Climate KIC

An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
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Policy Insights Report Summary Update

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1. Introduction and summary

Ireland has committed to transforming its economy into one that is climate-resilient, biodiversity-rich, environmentally sustainable, and climate-neutral by 2050, as mandated by the Climate Action and Low Carbon Development (Amendment) Act 2021. The agriculture sector is Ireland's most significant native industry and hugely important economically, socially, and environmentally. However, the agriculture sector also contributes significantly to Ireland's overall greenhouse has (GHG) emissions[1]. In 2023, agriculture accounted for 37.8% of Ireland's GHG emissions[1]. Progress on decarbonizing agriculture is not going fast enough, with Ireland's Greenhouse Gas Emissions Projections report expecting sectoral emissions ceilings for 2025 and 2030 to be exceeded in the agricultural and several other sectors[2].

The European Commission's recommendations to Ireland's updated draft National Energy and Climate Plan (NECP) covering the period 2021-2030[3] recommends that Ireland 'set out cost-efficient additional policies and measures, including in the agricultural and transport sectors, to bridge the projected gap of 31.8 percentage points to meet the national greenhouse gas target of – 42 % in 2030 compared to 2005 levels under the ESR'. The European Commission also recommends that Ireland takes action to 'set out a concrete pathway towards reaching the national LULUCF target as defined in Regulation (EU) 2018/841' and to 'significantly raise the ambition of a share of renewable energy sources to at least 43 % as a contribution to the Union's binding renewable energy target for 2030'.

The new Draft Programme for Government, 'Securing Ireland's Future', which was published in mid-January 2025[4], recognizes the importance of decarbonising. The chapter on agriculture and food demonstrates Ireland's commitment to supporting farmers and the agri-food sector, laying out key priorities that include protecting and enhancing farm incomes, working at EU level to improve and simplify the CAP, supporting inter-generational farm succession, pursuing innovation in the agri-food sector, developing the bioeconomy, and introducing a National Framework for Carbon Farming to guide the development of a Carbon Farming Scheme to strengthen farm incomes. Grant aid for biomethane is mentioned, too. It is noteworthy that there is a focus on multiple diverse schemes and funding pots, accompanied by the mission to streamline and simplify red tape, underlining the importance of pursuing a systems approach moving forwards.

At the EU level, progress in policymaking has been made against a backdrop of farmers protests and a rapidly changing climate characterized by increasing climate risks which may compromise food and water availability[5]. In 2024, the Soil Monitoring Law and Nature Restoration Law, which are both key EU legislations, were adopted. Additionally, the EU Methane Regulation came into force. The Strategic Dialogue on the Future of EU Agriculture was launched, and the EU Common Agricultural Policy (CAP) underwent several important updates. As per the OECD's 2023 recommendations for future EU agri-food policies, the CAP should be the instrument to close the

[1] Agriculture | Environmental Protection Agency
[2] https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-GHG-Projections-Report-2022-2050-May24--v2.pdf
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL_202401029
[4] https://www.finegael.ie/app/uploads/2025/01/Programme-for-Government-2025.pdf
[5] European Climate Risk Assessment | European Environment Agency's home page

gap between climate policy ambitions and the current state of agri-food systems in Europe[6]. A recent study that mapped and analysed CAP strategic plans 'suggests that the reformed CAP is likely to contribute to greater environmental and climate commitments'. In January 2025, the European Union revealed its new EU Competitiveness Compass, which was presented as an economic strategy to boost Europe's economic growth but may come at social and environmental costs. In February 2025, the Commission presented its Vision for Agriculture and Food, which aims to secure the long-term competitiveness and sustainability of the EU's farming and food sector.

These diverse changes highlight the importance of staying up to date with EU-level policy developments, as well as learning from other countries' innovative policies and progress in transforming their agri-food systems towards climate neutrality and resilience. Hence, this report builds on the Policy Insights Report (March 2023) and the Policy Updates (Q1 and Q2 of 2024) to highlight key policy developments at the EU level and provides insights and updates from policy initiatives that Ireland might draw strategic learnings from. Focusing on their relevance for the Irish Land Agri-Food system, this report outlines key policy developments from EU and non-EU countries. The EU country updates cover Belgium (approved a controversial nitrogen decree), Denmark (passed a groundbreaking Tripartite agreement), France (Ecophyto 2030 to reduce pesticide use), the Netherlands (facing challenges implementing its nitrogen decree, amendments to CAP Strategic Plan approved, de-risking investments in the agricultural transition through the Sustainable Agriculture Investment Fund and other initiatives), and Germany (progressive approach to LULUCF and peatlands). The non-EU country updates cover the United Kingdom (package of farming and food sector support, the Labour governments' announcements relevant to the agri-food sector, and misinformation around the Bovaer feed additive), Canada (Office of the Auditor's Report on Agriculture and Climate Change Mitigation), Australia (Net-zero plan and sectoral decarbonisation plan for agriculture), and New Zealand (new government ends plan to price agricultural emissions). The report concludes with policy recommendations that are of relevance to the Department of Agriculture, Food and the Marine's (DAFM) efforts to transform the agri-food system in Ireland.

2. Updates at the EU level

2.1 EU Vision for Agriculture and Food

The European Commission presented the Vision for Agriculture and Food, **'Shaping together an attractive farming and agri-food sector for future generations'**, on the 19th of February 2025[7]. This long-term vision sets out a roadmap until 2040 that aims to shape the agri-food system into being more attractive; competitive; economically, socially, and environmentally sustainable; and fair for both current and future generations. Foci include making farming more attractive to current and future farmers by reducing bureaucracy, improving pay, and generating new income streams, for example through carbon farming and bioeconomy projects. A Generational Renewal Strategy is expected to be delivered later in 2025. A new Agri-Food Chain Observatory shall stimulate trust and financial transparency about how costs and margins are formed and shared

[6] https://www.oecd.org/en/publications/policies-for-the-future-of-farming-and-food-in-the-european-union_32810cf6-en.html
[7] https://agriculture.ec.europa.eu/vision-agriculture-food_en

in the food chain. In terms of the CAP, the vision argues that the future CAP will give Member States more flexibility by shifting from conditions to incentives. The document acknowledges that the public image of the CAP was impacted by perceptions of a lack of fairness in payment distributions, proposing simplified income support tools and directing support towards "farmers who need it most". Cross-cutting drivers to make the EU agri-food sector more competitive and resilient include the simplification of EU rules, research, and innovation and digitalisation.

Shortly after its release, the new EU Vision for Agriculture and Food has received mixed feedback. There are concerns that the vision is too vague and fails to include feedback from the Strategic Dialogue on the Future of EU Agriculture (see Section 2.5)[8]. Whether this plan will change Europe's farming model, especially amidst the upcoming CAP reform, budget negotiations, and trade negotiations, remains to be seen[9] [10] [11].

2.2 EU Competitiveness Compass

The European Union revealed its new EU Competitiveness Compass on the 29th of January 2025[12], which was presented as **an economic strategy and roadmap to restore Europe's dynamism and boost its economic growth**. The Compass will guide the Commission's work this political cycle and builds on the Draghi Report on the Future of European Competitiveness[13], which identifies three imperatives for the EU to boost its competitiveness:

1. Closing the innovation gap
2. A joint strategy for decarbonisation and competitiveness
3. Increasing security and reducing excessive dependencies

The Competitiveness Compass lays out 5 'horizontal enablers' that will help to achieve these, including simplification, removing EU single market barriers, financing, skills and quality jobs, and better coordination.

Within a short time after its release, the Competitiveness Compass has received much critique for prioritizing deregulation efforts over decarbonization and other Green Deal efforts such as sustainability reporting[14]. There is major concern about the risk of the reports vagueness and

[8] https://www.euractiv.com/section/agriculture-food/news/hansens-eu-agri-food-vision-slammed-for-not-including-strategic-dialogue-advice/
[9] https://www.politico.eu/article/eu-agriculture-food-policy-christophe-hansen-trade-food-pricing-supply-chains/
[10] https://www.politico.eu/article/eu-agriculture-food-policy-christophe-hansen-trade-food-pricing-supply-chains/
[11] https://www.politico.eu/article/eu-agriculture-food-policy-christophe-hansen-trade-food-pricing-supply-chains/
[12] https://commission.europa.eu/topics/eu-competitiveness_en
[13] https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en
[14] https://www.politico.eu/article/eu-new-economic-vision-is-speaking-to-green-deal-critics-competitiveness-compass/?trk=public_post_comment-text

simplification efforts in leading to deregulation and environmental and social rollbacks[15] [16]. What the report means for agricultural policy remains to be seen, with the 2025/2026 release of the European Biotech Act and the EU Bioeconomy Strategy expected to offer more clarity on the innovation that the Competitiveness Compass foresees for different sectors including agriculture.

2.3 Corporate Sustainability Reporting Directive (CSRD)

The EU Corporate Sustainability Reporting Directive (CSRD) is a recent EU legislation that is part of the EU Green Deal and expands and strengthens sustainability reporting requirements for countries. The CSRD requires companies to provide detailed reports on their environmental and social impacts, sustainability risks, and opportunities. The CSRD entered into force on January 5, 2023[17], and following transposition into Irish company law, the CSRD Regulations came into effect in Ireland on July 6th, 2024.

The implementation of the CSRD in Ireland has several implications for the agri-food sector. These include, for example, requirements for many agri-food companies to make **extensive annual disclosures** on environmental, social, and governance (ESG) matters[18]. Complexities in Irish legislation **expanded the scope and accelerated timelines for reporting obligations**, affecting companies that previously thought they would be exempt[19] [20]. Large agri-food companies will need to report on sustainability information in accordance with **European Sustainability Reporting Standards** (ESRS)[21]. The ESRS are designed to create a unified framework for sustainability reporting across the EU. Their primary goal is to enhance the consistency, reliability, and comparability of sustainability information disclosed by companies. This approach addresses previous shortcomings in sustainability reporting practices. A key feature of the ESRS is their adoption of a "dual materiality" approach. This requires companies to provide comprehensive reporting on two fronts: firstly, their impact on society and the environment, and secondly, how social and environmental factors influence the company's financial risks and opportunities. This holistic perspective aims to provide a more complete picture of a company's sustainability profile.

Furthermore, companies will need to examine and disclose the impacts of climate change on their practices, such as changing weather patterns affecting farm operations[22]. The requirements

[15] https://eeb.org/competitiveness-compass/#:~:text=Published%20today%2C%20the%20Competitiveness%20Compass%20echoes%20corporate%20concerns,economy%20towards%20a%20clean%2C%20prosperous%20and%20circular%20future
[16] https://www.arc2020.eu/eus-competitiveness-compass-north-pointing-or-are-things-heading-south-for-agri-policy/
[17] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464
[18] https://www.mhc.ie/latest/insights/csrd-corporate-sustainability-reporting-legislation-enacted-in-ireland
[19] https://www.mhc.ie/latest/insights/csrd-corporate-sustainability-reporting-legislation-enacted-in-ireland
[20] https://www.beauchamps.ie/publications/1310
[21] https://www.eversheds-sutherland.com/en/ireland/insights/ireland-corporate-sustainability-reporting-regulations-2024
[22] https://kpmg.com/ie/en/home/insights/2024/06/csrd-legislation-cge-food-agri.html

for enhanced and more consistent reporting of ESG matters at the company level is expected to drive sustainability and innovation throughout the agri-food supply chain[23].

