vision of transition and understand local support requirements and challenges. Stakeholders include farmers, farm workers, local community members, other economic actors, NGOs, and more.

- Robust data collection and analysis, shared transparently to support a collective understanding of context and policy options and impacts.

- Agricultural transition plans which provide clear action pathways for all stakeholders and include realistic timeframes, targets and requirements. Transitions in land use and livelihoods take time and may require prolonged support; a predictable framework, long term commitment, and political support is particularly important for enabling access to loans and financial support instruments. Land value impacts should be taken into account, and the effect of land price changes on tenant farmers.

- Targeted technical support to enable change in agricultural approaches and/or diversification of economic activities. Accessible and independent advisory services and platforms for peer-exchange should ensure that farmers and agricultural stakeholders have access to up-to-date and impartial information and opportunities for exchange and cooperation. Small businesses should in particular receive support relevant to managing the administrative burden of new and changing regulatory requirements.

- Recognition of cultural factors implicit in livelihoods and land use transition. Change in agricultural practices is not only a technical shift, but for many farming communities also linked to heritage and identity. Discussion on transition pathways, and measures designed to support transition, will need to take this into account in order to be both acceptable, fair and successful.

- Funding through EU financial instruments should be subject to strong social conditionalities[74] in order to ensure quality of employment practice, non-exploitation of workers and so on. Incentives (whether financial or technical) to support transition work best when targeted at stakeholders who demonstrate commitment to change to more sustainable practices and activities. At the same time, fairness principles should be applied in allocations of support and subsidies to ensure that those already moving to more climate and environment friendly approaches do not lose out by virtue of having been ‘early movers’.

- Fairness principles should also be applied to consumers in the form of policies which enable equitable access to affordable and healthy food produced in a sustainable way**.** This includes communication and awareness activities to enable dietary shifts as well as measures to support affordability.

74 WWF, An Investment Commission for the Green Transition: next steps for EU public finance (2025) https://wwfeu.awsassets.panda.org/downloads/wwf-mff-position-paper.pdf.

EXISTING POLICIES THAT REQUIRE CHANGE

1. The Common Agricultural Policy

The current CAP has constantly failed to deliver. It has neither adequately supported farmers to face crises nor ensured a fair standard of living for all farmers, nor addressed environmental degradation. The 2023–2027 CAP continues to fund harmful subsidies that primarily benefit large farms and promote unsustainable practices, while support for environmentally friendly farming remains limited. The European Court of Auditors found that the Member States' Plans do not match the EU's ambitions for the climate and the environment, and that key elements for assessing green performance are missing.[75] A recent analysis estimated the CAP's overall potential to reduce non-CO_2 emissions from agriculture is only at 9Mt annually (2.6% of 2021 total emissions in agriculture in 18 Member States assessed).[76] This is not enough. To transform food systems to ensure long term food security, environmental sustainability, and social fairness we need a fundamental shift in agriculture.

The next CAP should focus on a just transition and a more effective performance framework. Building on the agreement reached in the Strategic Dialogue, agricultural funds should be repurposed in support of social equity, environmental sustainability, and a just transition. The CAP should:

- Move to a genuinely performance-based policy: link the EU budget disbursement to the achievement of clear, measurable EU policy objectives;
- Boost funding for protecting and restoring nature and functioning ecosystems: secure ring-fenced funds for nature in the new Multiannual Financial Framework (MFF) and increase the effectiveness of environmental payments for farmers. A minimum of 10% of the MFF should be allocated for measures that protect, maintain, and restore nature. This funding should, amongst other uses, support farmers and other land managers in adopting practices that safeguard and regenerate natural ecosystems;
- End harmful subsidies: establish a common, science-based exclusion list defining environmentally harmful activities that cannot be funded under the EU budget;
- Target socio-economic support to social sustainability objectives: ensure social payments for farmers reach those who need it most;
- Make strategic investments for systematic change: repurpose investments to support the transition to a more resilient and diverse farming, grounded in the principles of agroecology;
- Support a just transition in the livestock sector: support the reduction of livestock numbers in excessive high density areas and promote extensive animal farming systems;
- Promote diversification for farmers' resilience and sustainable food systems: eliminate obstacles for diversified crop production and protein consumption;
- Maintain baseline protection for soil, freshwater, permanent grasslands, peatlands, wetlands and landscape features.
- Ensure accountability and dialogue through robust governance: foster cooperation, transparency and balance among stakeholders;

Regarding nitrogen emissions:

- Develop and act upon a Nitrogen balance sheet that takes a comprehensive approach to tackle nitrogen air, water, and soil pollution;[77]
- Drive systemic change that includes a massive implementation of crop systems based on long-term and diversified crop rotation, where nitrogen fixing crops such as legumes are included in the alternation;[78]
- Increase the share of EU agricultural land under organic farming;[79]

Regarding peatlands:

- Ensure a comprehensive mapping and robust application of relevant rules under the CAP, such as GAEC 2 (good agricultural and environmental conditions) protecting wetlands and peatlands;
- Establish a comprehensive "no degradation" principle;[80]
- Introduce targeted support for sustainable peatland management and restoration; and strengthen independent advisory systems and knowledge support systems.[81]

See the WWF EU position on the CAP

75 European Court of Auditors, Special report 20/2024 Common Agricultural Policy Plans - Greener but not matching the EU ambition for the climate and the environment (2024) https://www.eca.europa.eu/en/publications/SR-2024-20.

76 EU CAP Network report, Rough estimate of the climate change mitigation potential of the CAP Strategic Plans (EU-18) over the 2023-2027 period (2024) p. 45.

77 Tightening the nitrogen cycle will result in multiple benefits across the environmental, economic and social pillar of sustainable development (meeting the Triple challenges of supplying the food needs of the world, while tackling the climate crisis and reversing the loss of nature, while also protecting human health and ecosystems though improved air and water quality and protecting the ozone layer). See WWF, Nitrogen: finding the balance towards a comprehensive approach to nitrogen in the UK (2021) https://www.wwf.org.uk/sites/default/files/2022-02/Finding_the_balance_report.pdf p. 20.

78 Billen, How industrial agriculture is disturbing the nitrogen cycle and undermining conditions for life on Earth (2020) https://theconversation.com/how-industrial-agriculture-is-disturbing-the-nitrogen-cycle-and-undermining-conditions-for-life-on-earth-220478.

79 The Farm to Fork & Organic Action Plan sets an objective to substantially increase the application of organic farming: by 2030, 25% of the EU's total agricultural area should be farmed organically. However, the rate of progress towards this 2030 target was far too slow: at the current rate, organic farming will only account for roughly 15% of the EU's entire agricultural area in 2030, mainly due to the inadequate development of the related market. See European Climate Neutrality Observatory, Agrifood, https://climateobservatory.eu/building-block/agrifood. See European Court of Auditors, Special report 19/2024: Organic farming in the EU - Gaps and inconsistencies hamper the success of the policy. (2024) https://www.eca.europa.eu/en/publications/SR-2024-19#:~:text=Member%20states%20only%20partially%20addressed,achieve%20those%20targets%20and%20objectives.

80 BirdLifeEU, EEB, Wetlands International and WWF. Protecting farmers by protecting nature. Preserving wetlands under the Common Agriculture Policy (2025) https://wwfeu.awsassets.panda.org/downloads/agriculture-briefings_online.pdf p. 17.

81 ibid.

2. Bioenergy rules in the Renewable Energy Directive (RED)

The incentives for biofuels in the RED have a big impact on land use in agriculture. The lack of meaningful restrictions in the RED has resulted in an overuse of bioenergy as a heating source causing harm to biodiversity and the climate.[82] Turning crops into biofuels makes no sense in climate or social terms when that land could be used to grow food instead, or to absorb carbon dioxide from the atmosphere by restoring natural carbon sinks such as forests.[83] Food production and communities have also been displaced as the price of biomass has skyrocketed, leading to increased food insecurity, human rights violations and land grabs around the globe.[84] Using crops (including food and feed crops) for biofuels threatens food security by impacting food availability, food prices and their stability, and the social and environmental sustainability of food systems.

The EU must stop rewarding the destruction of climate and nature, and instead support the shift towards wiser uses of biomass by:

- Ending all incentives for energy produced from dedicated crops regardless of the sector they are used in. At present there is a cap of maximum 7% on food and feed-based biofuels in transport, but no limit on food and feed-based bioenergy in heat or power, or any limit on other dedicated energy crops, despite the fact that this is unlikely to be a good use of land from a climate perspective compared to growing food or letting land return to natural vegetation such as forests.
- Implementing the cascading principle, namely prioritising high-value uses over lower-value ones, so that burning biomass for energy is a last resort;
- Ensuring that scarce biomass resources available for energy are used in sectors with no other options.[85]

See the WWF EU Guidance for Member States on bioenergy plans and policies.

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82 Letter from scientists to the EU Parliament regarding forest biomass (2018) https://wwfeu.awsassets.panda.org/downloads/update_800_signatures_scientist_letter_on_eu_forest_biomass.pdf and JRC, The use of woody biomass for energy production in the EU (2020) https://publications.jrc.ec.europa.eu/repository/handle/JRC122719.