2.4 EU Carbon Farming Framework

The new Carbon Removals and Carbon Farming (CRCF) Regulation (EU/2024/3012)[24] was adopted by the EU in 2024 and published in the Official Journal of the EU on 6 December 2024. The CRCF establishes an EU-wide voluntary framework for certifying carbon removals, carbon farming and carbon storage in products across Europe[25]. The framework aims to achieve several key objectives:

1. **Facilitate investment in innovative carbon removal technologies.** The CRCF sets clear quality criteria and monitoring processes for carbon removal activities, which will help attract investment into new and innovative technologies. Examples of what it covers include permanent carbon removal solutions such as Direct Air Capture and Storage (DACCS) and Bioengery with Carbon Capture and Storage (BECCS).
2. **Promote sustainable carbon farming solutions**. The framework includes certification for carbon farming activities, which include certification of carbon farming activities, which involve sequestering carbon in soils and forests, as well as reducing emissions from agricultural practices (soil and fertiliser). Livestock emissions are not yet included, but these may be added in 2026. This will encourage the adoption of sustainable farming methods that contribute to climate mitigation while providing co-benefits for biodiversity and soil health.
3. **Address greenwashing in the sector.** By establishing stringent quality criteria known as QU.A.L.ITY (QUantification, Additionality, Long-term storage, and sustainabilITY), the CRCF aims to ensure the credibility and transparency of carbon removal claims. This will help combat greenwashing by requiring third-party verification and certification of carbon removal claims.
4. **Standardize monitoring and reporting**. The regulation lays out processes for monitoring and reporting carbon removals, including the use of remote sensing, modelling, and on-site measurements. This standardization will improve the accuracy and reliability of carbon removal quantification.
5. **Create a market for high-quality carbon removals**. By providing a certification framework, the CRCF will help to create a market for verified carbon removal units, potentially stimulating investment and innovation in this sector.

While the CRCF has the potential to drive change in carbon removal and sustainable agriculture, it is important to note that some concerns have been raised about its implementation and potential unintended consequences[26]. The effectiveness of the framework will largely depend on how it is implemented and enforced in practice. The CRCF will have important implications for

[23] https://kpmg.com/ie/en/home/insights/2024/06/csrd-legislation-cge-food-agri.html
[24] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202403012
[25] https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en#:~:text=The%20Carbon%20Removals%20and%20Carbon%20Farming%20%28CRCF%29%20Regulation,farming%20and%20carbon%20storage%20in%20products%20across%20Europe
[26] https://www.iatp.org/sites/default/files/2024-06/CRCF%20trilogue%20article_finalfinal.pdf

the development of Ireland's national carbon farming framework, which is a key action in the government's Climate Action Plan. Other implications on the agriculture sector include but are not limited to the creation of new opportunities for Irish farmers to generate additional income through carbon farming activities; new monitoring and reporting requirements; and the need to identify synergies and opportunities for integration between the CRCF and Irelands existing agri-food policies, as well as the EU CAP.

2.5 Strategic Dialogue on the Future of EU Agriculture

The **Strategic Dialogue on the Future of EU Agriculture** was launched in January 2024[27]. The forum brings together a diverse group of actors from Europe's agri-food sector to shape a shared vision for the future of agriculture in Europe.

The dialogue reflected on four questions[28]

1. How can we give our farmers, and the rural communities they live in, a better perspective, including a fair standard of living?
2. How can we support agriculture within the boundaries of our planet and its ecosystem?
3. How can we make better use of the immense opportunities offered by knowledge and technological innovation?
4. How can we promote a bright and thriving future for Europe's food system in a competitive world?

In September 2024, the President of the European Commission, Ursula von der Leyen, received the final report of the Strategic Dialogue on the Future of EU Agriculture[29] [30]. The final report is titled 'A shared prospect for farming and food in Europe'[31]. It puts forth recommendations that are structured according to five pillars:

1. **Working together for a sustainable, resilient and competitive future**. This section emphasizes the need to adapt the Common Agricultural Policy (CAP) to support more sustainable and competitive food systems. It focuses on strengthening farmers' position in the value chain, improving access to finance, and addressing trade and international standards.
2. **Advancing towards sustainable agri-food systems**. This area promotes sustainable farming practices, including in livestock farming. It also emphasizes increasing awareness about animal welfare and empowering consumers to make sustainable and balanced dietary choices.

[27] https://commission.europa.eu/topics/agriculture-and-rural-development/strategic-dialogue-future-eu-agriculture_en
[28] https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_24_4528/IP_24_4528_EN.pdf
[29] https://ec.europa.eu/commission/presscorner/detail/en/ip_24_4528
[30] https://agriculture.ec.europa.eu/document/download/171329ff-0f50-4fa5-946f-aea11032172e_en?filename=strategic-dialogue-report-2024_en.pdf
[31] https://agriculture.ec.europa.eu/document/download/171329ff-0f50-4fa5-946f-aea11032172e_en?filename=strategic-dialogue-report-2024_en.pdf

3. **Promoting transformative resilience**. In response to various environmental, climate, geopolitical, and economic risks, this section recommends strengthening risk management tools and crisis management. It also advocates for better farmland preservation and management, promotion of water-resilient agriculture, and development of innovative plant breeding approaches.
4. **Building an attractive and diverse sector**. This part highlights the importance of generational renewal, gender equality, and vibrant rural areas in agri-food systems. It also addresses the need to protect workers in the sector.
5. **Better access to and use of knowledge and innovation**. The final section emphasizes facilitating access to knowledge and skills and recognizes digitalisation as an opportunity for the sector's development.

2.6 Eurobarometer survey shows strong support for the Common Agricultural Policy

In January 2025, the European Commission published results from **the eight EU-wide Eurobarometer survey on 'Europeans, Agriculture and the CAP'**, which was conducted in all 27 Member States in June and July 2024.The survey captures EU citizens' views of and attitudes towards agriculture and the EU's Common Agricultural Policy (CAP)[32].

The survey shows that support for the EU's common agricultural policy (CAP) is at an all-time high, with over three quarters of respondents (78%) expressing that they are aware of the CAP[33]. 92% of respondents consider agriculture and rural areas to be important for our future[34]. Over 70% of respondents agree that through the CAP, the EU is fulfilling its role in providing safe, healthy, and sustainable food of high quality, and securing a stable food supply in the EU at all times[35]. The survey also shows that 62% of respondents acknowledge that the agricultural sector has already made a major contribution to fighting climate change, highlighting the widespread perception that farmers and the agricultural sector are playing an active role in mitigating and adapting to climate change[36].

The country factsheet for Ireland[37] shows that in Ireland, 73% think that agriculture has already made a major contribution to fighting climate change, which is higher than the EU average of 62%. 53% of respondents would be prepared to pay 10% more for agricultural products that are produced in a way that limits their carbon footprint.

2.7 Climate change mitigation potential of the CAP Strategic Plans (EU-18) over the 2023-2027 period

A study from November 2024 estimated the climate change mitigation potential of the CAP Strategic Plans (CSP) of 18 MS (including Ireland) adopted under the CAP programming period

[32] https://ec.europa.eu/commission/presscorner/detail/en/ip_25_182
[33] https://europa.eu/eurobarometer/surveys/detail/3226
[34] Surveys - Eurobarometer
[35] https://europa.eu/eurobarometer/surveys/detail/3226
[36] https://ec.europa.eu/commission/presscorner/detail/en/ip_25_182
[37] https://europa.eu/eurobarometer/api/deliverable/download/file?deliverableId=96272

from 2023 to 2027[38]. The study analyses the potential contribution of the CSP to reducing greenhouse gas (GHG) emissions, enhancing carbon removals and conserving existing carbon stocks[39].

Key findings include:

1. Indications for a **potential positive contribution** of the analysed CSPs to GHG emission reduction and enhanced removal of 31 million tonnes of CO_2e per year. The 31 million tonnes are distributed between 9 million tonnes of GHG emission reductions and 22 million tonnes of enhanced carbon sequestration annually between the 19 CSPs. This estimation is associated with several uncertainties due to assumptions and methodology. However, the potential positive contribution to GHG emission reductions and enhanced carbon removal is modest, given that the figure represents only about 2.6% of the emissions reported under the agriculture sector in 2021 for the 18 EU countries covered in the study, and 10.9% of the net removals reported under LULUCF[40].
2. **Farming practices** including crop rotation or diversification, expansion of cover crops, and conversion to organic farming contribute 78% of the estimated mitigation potential of 31 million tonnes of CO_2 per year.
3. In terms of **instruments**, eco-schemes account for 38% of the estimated mitigation potential.

2.8 Progress made on the EU Soil Monitoring Law

The **new EU Soil Monitoring Law will** oblige EU MS to monitor and assess the health of all soils on their national territory[41]. The aim is to have all EU soils in a healthy condition by 2050. Building on the updates about the EU Soil Monitoring Law in the Q2 2024 Policy Update, it is important to note that further progress that has been made. All in all, the EU Soil Monitoring Law moved from proposal to active in 2024, with both the Parliament and the Council adopting their positions and entering trilogue discussions.

The European Parliament adopted its first reading position based on the ENVI report on 10 April 2024, with 336 votes to 242 and 33 abstentions[42] [43]. MEPs proposed a five-tier classification system to assess soil health: high, good, moderate ecological status, degraded, and critically degraded[44]. The Parliament supported creating a public list of potentially contaminated sites.

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[38] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cmef/sustainability/climate-change-mitigation-potential-csp-eu-18-2023-27_en
[39] https://agriculture.ec.europa.eu/document/download/7289aad3-2fa7-415a-9247-996b110e83d6_en?filename=report-rough-ghf-estimate-eu-18_en.pdf
[40] https://agriculture.ec.europa.eu/document/download/79f0453f-6961-4c84-ad14-4ccae5767861_en?filename=report-rough-ghf-estimate-eu-18-executive-summary_en.pdf&prefLang=ga
[41] https://www.soci.org/news/2024/4/european-parliament-votes-for-law-to-improve-soil-health
[42] https://www.safefoodadvocacy.eu/european-parliament-adopted-its-position-to-ensure-healthier-soils-and-safer-food/
[43] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-healthy-soils
[44] https://www.soci.org/news/2024/4/european-parliament-votes-for-law-to-improve-soil-health

The Council adopted its general approach on June 17, 2024[45]. The Council clarified the administrative structure for soil health monitoring, added flexibilities for soil measurements, and set minimum quality requirements for laboratories analysing soil samples.

Trilogue negotiations between the Parliament, Council, and Commission began on October 22, 2024.

2.9 EU efforts to reduce methane emissions

The **EU's efforts to reduce methane emissions** are reflected in **both the EU Methane Strategy and the EU Methane Regulation**. These efforts are in line with the EU's Green Deal ambitions and its endorsement of the Global Methane Pledge launched at COP26 to slash global methane emissions by 30% by 2030.

The EU Methane Strategy (COM2020/663) was published in October 2020 and sets the overall framework and ambition for reducing methane emissions across the agriculture, energy, and waste sectors[46].

The EU Methane Regulation (regulation (EU) 2024/1787), which is a direct outcome of the EU Methane Strategy, came into force on the 5th of August 2024[47]. It represents the first EU-wide legislation specifically targeting methane emissions. The regulation is primarily focused on the energy sector, targeting methane emissions from oil, gas, and coal. The agriculture sector is not included in this regulation, despite accounting for 54% of the EU's total methane emissions (as of 2020)[48]. However, the regulation sets a precedent for methane emissions reduction that could influence agricultural policies in the future. The EU is currently conducting an ongoing assessment for a report on solutions to address emissions from livestock rearing, particularly cattle, which the Commission will publish by the end of 2026. The findings of the 2026 report may lead to new legislative proposals or amendments to existing regulations, potentially expanding the scope of the Industrial Emissions Directive (Directive 2010/75/EU or 'IED 2.0') to include cattle farming[49]. The EU is also exploring various approaches for reducing agricultural methane emissions through the CAP[50]. Under the CAP, two strategies can be used to reduce methane emissions: increased productivity, which requires fewer animals and inputs to produce dairy and

[45] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-healthy-soils
[46] https://energy.ec.europa.eu/topics/carbon-management-and-fossil-fuels/methane-emissions_en
[47] https://energy.ec.europa.eu/news/new-eu-methane-regulation-reduce-harmful-emissions-fossil-fuels-europe-and-abroad-2024-05-27_en
[48] https://www.ccacoalition.org/sites/default/files/resources/European%20Union%20Methane%20Action%20Plan.pdf
[49] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-industrial-emissions-directive-(refit)?sid=8801
[50] https://www.ccacoalition.org/sites/default/files/resources/European%20Union%20Methane%20Action%20Plan.pdf

meat products; and innovative technologies and practices that directly reduce methane emissions, such as feed additives and altered breeding practices[51].

A summary of recent innovations around methane reductions in the agri-food sector is included in the annex.

2.10 Increasing urgency to adapt to climate change in light of the 2024 European Climate Risk Assessment

In 2024, the landmark first '**European Climate Risk Assessment**'[52] (EUCRA) was published by the European Environment Agency (EEA). It identifies 36 climate risks that threaten Europe's energy and food security, ecosystems, infrastructure, water resources, financial stability, and human health. The report demonstrates that many of these risks have reached critical levels already. Without urgent and decisive action, these levels of risk can become catastrophic. The EUCRA is the first-of-its kind assessment, aimed to support strategic policymaking.

The report shows that agriculture, health, environment and energy are among the policy areas that are most directly affected by major climate risks in Europe and thus require urgent action. The report also shows that "regional and local economies that are dependent on tourism, agriculture, fisheries and forestry are especially sensitive to climatic changes", such as Ireland for example. Key takeaways for agriculture from the report are:

1. **Addressing climate risks** to food production and security requires many policy levers. These include adapting and transforming food production systems, influencing demand and improving access to nutritious foods for all population groups.
2. Increased efforts are urgently needed to **manage the risk of prolonged drought**, including in the common agricultural policy (CAP) strategic plans of the Member States. An analysis of the current CAP strategic plans indicates considerable room for further improvement.
3. **A systems-approach to adaptation and resilience-building must be prioritised** on both EU and Member State level. This will help transcend sector silos and isolated risk drivers to better account for cascading and compounding risks. EUCRA indicates that policies related to ecosystems, agriculture and health have an especially high adaptation potential across different sectors.
4. **Reducing pollution from agricultural and industrial activities** should be a priority for protecting Europe's ecosystems under climate change.
5. **Diversifying agricultural approaches and promoting sustainable agricultural models**, such as regenerative agriculture, are crucial for increasing adaptive capacity and coping with climate extremes.

[51] https://www.ccacoalition.org/sites/default/files/resources/European%20Union%20Methane%20Action%20Plan.pdf

[52] https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment

2.11 EU Nature Restoration Law

In light of alarming rates of nature degradation, the European Parliament adopted the **EU Nature Restoration Law** in March 2024, which is a key element of the EU Biodiversity Strategy. 11 of 13 Irish Members of the European Parliament voted in support of the law. The law came into effect in August 2024[53] and sets legally binding targets for the restoration of degraded ecosystems[54]. Member States are legally required to restore 20% of the EU's land and sea areas by 2030, and all ecosystems in need of restoration by 2050. Member States need to submit National Restoration Plans by mid-2026, outlining how they will achieve the targets[55].

The Nature Restoration Law has several implications for Ireland's agrifood sector. Approximately 9% of Irish land is expected to be directly affected by the Nature Restoration Law[56]. The regulation contains specific targets for agricultural ecosystems, such as increasing biodiversity indicators such as grassland butterflies, the stock of organic carbon in cropland mineral soils, and the share of agricultural land with high-diversity landscape features[57]. Drained peatlands under agricultural use will also need to be restored[58]. The Irish government has dedicated a €3.15 billion Climate and Nature Fund to support the implementation of nature restoration measures[59]. A proposed carbon credit certification scheme could provide new economic opportunities for farmers who voluntarily choose to rewet their lands[60]. The Irish government has assured farmers that all nature restoration measures will be voluntary, as well as well-incentivised[61]. This commitment is reiterated in Ireland's 2025 Draft Programme for Government[62]. The draft programme includes several other links to the Nature Restoration Law, including the government's ambitions to ensure adequate farmer presentation on the Nature Restoration advisory committee, to progress Ireland's Nature Restoration Plan and to develop it in consultation with farmers[63].

2.12 European Board on Agriculture and Food

The **European Board on Agriculture and Food** (EBAF) expert group was officially established by the European Commission on January 24, 2025, following recommendations from the Strategic Dialogue on the Future of Agriculture[64]. Chaired by Commissioner for Food and Agriculture Christophe Hansen, the EBAF consists of 30 member organizations representing farmers, food

[53] https://environment.ec.europa.eu/news/nature-restoration-law-enters-force-2024-08-15_en
[54] https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en
[55] https://www.europeanmovement.ie/the-eu-nature-restoration-law-explained/
[56] https://www.europeanmovement.ie/the-eu-nature-restoration-law-explained/
[57] https://www.britishagriculturebureau.co.uk/updates-and-information/member-states-to-drive-eu-nature-restoration-law/
[58] https://www.britishagriculturebureau.co.uk/updates-and-information/member-states-to-drive-eu-nature-restoration-law/
[59] https://www.europeanmovement.ie/the-eu-nature-restoration-law-explained/
[60] https://www.europeanmovement.ie/the-eu-nature-restoration-law-explained/
[61] https://capnetworkireland.eu/nature-restoration-law-will-not-affect-irish-farmers/
[62] https://cdn.thejournal.ie/media/2025/01/draft-pfg-0fe27752-8d6e-4a16-945d-c8bdbf98088b.pdf
[63] https://cdn.thejournal.ie/media/2025/01/draft-pfg-0fe27752-8d6e-4a16-945d-c8bdbf98088b.pdf
[64] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/committees-and-expert-groups/ebaf_en

supply chain actors, and civil society groups[65]. The EBAF will provide high-level advice to the Commission on strategic policy developments, contribute to the Vision for Agriculture and Food.

2.13 Key upcoming EU agri-food policy moments in 2025

Various **important agri-food policy developments** await at the EU level in 2025. Figure 1 summarizes key upcoming developments.

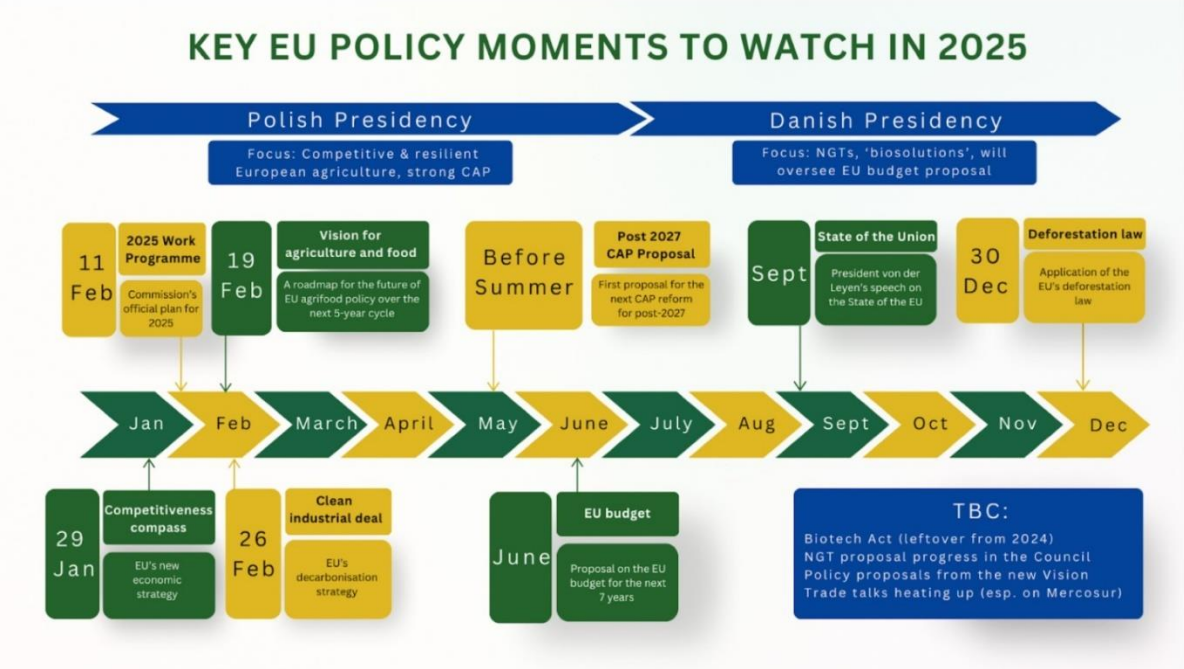

Figure 1: Key EU agri-food policy moments to watch in 2025. Figure created by Natasha Foote (2025), retrieved from The EU Agri-Food Playbook 2025 - What to expect, why it matters.