83 Beyond bioenergy statement (2025) https://wwfeu.awsassets.panda.org/downloads/beyond-bioenergy-cso-statement_final.pdf.

84 For more details on the food security impacts of biofuels see Oxfam, Biofuel Blunders: Time to fix two decades of EU policies driving food insecurity (2024) https://policy-practice.oxfam.org/resources/biofuel-blunders-time-to-fixtwo-decades-of-eu-policies-driving-food-insecurity-621622/.

85 Beyond bioenergy statement (2025) https://wwfeu.awsassets.panda.org/downloads/beyond-bioenergy-cso-statement_final.pdf.

EXISTING POLICIES THAT NEED TO BE FULLY AND PROPERLY IMPLEMENTED

1. Nature Restoration Regulation

The implementation of the NRR is expected to deliver dual benefits for the EU's climate mitigation and biodiversity objectives if adequately implemented and funded. Member States are expected to develop national restoration plans (NRPs) detailing how they will achieve the law's targets and obligations; this is an opportunity to improve consistency between multiple land use objectives. In fact, NRPs require Member States to identify ecosystem restoration practices that have synergies and trade-offs with climate and other objectives, including mitigation, adaptation, land degradation and disaster prevention.[86] The NRR also mandates the inclusion of all relevant actors in the planning process to ensure they can provide relevant input. This is important to make sure that appropriate socio-economic considerations are taken into account and that market opportunities such as as transitioning to paludiculture or pluviculture[87] are considered.

These plans must be used to create consistency between NRR and the CAP.[88] The EU must supervise Member States and make sure that they:

- Develop ambitious nature restoration plans and create consistency between NRR and the CAP;
- Set-up schemes to incentivise or compensate farmers for peatland rewetting;
- Ensure that the Green and Blue corridors initiative, as well as the Sponge Facility announced in the European Water Resilience Strategy are effectively set out and implemented.[89]
- Introduce dedicated, earmarked funding for nature restoration in the next Multiannual Financial Framework (MFF). See WWF position paper on the MFF.

2. LULUCF Regulation

The LULUCF sector plays a key role in achieving the EU climate neutrality objective; and it needs to be preserved. However, as mentioned before in this paper, in recent years the land sink has been in decline, and the EU is not on track to reach its targets. The aggregation of the LULUCF projections shows that the shortfall in overall net removals would lead to a gap of around -50 to -70MtCO_2-eq compared to the 2030 target of -310MtCO_2-eq - a target which itself is too low, given the climate emergency.[90] This trend must be reversed, by for example carrying out close-to-nature agricultural soil management practices by using an ecosystem-based approach (e.g. agroforestry, maintaining landscape features and maintaining and protecting permanent grasslands). The EU should:

- Ensure Member States detail their plans to reverse the trend of the LULUCF sector in the National Energy and Climate Plans (NECPs).
- Ensure Member States find synergies between restoration and carbon sequestration wherever possible. Clear and concrete links between the LULUCF Regulation and the European Union's biodiversity and nature restoration targets and objectives are paramount.
- Enforce the LULUCF Regulation. Enforcement from the Commission can play an important role here. The current legislation is characterised by a lack of meaningful enforcement.

See WWF response to the call for evidence of the evaluation of the LULUCF Regulation.

3. The Carbon Removals and Carbon Farming Regulation (CRCF) and its methodologies

The implementation of the CRCF should deliver high-quality science-based certified carbon removals that result in an unambiguous positive climate impact, while preventing greenwashing.[91] This framework has the potential to incentivise the right type of activities for farmers and generate new business opportunities. Its real potential contribution towards climate objectives will nonetheless depend on the environmental criteria that are defined under the activity-specific methodologies, to be developed via Delegated Acts.

The current robustness of CRCF methodologies has been subject to criticism by civil society. Regarding carbon farming, civil societies have specifically called out the calculation of biodiversity co-benefits, considerations regarding additionality, and setting of arbitrary baselines for the activities.[92] Concerning so-called permanent removals such as biochar, civil society has accused the Commission of appearing to support greenwashing by relying on the assumption that the RED sustainability criteria for biomass are sufficient to ensure carbon dioxide (CO_2) removals from the atmosphere take place.[93] The following key recommendations must be implemented:

- The CRCF must be subject to strict monitoring, reporting, and ethical and environmental safeguards. They must deliver genuine, near-term removals based on the best available science. This principle must be operationalised by the CRCF and its secondary legislation.
- No carbon removal credit should ever be interchangeable with emission reductions. This for example includes the introduction of removals in compliance mechanism (e.g. a future Agriculture-Emission Trading System (Agri-ETS).[94]
- No carbon removal credit should ever lead to misleading claims and greenwashing.[95]
- Investments in nature-based carbon dioxide removals should be prioritised over other types of removals.
    - These measures should be first financed via the extensive existing public funds available under existing instruments (e.g. the CAP), and secondly via additional public funding for nature restoration and protection that should be instituted.
    - Private funding should also play a role through investment within or beyond company value chains, following a contribution-based approach. A compliance approach for companies could also be envisaged, based on a carbon removal target, provided that this did not lead to nature-based removals being treated as equivalent to emissions (e.g., inclusion in existing compliance regimes such as the EU ETS or a new Agri-ETS).[96]

See WWF policy recommendations for a European carbon dioxide removals strategy.

NOVEL POLICIES

Ensuring a fair and equitable approach, changing existing policies that are counterproductive, and fully implementing those that can help achieve the green transition of the sector is a necessary precondition. However, the incentives created through these actions are unlikely to be enough to support the required change. Novel policies will also be needed to drive the transition of the agricultural sector and address emerging challenges and opportunities. The following policies should be introduced by the EU:

1. Set a 1.5°C compatible gross non-CO_2 emission reduction target for agriculture emissions.

The current regulatory framework for agriculture emissions has not been able to drive GHG emissions reduction in the sector, as only a 5% emissions reduction was achieved between 2005 and 2022, as discussed before. To reduce GHG emissions from agriculture, the EU and Member States therefore need to adopt and implement policies and incentives consistent with the 1.5°C goal.[97] The EU should:

- Set a standalone 1.5°C compatible gross non-CO_2 GHG emissions reduction target for agriculture emissions.

2. Introduce carbon pricing policies to operationalise the polluter pays principle.

The Commission should operationalise the polluter pays principle by for example introducing socially just carbon pricing policies. This could be done via approaches that are structured in a fair and just way, as well as set to achieve a genuine climate and environmental benefit. The Commission could explore market-based approaches or taxes on GHG-intensive products and subsidies for healthy and sustainable foods. The policy must seek to contribute to correcting problematic developments in the sector and take into account the many particularities of the sector (e.g. including the diversity of actors, GHG fluxes, biodiversity, water scarcity, soil health, animal welfare and so on).

Currently, the Commission is investigating the possibility of introducing a market-instrument e.g. to set targets on agri-food value chain actors, or to create an emission-trading system for the sector. Voluntary carbon markets are also being considered, but in general WWF cautions about their use as they often lack effectiveness, transparency and accountability. Past experiences with carbon offset programs have shown the risks of relying on credits of uncertain quality, often exacerbated by weak governance processes.[98] These risks can lead to greenwashing, where unreliable and low-quality certificates, potential fraud, errors, or double-counting result in carbon removal certificates that fail to meet the expected climate and sustainability standards.[99] By contrast, mandatory measures clearly indicate the direction of travel to actors in the agri-food value chain and investors, as well as are normally considered more effective. We recommend that the EU:

- Explore mandatory carbon pricing policies;
- Keep any carbon pricing mechanism separate from and avoid negative impacts on existing instruments such as Emission Trading System 1 and 2 (ETS1 and 2);

86 Article 14 Regulation(EU) 2024/1991 on Nature Restoration.

87 ESABCC, Scaling-up carbon dioxide removals - recommendations for navigating opportunities and risks in the EU (2025) p. 70.

88 Regarding agricultural ecosystems, the law mandates the implementation of restoration measures to enhance biodiversity in agricultural ecosystems, achieving an increasing trend by 2030 in two out of three indicators: a) grassland butterfly index; b) organic carbon stocks in cropland mineral soils; c) share of agricultural land with high-diversity landscape features. And for agricultural peatlands, Member States should restore or rewet organic soils in drained peatlands under agricultural use: 30% of areas by 2030 (of which one quarter rewetted); 40% by 2040 (one third rewetted); 50% by 2050 (one third rewetted).

89 European Commission, Communication on the European Water Resilience Strategy COM (2025) 280 final https://environment.ec.europa.eu/publications/european-water-resilience-strategy_en.

90 Report from the Commission to the EU parliament and the Council on the operation of Regulation (EU) 2018/841 ("LULUCF Regulation") pursuant to Article 17(2) as amended by Regulation (EU) 2023/839, p. 5.

91 Recitals 3, 7 Regulation EU/2024/3012 Carbon Removals and Carbon Farming.

92 For example, see Carbon Market Watch, Biodiversity and the carbon removal carbon farming framework: a poor implementation of the mandatory co-benefits criterion (March 2025) https://carbonmarketwatch.org/publications/biodiversity-and-the-carbon-removals-carbon-farming-framework/.