3. Insights on relevant measures by country

3.1 EU countries

3.1.1 Denmark

Groundbreaking Green Tripartite Agreement reached, including a Carbon Tax on Agriculture

Denmark introduced a groundbreaking Green Tripartite Agreement in June 2024[66], which

[65] https://www.pubaffairsbruxelles.eu/eu-institution-news/the-european-board-on-agriculture-and-food-appoints-its-members-following-the-strategic-dialogue-on-the-future-of-eu-agriculture/
[66] https://www.wri.org/insights/denmark-agriculture-climate-policy

aims to bring about a green transition in the agri-food sector. This is a historic agreement, as it makes Denmark the first country in the world to tax agricultural emissions[67]. The agreement was reached following five months of negotiations between farmers, environmental organizations, the government, and political parties[68] [69]. The approach combines stringent regulations with substantial government funding to tackle emissions.

The agreement include[700]:

1. A livestock emissions tax starting in 2030, making Denmark the first country to tax agricultural emissions[71] [72]
2. Creation of a Green Landscape Fund to set aside agricultural land, accelerate afforestation, and rewet peatlands to make more room for nature
3. Incentives to reduce nitrogen pollution from nitrogen fertilization[73].

The carbon tax explained

The carbon tax on agriculture will be implemented as follows. Starting in 2030, farmers will pay 300 Danish krone (€40) per metric ton of CO_2 emissions from livestock. The tax will increase to 750 Danish krone (€100) per ton of CO_2 emissions from livestock by 2035. A 60% basic deduction or 'tax break' will be applied to average emissions from different types of livestock, which will economically advantage climate-efficient farmers. This deduction will result in an effective tax of 120 Danish krone (€16) per ton of CO2[74] [75].

The government estimates the main socio-economic effects of the carbon tax to be reduced agricultural production and employment, with a 4% decline in production and 1,500 jobs lost by 2030. Price increases for meat and dairy products are also expected[76].

The Green Land Fund

Approximately 43 billion Danish krone (€5.8 billion) will be allocated to the Green Landscape Fund to support the following initiatives:

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[67] https://cphpost.dk/2024-11-18/news/climate/danish-government-strikes-major-green-deal/
[68] https://stateofgreen.com/en/news/denmark-announces-historic-tripartite-agreement-to-cut-agricultural-carbon-emissions-and-restore-nature/
[69] https://www.carbonbrief.org/qa-how-denmark-plans-to-tax-agriculture-emissions-to-meet-climate-goals/
[70] https://concito.dk/node/3817
[71] https://www.wri.org/insights/denmark-agriculture-climate-policy
[72] https://climateadaptationplatform.com/denmark-is-first-country-to-tax-agriculture-emissions/
[73] https://www.wri.org/insights/denmark-agriculture-climate-policy
[74] https://www.britishagriculturebureau.co.uk/updates-and-information/denmark-agrees-carbon-tax-on-agriculture/#:~:text=The%20climate%20tax%20on%20agriculture,advantage%20to%20climate%2Defficient%20farmers
[75] https://www.britishagriculturebureau.co.uk/updates-and-information/denmark-agrees-carbon-tax-on-agriculture/#:~:text=The%20climate%20tax%20on%20agriculture,advantage%20to%20climate%2Defficient%20farmers
[76] https://concito.dk/node/3817

1. By 2045, 10% of Denmark's total area should be forest and nature
2. Plant 250,000 hectares of new (production) forest by 2045[77]
3. 100,00 hectares should be turned into protected forest
4. Take 140,000 hectares of low-lying mineral soils and buffer areas out of production
5. Restore 140,000 hectares of drained peatlands
6. Establish five more national nature parks[78]

This holistic approach for land use change through voluntary incentive schemes will also support reductions in nitrogen pollution and may be supplemented by regulation from 2027 onwards if needed[79].

Nitrogen pollution reductions

Nitrogen emissions from agriculture will need to be reduced by 13,780 tonnes by 2027[80]. In Denmark, nitrogen leaching into waterbodies has caused significant damage. The measures are targeted at critical areas, where farmers holding large areas of peatland or areas with high nitrogen leaching potential have incentives to convert their land or undergo afforestation, for example using funds from the Green Land Fund[81]. The Agreement also includes paying farmers $100 per ton to reduce GHG emissions from nitrogen fertilization of farm fields, including for example nitrous oxide[82] [83]. Funds from the EU CAP are intended to be used for this[84].

€65 million for feed additives including Bovaer

The agreement earmarks €65 million for feed additives including Bovaer[85]. Under the agreement, all Danish dairy farms with more than 50 cows must use methane-reducing feed supplement[86]. Bovaer has become a contentious issue for many farmers and consumers (not just in Denmark), with a significant part of recent farmers protests in Denmark being directed against Bovaer[87] [88].

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[77] https://climateadaptationplatform.com/denmark-is-first-country-to-tax-agriculture-emissions/
[78] https://cphpost.dk/2024-11-18/news/climate/danish-government-strikes-major-green-deal/
[79] https://www.arc2020.eu/political-deal-reached-on-denmarks-green-tripartite-whats-in-it-and-whats-not/#:~:text=Under%20the%20PGTA%2C%20nitrogen%20emissions,a%20reduction%20of%2014%2C100%20tonnes
[80] https://www.arc2020.eu/political-deal-reached-on-denmarks-green-tripartite-whats-in-it-and-whats-not/#:~:text=Under%20the%20PGTA%2C%20nitrogen%20emissions,a%20reduction%20of%2014%2C100%20tonnes
[81] https://concito.dk/node/3817
[82] https://www.wri.org/insights/denmark-agriculture-climate-policy
[83] https://climateadaptationplatform.com/denmark-is-first-country-to-tax-agriculture-emissions/
[84] https://climateadaptationplatform.com/denmark-is-first-country-to-tax-agriculture-emissions/
[85] https://rgo.dk/en/is-Denmark%27s-green-tripartite-agreement-really-as-groundbreaking-as-it-claims/
[86] https://www.voltagreentech.com/news/denmark-mandates-dairy-farmers-to-use-feed-additives-from-january-2025-to-battle-global-warming
[87] https://nordictimes.com/the-nordics/denmark/danish-farmers-protest-against-climate-taxes-and-bovaer/
[88] https://www.euronews.com/green/2024/12/03/burping-cows-bovaer-and-boycotts-the-anti-methane-additive-thats-taking-social-media-by-st

€1.3 billion for biochar storage through pyrolysis

The agreement provides €1.3 billion for biochar storage through the process of pyrolysis[89], to reduce emissions of GHG from agriculture. The process of pyrolysis converts organic material into a stable form of carbon that can be stored in soil for the long term. According to a briefing by CIP Foundation, the biochar storage has the potential of up to 2 million tonnes of carbon storage per year by 2030[90].

Strategy for Green Jobs in Agriculture

Under the Green Tripartite Agreement, Denmark also implemented a Strategy for Green Jobs in Agriculture, aiming to accelerate the green transition in agriculture, reduce emissions and protect land and biodiversity, secure a stable food supply, foster innovation and development of green agricultural solutions[91].

Criticisms

While the Green Tripartite Agreement has been applauded by many, various actors voiced criticisms and shortcomings[92]. These include that the agreement does not sufficiently contribute to a structural transition away from intensive livestock farming (NGO Green Transition Denmark), the need to follow implementation closely as plans are not detailed yet and the importance of acting swiftly if the regulation does not deliver (green think tank CONCITO), the focus on technical solutions rather than structural reform (Organic Denmark), reliance on immature technologies, too little regard for animal welfare and biodiversity, and others. A spokesperson of the Danish La Via Campesina (Frie Bonder- Levende Land) also emphasised that it is critical that the agreement excludes representatives of those affected, such as some farmers and rural populations.

Making the agreement work in practice

Work to convert the agreement into law is still underway. It positions Denmark as a global leader in addressing agricultural emissions and could serve as a model for other countries considering similar measures. However, it is noteworthy that the approach is not without criticisms and is deemed to a very top-down approach. There have been recent farmer protests in Denmark opposing measures under the Tripartite Agreement[93]. There is no clear plan of implementation yet, indicating that how this plan will be put into action, and with which stakeholders, remains to be seen. The buy-in of farms, and people more widely, still needs to come.

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[89] https://rgo.dk/en/is-Denmark%27s-green-tripartite-agreement-really-as-groundbreaking-as-it-claims/
[90] https://cipfonden.dk/wp-content/uploads/2024/03/How-to-establish-a-market-for-CCS-with-biochar-in-Denmark-1.pdf
[91] https://www.em.dk/Media/638454134562067801/Strategi%20for%20gr%c3%b8nne%20job.pdf
[92] https://www.arc2020.eu/political-deal-reached-on-denmarks-green-tripartite-whats-in-it-and-whats-not/
[93] Danish farmers protest against climate taxes and bovaer - The Nordic Times

3.1.2 Belgium

Nitrogen decree is approved

On Wednesday the 22nd of January 2025, the Flemish parliament approved an amended version of the **Nitrogen decree for livestock farming**[94] that aims to significantly reduce nitrogen emissions by 2030[95]. The nitrogen decree has faced strong opposition, particularly from the agricultural sector[96]. The farmers union Boerenbond has initiated legal proceedings against the decree, submitting three separate applications to annul it to the Constitutional Court[97]. The criticism against the nitrogen decree includes that it restricts entrepreneurship, lacks sufficient scientific basis for reduction targets, and discriminates against the agricultural sector compared to industry and mobility.

3.1.3 France

Ecophyto 2030

Since 2008, France has been implementing a series of plans, known as **Ecophyto, to reduce the use of chemical fertilizers and plant protection products** in line with the European Directive 2009/128/EC[98] on the sustainable use of pesticides[99]. The latest iteration, Ecophyto 2030, was published in May 2024, and aims to cut pesticide use in half by 2030 compared to the 2015-2017 baseline period.

3.1.4 The Netherlands

Local implementation of EU Nitrates Directive facing challenges

The Netherlands' **implementation of the EU Nitrates Directive** has faced significant challenges, leading to a contentious policy standstill. The Netherlands secured a phased-out derogation (a temporary exemption) until 2025[100], but despite this, negotiations with the

[94] https://lv.vlaanderen.be/beleid/klimaat-milieu/stikstofemissies/welke-zijn-de-grote-lijnen-binnen-het-stikstofdecreet-voor
[95] https://www.belganewsagency.eu/new-nitrogen-agreement-is-a-sticking-plaster
[96] https://www.brusselstimes.com/893201/as-good-as-it-gets-flanders-approves-highly-contentious-nitrogen-decree
[97] https://www.brusselstimes.com/1189476/boerenbond-appeals-to-constitutional-court-against-flanders-nitrogen-decree
[98] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0128
[99] https://lynxee.consulting/en/france-government-publishes-the-ecophyto-2030-strategy/
[100] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A32022D2069

European Commission stalled due to persistent water quality issues[101] and concerns over manure management[102].

In January 2025, a court ruled that the Dutch government must ensure that at least half of the country's most vulnerable habitats fall below harmful nitrogen thresholds by 2030 or pay a €10 million fine[103]. The court emphasized that tangible regulatory and financial measures will be important to achieve nitrogen pollution reductions, but many of which were in place were slashed by the new Dutch government under Dick Schoof in June 2024. The case was brought to court by Greenpeace, and it remains to be seen if and how the government will go about the nitrogen pollution cuts, especially considering the recent farmer protests, combined with the risk of non-compliance with EU environmental laws.

The Netherlands' third amendments to the CAP Strategic Plan approved

The third round of **amendments to the Netherlands' CAP Strategic Plan** were approved in December 2024[104]. About 66% of land in the Netherlands is used for agricultural purposes, the 51,000 farms in the country have an average size of 32 hectares and generate more than €100 billion from agri-food product exports[105]. The main features of the (amended) CAP strategic plan include knowledge sharing, innovation, and digitalisation (an example includes a €1750 training voucher per farmer); ensuring the fair distribution of financial support, for example by re-distributing money from large to small and medium-size farms, and allocating funds for weather insurance; implementing agricultural practices that protect the soil, reduce the use of nutrients and pesticides; and trying to attract more young people to the farming profession[106].

De-risking investments in the agricultural transition

The Dutch government has implemented several **initiatives to de-risk investments in the agricultural transitions**. These include several sustainable agriculture investment funds that aim to support the transition to more sustainable and climate-smart agriculture and work to reduce risk for farmers and investors, such as the ASR Dutch Farmland Fund, the ReGeNL program, and other funds. One of the most notable recent developments is the ASR Dutch Farmland Fund, which has seen significant growth and investment in the past years. Its de-risking strategies include long-term leases of land to farmers, stable returns for investors, a climate-smart farming strategy which aims to make the agricultural sector more resilient to climate change, sustainability incentives, and diversification effects for institutional investors

[101] https://www.dutchnews.nl/2025/02/eu-warns-about-deteriorating-water-quality-in-the-netherlands/

[102] https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Dutch+Loss+of+Manure+Derogation_The+Hague_Netherlands_NL2024-0007

[103] https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Dutch+Loss+of+Manure+Derogation_The+Hague_Netherlands_NL2024-0007

[104] https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans/netherlands_en

[105] agriculture.ec.europa.eu/document/download/55f2438e-bb14-4509-bd42-d4034a2533a8_en?filename=csp-at-a-glance-netherlands_en.pdf

[106] agriculture.ec.europa.eu/document/download/55f2438e-bb14-4509-bd42-d4034a2533a8_en?filename=csp-at-a-glance-netherlands_en.pdf

that spread risk across different agricultural assets. In January 2025, BPL Pension, a Dutch pension fund for agricultural and horticultural workers, invested an additional €90 million into the fund, bringing their total investment to €300 million[107] [108].

At the end of 2023, it was announced that the National Growth Fund is investing €129 million in the ReGeNL program, which aims to transform the Dutch agricultural sector into a regenerative, sustainable, and future-proof industry[109]. It de-risks investments by developing replicable business models for regenerative agriculture, through education innovations that will train at least 10,000 farmers, advisors, and employees in regenerative agriculture practices, and consortium support from 54 partners from across the food system, including research institutions, companies, and organizations.

Another example is the €75 million Converting to Sustainable Agriculture Programme, set up by the Ministry of Agriculture, Nature and Food Quality, improves farmers' access to finance to support the transition to sustainable practices[110]. The fund addresses the financial risks associated with transitioning to sustainable agriculture by comprising of an Investment Fund, a grant scheme that supports the drafting of conversion plans, a grant scheme for starting demonstration farms, and a loan guarantee scheme that makes it easier for farmers to access necessary funds during the transition period.

3.1.5 Germany

Germany's approach to LULUCF and drained peatlands

Germany's approach to **Land Use, Land Use Change, and Forestry** is significantly influenced by its large area of **drained peatlands**, which are a major source of greenhouse gas emissions. Germany has set specific targets in the Federal Climate Change Act that aim to make the LULUCF sector a net carbon sink: by 2030, -25 million tonnes CO_2 equivalent per year, by 2040 -35 million tonnes CO_2 equivalent per year, and by 2050, -40 million tonnes CO_2 equivalent per year.

To achieve these goals, Germany has implemented several key initiatives:

- The National Peatland Protection Strategy, launched in September 2021, which aims to reduce annual emissions from peatlands by 5 million tonnes of CO_2 equivalents by 2030[111].

[107] https://globalaginvesting.com/asrs-sustainable-dutch-farmland-fund-clinches-e90m-investment-from-bpl-pensioen/
[108] https://impact-investor.com/bpl-pensioen-invests-further-e90m-in-dutch-farmland-fund/
[109] https://www.wur.nl/en/research-results/research-institutes/plant-research/show-wpr/national-growth-fund-invests-in-transition-of-agricultural-sector-wur-participates-in-re-ge-nl.htm
[110] https://www.cif.org/just-transition-toolbox/example/finance-help-farmers-participate-transition-sustainable-agriculture
[111] https://www.bmuv.de/fileadmin/Daten_BMU/Pools/Broschueren/nationale_moorschutzstrategie_en_bf.pdf

- A target agreement on climate change mitigation via peatland protection, signed in October 2021[112].

- The Federal Action Plan on Nature-based Solutions for Climate and Biodiversity, which includes measures for peatland restoration[113].

Germany's approach focuses on rewetting drained peatlands, promoting paludiculture (the productive land use of wet and rewetted peatlands that preserves the peat soil and minimizes CO_2 emissions and land subsidence), and reducing peat use. To facilitate these changes, Germany has implemented funding programs (for example allocating €100 million over ten years for paludiculture demonstrations[114]), legal framework adjustments (including changes to the Common Agricultural Policy implementation and water management regulations, and voluntary approaches (emphasizing cooperation between landowners and farmers to ensure a just transition[115]).

3.2 Non-EU countries

3.2.1 Australia

Net-zero plan and sectoral decarbonisation plan for agriculture and land (in development)

The Australian Government, more specifically the Department of Climate Change, Energy, the Environment and Water, is currently **developing a Net-zero plan that will lay out and expand how Australia will transition its economy to net zero emissions by 2050**[116] [117].

Six sectoral emissions reduction plans will support the Net Zero Plan, including one for 'Agriculture and Land', alongside the sectors of electricity and energy; transport; industry; resources; and the built environment. The Agriculture and Land plan is being developed in collaboration with the Department of Agriculture, Fisheries and Forestry, and it is going to cover livestock, cropping, on-farm energy use, forestry, and land use in its scope. An additional $63.8 million has been allocated for improving GHG accounting in the agriculture and land sector;

[112] https://unfccc.int/sites/default/files/resource/Anlage%202_Update%20to%20the%20long-term%20strategy%20for%20climate%20action%20of%20the%20Federal%20Republic%20of%20Germany_02Nov2022_0.pdf
[113] https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Naturschutz/ank_2023_kabinett_lang_en_bf.pdf
[114] https://unfccc.int/sites/default/files/resource/Anlage%202_Update%20to%20the%20long-term%20strategy%20for%20climate%20action%20of%20the%20Federal%20Republic%20of%20Germany_02Nov2022_0.pdf
[115] https://www.bmuv.de/fileadmin/Daten_BMU/Pools/Broschueren/nationale_moorschutzstrategie_en_bf.pdf
[116] https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero
[117] https://www.dcceew.gov.au/climate-change/emissions-reduction/agricultural-land-sectors

support on ground-action to reduce agriculture and land emissions; and drive long-term research for agriculture and land emissions reductions[118].

Each of the sectoral plans will cover the following aspects, as applicable to the specific sector:

1. Valuing emissions reduction, for example through carbon markets
2. Removing blockers to action, for example by supporting skills development and innovation
3. Growing social equity through the transition, for example by considering regional impacts and benefits, as well as resilience and adaptation
4. Working internationally, through trade and partnerships
5. Key enabling technologies, that support emissions reductions or removals

Australian Carbon Credit Union Scheme

In Australia, the **Australian Carbon Credit Union (ACCU) Scheme** provides an opportunity for land managers and farmers to participate in emissions reduction efforts, and to capture and sequester carbon, if they adopt approved ACCU Scheme methods. With these methods, they can earn Australian Carbon Credit Units (ACCUs), which can be sold to generate additional income[119].

One method under the ACCU scheme is the Plantation Forestry Method, which incentivizes carbon sequestration through four eligible activities[120]:

1. Establishing and maintaining a new plantation forest for commercial harvesting of wood products
2. Converting an existing short rotation plantation forest to a long rotation plantation forest for commercial harvesting of wood products
3. Avoiding conversion of an existing or recently harvested plantation forest
4. Transitioning a plantation forest to a permanent forest, in situations where that plantation is at risk of being converted to non-forested land.

Responsibilities for the scheme are shared between two entities: the Department of Climate Change, Energy, the Environment and Water is responsible for the ACCU Scheme Policy, and the Clean Energy Regulator is the independent statutory authority that is responsible for administering the scheme[121].

[118] https://www.dcceew.gov.au/climate-change/emissions-reduction/agricultural-land-sectors
[119] https://www.agriculture.gov.au/agriculture-land/farm-food-drought/climatechange/mitigation/cfi
[120] https://www.agriculture.gov.au/agriculture-land/farm-food-drought/climatechange/mitigation/cfi
[121] https://www.agriculture.gov.au/agriculture-land/farm-food-drought/climatechange/mitigation/cfi

3.2.2 New Zealand

New government ends plan to price agricultural emissions

In June 2024, the new government of New **Zealand dropped the initiative to introduce a price levy on agricultural emissions**, including on methane emitted by sheep and cattle[122]. This decision came in response to farmer pressures that their business would become unprofitable under the plan. The plan had initially foreseen for farmers to start paying for emissions from methane in quarter four of 2025. The new government stated that it would form a Pastoral Sector Group with agriculture representatives that would find alternative ways to reduce biogenic methane emissions[123].

3.2.3 Canada

Office of the Auditor's Report on Agriculture and Climate Change Mitigation

The **Office of the Auditor General's Report on agriculture and climate change mitigation** was published in 2024[124]. It highlights that Agriculture and Agri-Food Canada has only several growing seasons left to achieve its 2030 emission reduction targets. The report concludes that without a strategy to provide the agri-food sector with a long-term vision and direction, the department's path to help achieve Canada's 2030 and 2050 goals remains unclear. Agriculture and Agri-Food Canada should also implement a monitoring framework to enable the timely, accurate, and transparent assessment of results.

2030 Sectoral Emissions Reduction Plan

In December 2023, the Government of Canada published the **Emission Reduction Plan Progress Report (ERP PR)**[125]. The accompanying 2030 sectoral emissions reduction plan for agriculture[126] highlights that so far, a $3 billion Canadian Agricultural Partnership, a $165.7

[122] https://www.reuters.com/business/environment/new-zealand-ends-plans-price-agricultural-emissions-2024-06-11/#:~:text=WELLINGTON%2C%20June%2011%20(Reuters),would%20make%20their%20business%20unprofitable
[123] https://www.reuters.com/business/environment/new-zealand-ends-plans-price-agricultural-emissions-2024-06-11/#:~:text=WELLINGTON%2C%20June%2011%20(Reuters),would%20make%20their%20business%20unprofitable
[124] https://www.oag-bvg.gc.ca/internet/English/att__e_44477.html
[125] https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030/2023-progress-report.html
[126] https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/erp/factsheet-07-agriculture.pdf

million Agriculture Clean Technology Program, and a $385 million Agricultural Climate Solutions Fund have been launched.