93 Joint briefing of Fern, WWF and others, Greenwashing carbon removals (June 2025) https://www.fern.org/fileadmin/uploads/fern/Documents/2025/Greenwashing_Carbon_Removal.pdf.

94 WWF, Carbon dioxide removals: policy recommendations for a European strategy (2025) https://wwfeu.awsassets.panda.org/downloads/cdr-policy-recom-final.pdf.

95 ibid.

96 WWF, Carbon dioxide removals: policy recommendations for a European strategy (2025) https://wwfeu.awsassets.panda.org/downloads/cdr-policy-recom-final.pdf p. 11.

97 ESABCC, Scaling-up carbon dioxide removals - recommendations for navigating opportunities and risks in the EU (2025) p. 154.

98 Incentives for Climate Change Mitigation across the Agri-food Value Chain Input paper #1 – Policy options,https://climate.ec.europa.eu/document/download/cdf7e657-ac93-4706-a1b9-3b1adba80dbd_en?filename=policy_crcf_agrifood_tw1_input_en.pdf pp. 4 onwards.

99 The Guardian published an analysis revealing that more than 90% rainforest carbon offsetting by biggest certifiers are worthless (see https://www.theguardian.com/environment/2023/jan/18/revealed-forest-carbon-offsets-biggest-provider-worthless-verra-aoe). Further investigations keep reaching the same results, see https://www.theguardian.com/environment/2023/sep/19/do-carbon-credit-reduce-emissions-greenhouse-gases.

- Treat emissions reductions and land-based sequestration activities separately. And in no circumstances include carbon removals credits from the CRCF in a compliance mechanism such as an ETS (or agri-ETS), nor allow ''offsetting'';

- If an ETS system is selected:

    - There should be no trading of CRCF units but instead trading of emissions allowances. Obligated entities should not be buying CRCF units directly from farmers/foresters, but instead they should be buying emissions allowances;

    - Revenues generated from the ETS system could be used to support farmers and/or vulnerable households subject to increase in prices of GHG intensive products, and to fund specific emission reductions or carbon removals projects;

    - A strict cap on allowances corresponding to the desired emissions reduction trajectory can be very effective in mitigation for the sector;

    - Free allowance distribution should not be included in the system. Free permits to pollute directly contradict the 'polluter pays principle' and have been shown to slow down industrial decarbonisation under ETS1;[100]

    - Following the assessment of possible carbon leakage risks, a carbon adjustment mechanism could be explored instead of free allowances;

    - Additional complementary measures that should be explored would be for example the introduction of a centralised body that would be able to facilitate market stability.

3. Introduce a sustainable Livestock Strategy

In its Vision for the agricultural sector,[101] the European Commission announced the development of a long-term sustainable Livestock Strategy. This marks a necessary and overdue step for the livestock sector, which must now take greater responsibility in addressing its environmental, health, and ethical impacts, and align more closely with the broader objectives of the European Green Deal and sustainable food systems. For this strategy, the EU should:

- Set out better to support high-nature value, extensive rearing systems such as extensive grazing in semi-natural grasslands;

- Drive and support a general extensification of the vast majority of the livestock sector towards systems which respect the carrying capacity of the local environment;

- Achieve high animal welfare;

- Not rely on massive imports of feed;

- Transition to organic farming;

- Take into account regional and local specificities throughout the EU and the demand-side measures discussed here below.

4. Introduce demand reduction measures

Demand reduction measures are crucial to drive down emissions in agriculture and make sure we avoid any carbon leakage from simply outsourcing our meat production to somewhere else in the world. The European Commission and Member States should develop and invest in EU-wide demand reduction policies such as:

- Public awareness campaigns;

- Improved product labelling (signalling both health impacts and environmental impacts);

- Promotion of plant-based dietary options and meat alternatives (at the retail level for example);

- Guidelines and regulations for public catering (including schools, hospitals and so on) to ensure availability of quality plant-based options;

- Use of economic measures, including taxation measures[102] and subsidies;

- Amending the Public Procurement Directive to support an EU-dietary shift.

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100 European Court of Auditors Report, Special Report 18/2020: the EU Emissions Trading System - free allocation of allowances need better targeting.

101 Communication from the Commission: a vision for agriculture and food, COM(2025) 75 final https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025DC0075.

102 For example as discussed in J Roosen et al., Demand elasticity for fresh meat and welfare effects of meat taxes in Germany (2022) Food Policy V. 106 https://www.sciencedirect.com/science/article/pii/S0306919221001731.

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