3.2.4 UK

Package of farming and food sector support unveiled in May 2024

In May 2024, the UK government unveiled a **major package of farming and food sector support**[127]. The package includes a new Blueprint for growing the UK Fruit and Vegetable Sector, aiming to increase domestic production and drive investment in this £4 billion industry. Key initiatives involve ensuring access to affordable energy and water, cutting planning red tape for glasshouses, and doubling funding for horticulture businesses to £80 million. The government is also providing £75 million to support internal drainage boards and adjust Environmental Land Management Schemes to help farmers affected by wet weather. Additionally, the package addresses fairness in the food supply chain, with commitments to introduce regulations improving fairness in the fresh produce and egg sectors.

The Labour government's announcements relevant to the agrifood sector

Since taking office on the 5th of July 2024, **Keir Starmer's Labour government has made several announcements relevant to the agri-food sector**.

1. Inheritance Tax Changes: The government introduced changes to Agricultural Property Relief and Inheritance Tax, removing the inheritance tax exemption for farms with assets over £1 million and applying a 20% tax[128]. This has sparked protests from farmers and rural communities[129].

2. Public sector food procurement: Labour has committed to setting a target for 50% of all food purchased across the public sector to be locally produced or certified to higher environmental standards[130].

3. Trade Strategy: The new Trade Strategy aims to achieve long-term sustainable, inclusive, and resilient growth[131]. The National Farmers Union has responded to the government's

[127] https://www.gov.uk/government/news/government-unveils-major-package-of-farming-and-food-sector-support
[128] https://www.grampianonline.co.uk/news/north-east-farmers-rally-to-protest-cruel-family-farm-tax-373726/
[129] https://www.independent.co.uk/news/uk/politics/starmer-farm-tax-budget-supermarkets-b2692751.html
[130] https://www.nfu-cymru.org.uk/news-and-information/general-election-nfu-cymru-analysis/#labour
[131] https://www.export.org.uk/insights/trade-news/government-seeks-industry-views-on-upcoming-trade-strategy/#:~:text=As%20part%20of%20the%20new%20government%E2%80%99s%20developing%20economic,is%20expected%20to%20be%20published%20early%20next%20year.

trade strategy consultation in January 2025[132], suggesting six principles that they would like to see included in the new Trade Strategy. These include 1) Ensuring the consistency of domestic and international trade policy, 2) Maintaining commitment to the UK's high food standards, 3) Prioritising mutually beneficial and balanced trade deals, 4) Transparently assessing the impacts of trade liberalisation on the UK's agricultural sectors, 5) Encouraging government-industry collaborations to grow agri-food exports and address barriers to growth, and 6) Appoint a government minister who is exclusively responsible for championing agri-food trade and competitiveness to ensure accountability[133].

4. Agricultural Budget: The government is under pressure to deliver a renewed and enhanced multi-annual agricultural budget, with the National Farmers Union calling for £5.6 billion[134]. However, specific commitments have not yet been announced.

Misinformation about Bovaer cow feed additive

Bovaer is a nitrate-based feed additive that reduces methane emissions from cattle, which is approved for use and considered safe for cows. It is already used in 29 countries around the world[135]. In late 2024, however, Bovaer was at the centre of a social media misinformation storm in the UK. After Arla, a large dairy company, announced that it would trial Bovaer in some of its farms as part of the Future Dairy Partnership initiative. Misinformation was spread online about potential toxic residues in the milk and adverse effects on the animals[136]. Some boycotted Arla in the UK, leading to the UK Food Standards Agency publishing a clarifying article starting that "the additive is metabolized by the cows so does not pass into the milk"[137]. This case demonstrates the important role of social acceptance around innovations.

4. Policy recommendations

Several policy recommendations for Ireland have been distilled from the lessons learned above and presented under the three categories of visioning, finance, and policy.

Visioning

1. **Enhance systemic long-term visioning and participatory, strategic planning and learning in the Irish Agri-Food system.** The policy updates demonstrate the need to plan for long timeframes until 2050, as is already being done in the EU's Soil Monitoring and Nature Restoration Laws, Germany's approach to LULUCF and peatlands restoration,

[132] https://www.nfuonline.com/updates-and-information/government-consults-on-upcoming-uk-trade-strategy/
[133] https://www.nfuonline.com/updates-and-information/government-consults-on-upcoming-uk-trade-strategy/
[134] https://www.nfuonline.com/updates-and-information/prime-minister-s-commitments/
[135] Arla to continue with Bovaer trial, despite boycott calls | The Grocer
[136] Arla to continue with Bovaer trial, despite boycott calls | The Grocer
[137] https://food.blog.gov.uk/2024/12/05/bovaer-cow-feed-additive-explained/

the UK's Blueprint for growing the UK Fruit and Vegetable Sector and Australia's upcoming sectoral decarbonization plan for agriculture. Similarly, Canada's Office of the Auditor General's Report on agriculture and mitigation encourages the government to plan a strategy that provides the agri-food sector with a long-term vision and direction to achieve Canada's 2030 and 2050 goals. Additionally, Denmark's groundbreaking Green Tripartite Agreement underlines the importance of comprehensive, long-term strategy planning for transitioning the agri-food sector. Solid strategy planning includes undertaking participatory visioning processes to envision what possible futures may look like and explore how to get there. We encourage to pursue participatory future visioning efforts under the Vision 2050 Flagship of the Deep Demonstration, and to carry this vision forward by integrating it into policy and planning moving forward. Different options for implementing a comprehensive long-term visioning and strategic planning framework could include establishing a Foresight Commission and integrating long-term planning into existing policies. Future iterations of the Food Vision 2030 strategy, for example, could be aligned with longer-term goals reaching far beyond 2030. Additionally, while Ireland's National Adaptation Framework provides a long-term vision to 2050, it could be strengthened by defining more specific future risk projections, detailed adaptation pathways and (intermediate) targets for the short, medium, and long-term. The two Irish regions of Donegal and Tipperary are already participating in the Pathways to Resilience project, which takes place under the EU Mission on Adaptation. Through their participation in policy impact labs under the Pathways to Resilience project, Donegal and Tipperary will make a head start on defining future pathways and speeding up policy development.

2. **Actively include young generations and consider future generations in decision-making processes and policies.** The EU's Common Agricultural Policy Reform Updates encourage young farmers to join the farming profession, as also reflected in the Netherlands' third round of amendments to their CAP Strategic Plan. Ireland's Programme for Government 2025 conveys the governments' commitment to protecting present and future generations through environmental stewardship and investments in adaptation measures. Additionally, generational renewal in agriculture is an important measure for the transition towards a net-zero agri-food sector, which is mentioned in the Climate Action Plan 2024 and the Irish Common Agricultural Policy Strategic Plan 2023-2027 and is the key objective of the Commission on Generational Renewal established by Minister McConalogue in 2024. The Irish government has allocated almost €178 million for additional income support to young farmers under the CAP. To date, Ireland has already made efforts to include young generations in decision-making processes and policies, but there is further room for improvement. Possible strategies to enhance youth inclusion are to expand youth representation and create opportunities for youth engagement in formal policy-making bodies and advisory committees. At the same time, policy development processes should explicitly consider the impact on future generations and include long-term visions that uphold the value of intergenerational equity.

Finance

3. **Map the agri-food system to understand where finance currently flows and where the finance gaps are that need to be filled to drive the transition.** The policy updates have demonstrated that major funding gaps need to be filled to drive the transition of the agri-food system. Examples include the Dutch government's actions

under the 'Converting to Sustainable Agriculture Program', the ASR Dutch Farmland Fund, and the ReGeNL program; as well as different funding allocations made under the Danish Green Tripartite Agreement, for example to the Green Landscape Fund and for feed additives. To design targeted and sufficient funding interventions, the first step is to understand the size of existing funding gaps. The second step is to then match these funding gaps to the policy ambition. We thus recommend mapping the Irish agri-food system with the objective of understanding where finance currently flows and where the finance gaps are that need to be filled to drive the transition.

4. **Fund the transition gap by de-risking investments into the agricultural transition**, building on the examples of the Dutch Agriculture Transition Fund, ReGeNL Program, and Converting to Sustainable Agriculture Programme. De-risking investments in the agricultural transition is crucial for accelerating the shift and supporting farmers in their transition towards sustainable, regenerative, and future-proof farming practices. Mitigating financial risks encourages farmers to adopt innovative technologies and practices that can reduce environmental impacts while maintaining productivity and building resilience to climate risks, ultimately strengthening competitiveness and food security in a changing climate. This policy priority closely aligns with the Climate Action Plan of 2024, which highlights the need for significant investment to support the agricultural sector's transition and note that closing the emissions gap will require significant investment of €119-125 billion across sectors including food and agriculture. Furthermore, de-risking agricultural investments supports Ireland's goal of developing a competitive, sustainable agri-food sector as outlined in the Food Vision 2030 strategy, helping to balance economic viability with environmental sustainability.

5. **Create an enabling environment for innovative business models in the agri-food sector, for example for bioeconomy advancement.** The policy updates demonstrate that the demand for testing, developing and rolling out innovative business models is high, and key to achieving a future-proof agri-food sector that is competitive and resilient. The UK's new farming and food sector support package, for example, includes a blueprint for significantly growing their domestic production of fruit and vegetables. In the Netherlands, the investment of €129 million in the ReGeNL program underlines the need for business models for regenerative agriculture. In New Zealand, on the other hand, the new government ended the plan to price agricultural emissions in part due to farmer pressures that their business would become unprofitable under the plan. In Ireland, future opportunities should be discussed for different business types ranging from large corporations to SMEs and dairy cooperatives, as they all need to be part of the transformation. This is planned as a key component in the Dairy Flagship with the aim to develop resilient and sustainable business models at farmer level, while also testing the implications on cooperatives of all their suppliers transitioning to sustainable production models. Discussions need to be held around possible transition instruments, and how the government can enable the transformation. Innovative business models can be harnessed in different agri-food sectors, but the bioeconomy sector stands out as offering different opportunities to catalyse on, such as biochar. The Programme for Government 2025 calls for the development of Ireland's bioeconomy sector through a coordinated approach that harnesses Ireland's natural resources and competitive

advantage (p.27), building on Ireland's National Policy Statement on the Bioeconomy[138] and National Bioeconomy Action Plan for 2023-2025[139]. The latter emphasizes that "the bioeconomy offers a vast range of new opportunities, new business models, new value chains" (p.2).

Policy

6. **Explore and plan for a mix of different strategies to reduce methane emissions in the agri-food sector.** The formulation of a long-term plan that combines short, medium, and long-term measures is encouraged. Ensuring the social acceptance of these measures will be imperative, given the learnings from the Bovaer© feed additive misinformation case in the UK. All-in-all, this will position Ireland as a proactive and anticipatory player in the EU context of CAP reforms, upcoming efforts to reduce methane emissions from agriculture, and the EU Competitiveness Compass. It will also help Ireland to fulfil its Programme for Government 2025, which aims to "acknowledge the special economic and social role of agriculture and the distinct characteristics of biogenic methane and support the progress made to date by farmers and industry in reducing emissions" (p.26).

7. **Increase the successful localization of policies by matching policy ambitions with financial resources and speedy implementation.** The policy updates have demonstrated that many new policies, plans, strategies, and laws are being developed at the EU and national levels. These need to be localized to the regional level in order to yield results on the ground. In Ireland, policies that require localization include the 2030 Vision for Food and Agriculture, the annual Climate Action Plans, the strategic CAP implementation plan, and the National Adaptation Framework, amongst others. The level of ambition in developed policies is very high in Ireland. Matching this with the level of investment that is needed to successfully implement and localize them in a timely manner will be a challenge. Understanding where existing resources are being deployed, where additional investment will have the biggest impact and the best combinations of investment to achieve impact will catalyse the transition. In turn this will boost competitiveness and regional diversification through the transformation of the Irish agri-food system.

8. **Learn by doing and integrating learning loops with long term outcomes in mind.** The policy updates have shown that learning through implementation and learning by monitoring and reflecting on results is important for scaling up solutions. Canada's Office of the Auditor General's Report on agriculture and climate change mitigation, for example, shows that implementing a monitoring framework to enable the timely, accurate, and transparent assessment of results is very important. Additionally, the 2024 knowledge for policy report on the Strategic Dialogue on the Future of EU Agriculture recommends the harmonization of sustainability assessments and methods to enable better comparisons and improvements, calling for a system based on common objectives, principles, criteria, and monitoring and verification tools with common metrics and indicators. To ensure the effective and adaptive transition of Ireland's agri-

[138] https://assets.gov.ie/2244/241018115730-41d795e366bf4000a6bc0b69a136bda4.pdf
[139] https://assets.gov.ie/273984/64aa20ef-3907-46fe-a599-73ba208a1edf.pdf

food sector in alignment with national and EU climate goals, we recommend that stakeholders focus on the need for learning by doing, by testing innovations at scale, improving and scaling solutions as quickly as possible. Simultaneously, we recommend the integration of learning loops into monitoring, reporting, verification (MRV), learning, and evaluation processes. These learning loops should always keep long term outcomes in mind.

5. Conclusion

This report has provided updates from key policy developments that are relevant to the transition of the agri-food sector in Ireland. Policy developments were included from the EU level, the EU Member State level (Belgium, Denmark, France, Netherlands, and Germany) and from other national contexts (United Kingdom, Canada, Australia, and New Zealand). Based on the learnings from these policy updates, the following policy recommendations were distilled:

Visioning

1. **Enhance systemic long-term visioning and participatory, strategic planning and learning in the Irish Agri-Food system.**
2. **Actively include young generations and consider future generations in decision-making processes and policies.**

Finance

3. **Map the agri-food system to understand where finance currently flows and where the finance gaps are that need to be filled to drive the transition.**
4. **Fund the transition gap by de-risking investments into the agricultural transition.**
5. **Create an enabling environment for innovative business models in the agri-food sector, for example for bioeconomy advancement.**

Policy

6. **Explore and plan for a mix of different strategies to reduce methane emissions in the agri-food sector.**
7. **Increase the successful localization of policies by matching policy ambitions with financial resources and speedy implementation.**
8. **Learn by doing and integrate learning loops with long term outcomes in mind.**

These policy recommendations are already aligned with some of the learnings generated during sensemaking exercises under the Deep Demonstration partnership. Implementing these policy recommendations will help to drive forward Ireland's agri-food sector transformation on its path to becoming a resilient, sufficient, efficient, competitive, biodiversity-rich, environmentally and socially sustainable, and climate-neutral nation by 2050.

Annex- Innovations around methane reduction

(Saskia Visser; EIT Climate-KIC)

Methane (CH4) in Agriculture

Methane is a powerful greenhouse gas and short-lived climate pollutant (SLCP) primarily emitted by human activities. It has an atmospheric lifetime of around 12 years. While it has a much shorter lifetime than carbon dioxide (CO_2), methane is much more efficient at trapping radiation. Per unit of mass, methane has a warming effect 86 times stronger than CO_2 over 20 years. Over a 100-year period methane is 28 times stronger[1]. Methane's relatively short atmospheric lifetime and its strong warming potential means that actions to reduce emissions can slow the rate of warming and provide many other societal and environmental benefits within a matter of decades. Maximum possible reductions in methane emissions are essential to limiting atmospheric warming to 1.5°C. Agriculture is the largest human source of methane emissions, responsible for 40% of the global emissions.

Globally, ruminant animals, like cattle and sheep, are significant methane producers, ranking as the second most important contributor to climate change after carbon dioxide. They have specialized stomachs that ferment their food, leading to the release of methane during digestion. This ruminant enteric methane accounts for as much as 30% of global anthropogenic methane emissions, making it a key contributor to the sector's environmental footprint. Reducing or even eliminating these emissions is crucial for mitigating the livestock industry's impact on climate change.

With COP30 approaching it is expected that reduction in methane emissions will be high on the agenda. There is a strong need to enhance collaboration across the food system, align methane mitigation efforts with food and nutrition security and farmer livelihoods, and scale innovative solutions. This paper provides an overview on innovations and (some) recent developed partnerships around methane reduction.

Innovations

Livestock systems present both challenges and opportunities for impactful interventions. Innovation in methane reduction from livestock relate either to i) avoiding its creation up front, for example by breeding low emitting livestock, change the character of the diet, providing methane inhibiting feed additives; ii) Focus on avoiding the enteric development of methane stimulating a breakdown in the stomach; think of anti-methane vaccines and or influencing the rumen microbiome and iii) avoiding the emission of methane, think of methane capture and/or neutralisation and methane eating microprobes(MEMs) (Figure 1). These innovations are all fully under development, have obtained investments, are part of collaborations and are currently paving their own pathway to the market. An important factor in the adoption of methane reducing innovations is the capacity to measure the reductions, here the large innovation focusses on animal-based methane measurement. Finally, the social acceptance of these innovations requires sufficient attention, avoiding the failure of innovations due to social debate. The next sections provide a brief overview of the current state of the innovations.

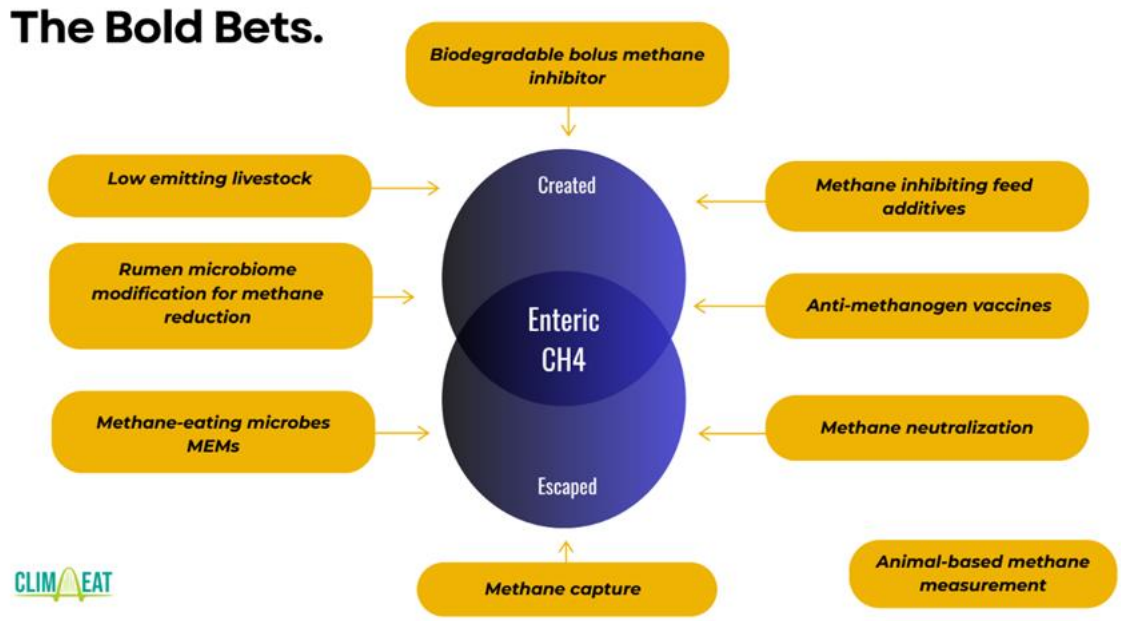

Figure 1: Overview of different options to reduce methane by Climeat

Avoiding the creation of methane

Ruminant BioTech, headquartered in Auckland New Zealand, has developed a methane-busting solution that is viable and effective in pasture-grazed farming systems. The delivery system is **a bolus,** a capsule designed to reside in the largest stomach of the ruminant animals, that releases a constant and consistent dose of the active ingredient. The company claims to achieve methane reductions exceeding 70% over a period of 3- 6 months.

A dedicated plant for manufacturing the capsules is scheduled to be ready in Q 2 2025, and first sales are expected in October 2025 in Australia, while the produce awaits regulatory approval for use in New Zealand.

Animal breeding is all about improving genetic abilities from one generation to the next, by selecting the right partners. Ruminants differing genetically in terms of methane (CH_4) emissions can be identified, and the heritability is sufficiently high (15-25%) to enable breeding programs to develop populations of low-emitting CH_4 animals. Although CH_4 emissions reflect feed intake to a significant extent, research has found that differences in feed intake do not fully account for differences in emissions, indicating the potential to breed for both low-emitting animals and maintained or even higher feed intake (a balanced breeding index), therefore allowing CH_4 mitigation in combination with increased animal production, enhancing the likelihood of adoption. Van Breukelen (2024) indicated that the largest impact in reducing methane emissions through animal breeding will be achieved by sharing data between institutes and countries. Yet breeding currently shows the largest long-term potential, due to its low implementation costs, and the permanent and cumulative effects. The Global Methane Hub (GMH) serves as a central hub for information about methane mitigation and advocate for free data sharing. Reductions of at least 1% per year in emissions per animal are possible through balanced selection and it could realise a reduction as large as 40% over a period of 30 years. The GMH has facilitated world-wide data sharing, developed protocols and facilitated phenotyping for reference populations. Ireland

is actively participating in the Sheep global reference program. Additionally, there are programs for dairy, beef and microbiomes.

Already in 2022, DSM-firmenich received EU market approval for its methane reducing feed additives Bovaer®. **Bovaer®** has a significant and immediate impact reducing the environmental footprint of beef and dairy products. The product has been approved as safe by numerous regulatory authorities worldwide. Microbes in the cow's rumen digest food, producing hydrogen and carbon dioxide. Methanogenic microbes utilise these two gases and convert them into methane by a series of enzyme reactions. Bovaer® is a feed supplement that temporarily inactivates one of these enzymes and this results in lower methane production. Just a ¼ of a teaspoon per day is added to the cow's feed and it takes effect in 30 minutes. Naturally metabolised by the cow, Bovaer® consistently reduces methane emissions and is safe for the cow and is not transferred into milk or meat. Bovaer® has been extensively used worldwide for and is available at the European market. It is especially suitable for large commercial farms, where cows have indoor feeding systems. As the product does not provide any additional gains, like increase production, its adoption is highly related to support schemes from larger corporates providing a bonus on e.g. milk or meat related to the use of the product. Therefore, DSM is currently developing partnerships along the value chain.

BioLumic is internationally acclaimed for its unique and proprietary **UV Light Treatments** which are applied to seeds to regulate their genetic expression and unlock their natural genetic potential. AgriZeroNZ funding will enable BioLumic to apply its technology to ryegrass, the most common forage pasture on New Zealand farms, with a goal to increase fat content and subsequently reduce methane emissions from animals that consume it. BioLumic is targeting a 2-3 per cent increase in the lipids content of ryegrass to drive methane reduction by over 12 per cent. The company is targeting wide scale use from 2027, with reduced regulatory barriers expected from the light treatment approach which will support a faster speed to market.

Animals' menu has a lot of influence on the amount of methane an animal products. 'We can tinker with the diet to reduce emissions.' Research by Wageningen University shows that replacing grass silage with maize with a high starch content reduces methane emissions; starch is easy to digest. In a ration with a quarter of maize as roughage, it reduces methane with three to four per cent compared to a ration with only grass silage as roughage.

Avoiding enteric methane creation

Since scientists initially investigated the potential of marine macroalgae to reduce methane emissions, using **seaweeds** as an anti-methanogenic feed additive has become prevailing in recent years. *Asparagopsis taxiformis* is the preferred species because it contains a relatively higher concentration of bromoform; the active ingredient that inhibits the activity of the co-enzyme that develops the methane. However, bromoform is a potential toxin and ozone-depleting substance. Liu et al. (2024) concluded that the methane-reducing efficacy of seaweed is indisputable. However, its application as a commercial feed additive is still influenced by factors such as safety, costs, policy incentives, and regulations. Yet, in some countries, seaweed supplements are already available on the markets.

Yet in November 2024 Tasmania-based Sea Forest— a startup producing feed supplements from Asparagopsis seaweed to curb livestock methane emissions—has announced its partnership with Uganda-based Nile Orbital Aerospace to feed its supplements to cattle in East Africa. Stage one of the partnership starts early 2025 with 30,000 cattle across 15 farms in Uganda and

Kenya. Sea Forest will provide a lick to be used in the grazing systems while the reduced emissions will be measured simultaneously. Noa's Herd—an app developed by NileOrbital Aerospace—will measure the resulting reductions in methane, supported by GreenFeed devices, portable feeding stations that capture and analyse gases produced by ruminants. Eventually the entire solution of feed additives & measuring emissions will be financed through carbon credits.

A successful **methane vaccine** would trigger an animal's immune system to generate antibodies in saliva that suppress the growth and function of methane-producing microbes (methanogens) in the rumen. A vaccine is a highly desirable tool for reducing enteric methane emissions because it requires no farm system changes, is used infrequently, leaves no residues in products and is applicable to all ruminant farm animals. Since 2004 the New Zealand Agricultural Research Centre (NZAGRC) is supporting work to accelerate the development of a prototype of vaccine. In vitro research has demonstrated that a vaccine can produce sufficiently high levels of antibodies in the saliva of sheep and as such influences the active methanogen within the rumen, potentially reducing methane formation. Yet so far vaccination trials in sheep have not successfully reduced methane emission. Bezos Earth Fund has recently (February, 2025) invested $9.4 M in a collaboration between (NZAGRC), Royal Veterinary College (UK) and Pirbright Institute (UK) to develop a single-dose vaccine that an animal would receive relatively early in life that continues to have an effect, and the target is an absolute minimum of 30% reduction in methane emissions. This study will last for 3 years, after which the required approvals need to be obtained.

Capturing escaped methane

Windfall Bio is developing a unique solution to capture methane using "Methane Eating Microbes" (MEMs), which thrive on methane as their sole energy source. These microbes, typically found in anaerobic environments like wetlands and soils, consume methane and break it down into simple carbon compounds. This process provides the microbes with energy for growth and nitrogen from the air, which they release as nutrients for other microorganisms in the soil. MEMs present an opportunity for agriculture -but also for oil and gas, and waste management- to reduce their methane emissions and improve efficiency. In February 2025, Windfall Bio's OptiMem product received OMRI certification for use in organic operations under USDA standards. This certification validates Windfall's methane-derived microbial output as a legitimate solution for partners seeking to produce organic fertilizer and generate carbon credits. OMRI's certification allows Windfall to enter the growing market for sustainable alternatives to synthetic fertilizers. MEM production is economically viable for various applications. Windfall has attracted interest amongst others Whole Foods, which aims to reduce methane emissions from small dairy operations, and fertilizer manufacturers like Wilbur Ellis. Other potential customers include landfill operators, composting facilities, and oil and gas companies. However, with only 25 employees, Windfall's main challenge is prioritizing these opportunities effectively.

Headquartered in London ZELP is developing a low-cost, cattle wearable technology to mitigate methane emissions. The 'cow mask' allows methane to be routed directly from the cow's rumen to an external catalyst where it is oxidised, before being released into the atmosphere as carbon dioxide and water. A sensor at the tip of the masks detects when a cow exhales and the percentage of methane expelled. The mask sets the oxidation mechanism into action when methane levels are too high. The mask also collects data on the animals to improve efficiency and animal welfare on farms. As carbon dioxide has a much lower global warming effect than methane, the mask immediately reduces the impact of the livestock on the climate.

Monitoring

The European Copernicus Sentinel-5P satellite continues to measure atmospheric methane concentrations on a global scale. The Copernicus Atmosphere Monitoring Service recently launched methane hotspot monitoring maps that are updated weekly. Until recently, Copernicus Sentinel-5P depended on cloud masking information from another mission to produce high quality methane observations. Since January 2025, Sentinel-5P's methane processor has received a crucial update that enables it to independently generate these measurements, without relying on external cloud data. This upgrade has a number of important benefits, including allowing the processing of methane data in near real-time, in the near future.

Sentinel 5P's methane product, second only to the nitrogen dioxide product, is among the mission's most exploited datasets by the atmospheric user community. Monitoring of the gas is a priority for scientists because of its powerful heat trapping properties and its significant contributions to rising global temperatures.

Partnerships focussing on methane (in Agriculture)

The 2021 CCAC-UNEP Global Methane Assessment showed that significant action is needed, particularly in this decade, to reduce methane along with all other climate forcers to achieve the 1.5ºC target. It also showed that this is achievable. These messages sparked global action, as evidenced by the launch of the Global Methane Pledge (GMP). The Global Methane Pledge (GMP) was launched at COP26 by the European Union and the United States who have been joined by many countries. In January 2025, GMP counted 159 participants. Since its launch, the GMP has generated momentum for methane mitigation, with major work underway in six action areas including the Food and Agriculture Pathway, Methane Plans and Policies, Data for Methane Action, and Finance for Methane Abatement. This work is being supported by a broad range of leading international actors such as the Global Methane Initiative (GMI), the Global Methane Hub (GMH), the International Energy Agency (IEA), the United Nations Economic Commission for Europe (UNECE), and the World Bank.

For instance the Global methane Hub runs the Entric fermentation R&D accelerator. This is the largest, globally coordinated public-good investment in breakthrough research tackling livestock methane emissions, the largest single contributor to global food system methane emissions. The Accelerator aims to fund the development of a holistic and balanced portfolio of research and technologies to decrease the production of methane that will be attractive for farmers to adopt and viable within the diverse nature of livestock production systems globally. The volume of such research has increased in recent decades, but while some solutions exist, scaling their adoption globally has been slow.

Since launching at COP28, the Dairy Methane Action Alliance (DMAA) has expanded to eight food and dairy companies, together worth over $230 billion in annual global sales: Bel, Clover Sonoma, Danone, General Mills, Kraft Heinz, Lactalis USA, Nestle, and Starbucks. Environmental Defense Fund (EDF) has just published two foundational frameworks for the global dairy sector to integrate methane accounting and disclosure into their sustainability strategies. Along with the launch of these guides, two DMAA members, Bel Group and Lactalis USA, have now publicly disclosed their methane emissions, with the rest of the group committing to disclose in 2025.

Investment in public acceptance of methane reducing tools

In late 2024, Bovaer©, a nitrate-based feed additive, was at the centre of a social media storm in the UK after Arla, one of the largest dairy companies in the country, announced that it would trial it in some of its farms. Although Bovaer© is approved for use and considered safe for cows, misinformation spread online about potential toxic residues in the milk and adverse effects on the animals, which led some to boycott the brand in the UK. The UK's Food Standards Agency was prompted to publish an article stating that "the additive is metabolized by the cows so does not pass into the milk."

Furthermore, in the European parliament questions were asked about the 'cow masks' and the impact on animal welfare. Stating that 'farmers strongly oppose the masks'.

These examples show potential hurdles for a successful adoption of methane reducing tools: how to deal with misinformation and consumer acceptance. So far investments go towards the science to get us the tools; yet no investment goes towards thinking about how these tools, once they hit the marketplace, are going to be accepted by the consumer."

Summary/ Conclusion

In conclusion, innovative strategies for methane reduction in agriculture are rapidly advancing, offering promising solutions to one of the most significant contributors to climate change. The developments span a wide range of technologies, from methane-inhibiting feed additives like Bovaer® to promising genetic approaches like animal breeding for low-emitting livestock. Additionally, cutting-edge solutions such as methane-eating microbes, seaweed supplements, and wearable methane capture devices show potential to mitigate emissions across various farming systems. However, challenges remain, particularly around the widespread adoption of these technologies and their acceptance by farmers and consumers. Collaborations between governments, research organizations, and private companies, along with global efforts like the Global Methane Pledge, are crucial to ensuring the scaling and implementation of these innovations. At the same time, addressing the public's concerns and building trust in these new tools will be vital for their success. As the urgency to meet climate targets intensifies, methane reduction innovations present a significant opportunity to achieve meaningful, near-term climate benefits, particularly when aligned with broader food security and sustainability goals. The continued investment in research, development, and education around these solutions will be key to mitigating the livestock sector's environmental impact and advancing global efforts to tackle climate change.

[1] https://www.ccacoalition.org/short-lived-climate-pollutants/methane

www.climate-kic.org

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