

The relationship between climate change and agriculture is a contentious, complex and important one. In this series of thirteen blogs, UCD Adjunct Professor Frank Convery will explore the context, challenges and potential solutions for dairy, beef and sheep farming in Ireland. Each blog presents key evidence to underpin informed debate and the series seeks to help plot a sustainable future for the sector.

Responses are invited via earth.institute@ucd.ie and the UCD Earth Institute will host a workshop in association with the UCD School of Agriculture and Food Science and the National Economic and Social Council at the end of the series to discuss the evidence and its implications.

Professor Eoin O'Neill, Director, UCD Earth Institute

12. Climate Performance by Irish Ruminant Farming: New policies to drive emissions reductions and carbon removal at scale

Frank Convery, Adjunct Professor, University College Dublin

How to cite this blog (APA): Convery, F. (2023, October 17). Climate Performance by Irish Ruminant Farming: New policies to drive emissions reductions and carbon removal at scale. *UCD Earth Institute Climate Policy for Ruminant Agriculture in Ireland*. <https://www.ucd.ie/earth/blog/climate-policy-agriculture-ireland-blog/climatepolicyforruminantagricultureinirelandblog12/>.

See <https://libguides.ucd.ie/academicintegrity> on how to cite in other formats.



Register for a weekly email notification when a new blog is published:

Email Address



Sign Up

I give my consent to join this mailing list. [Privacy Policy](#)

"Ireland will become a **world leader** in Sustainable Food Systems (SFS) over the next decade. This will deliver significant benefits...and will also provide the basis for the future competitive advantage of the sector".

Food Vision 2030 [1]

"The deep connection that has always existed between our people and the land has translated into a commitment to fight climate crisis to preserve our planet for future generations. The single existential threat to the world is climate change. We don't have a lot of time, and that's a fact. Ireland's famous



News & Events



Jennifer Keating
awarded funding for historical and environmental research on former Russian Empire



Emma Teeling
receives prestigious ERC Synergy Grant



New Earth Institute
Deputy Directors

Tweets from @UCDEarth

Follow

UCD Ea... @... · 1h X
Jennifer Keating @UCDHistory shares details of her European Research Council @ERC_Research project starting January 2024

Land Limits: Towards connected history of population, environmental change, capital + conflict in Russian Eurasia 1860s-1920s

ucd.ie/earth/newseven

ALT

40 shades of green are being supplemented by green energy, green agriculture, green jobs..... Our world stands at an inflection point where the choices we make today are literally going to determine the future of the history of this world for the next four to five decades – literally, not figuratively”.

President Joe Biden, to the Oireachtas, April 13, 2023. [2]

Key Points

1. **The new normal is this: If Irish ruminant farming doesn't perform to high climate and environmental standards, there will be negative commercial consequences and spurious claims will be illegal.**

- We failed to deliver on the commitment in *Food Wise 2025* published in 2015 that “Environmental protection and economic competitiveness are equal and complementary: one will not be achieved at the expense of the other.” The consequence was that as farming intensified, nitrate pollution increased in 9 catchments and water quality deteriorated. The core compliance requirement under which some farmers were given a derogation allowing them to spread 250 Kg of manure/ Ha (the standard allowance is 170 Kg/Ha) is the 6-word condition of the Nitrates Directive - “will not contribute to higher pollution.” It did, and now the derogation will be reduced to 220 Kg/Ha. This will add to costs. It is likely that unless the deterioration in the water quality in 9 catchments is reversed, the derogation will be removed completely at the next review, and this will add even more to on-farm costs. There are no free lunches here.
- Increasing carbon footprint competition (Kgs CO₂e/Kg of product) from dairy beef and sheep farmers producing in our top three markets (EU, UK, US) is in prospect. Within the EU, in 2018, France initiated a programme to encourage carbon removal and emissions reduction and the labelling of achievement in this regard, with a particular focus on forestry and farming [Low-carbon label: rewarding actors in the fight against climate change \[Ministries Ecology Energy Territories \(ecologie.gouv.fr\)\]](#) and in [Denmark a Working Group](#) has recently made recommendations in regard to carbon labelling of food. California started to support the reduction in greenhouse gas emissions in 2015, by inviting their dairies and farmers to apply competitively for grant aid to reduce their emissions, evaluated as follows: 50% of the marks based on emissions reduced, and the other 50% for the technical quality credibility and cost effectiveness (value for money) of the proposals to do so. Digester projects are also able to receive environmental credits under the state's Low Carbon Fuel Standard (LCFS) Program and the federal Renewable Fuel Standard (RFS) Program. At US federal level, in the range of €9.5 billion to €20 billion are provided via the Inflation Reduction Act (2022) to support farmers make climate smart investments. Similar investment support (ELMS) is beginning to flow to farmers in England and Wales, and increasingly carbon efficient product from NZ and Australia will have tariff-free access to this market. The choices of some premium customers in these three markets will be influenced by their understanding of the Kgs of CO₂ emissions associated with their purchases. We will start leaking premium customers in these markets if we do not match this competition. When launching New Zealand's climate strategy for farming, Minister for Agriculture put climate competitive front and centre of his case for action: The heading was ‘New Emissions Plan will Future Proof New Zealand's Export sector’, and he observed that: “Nestle, the single biggest customer of our biggest company, Fonterra, has committed to a 50 per cent reduction of scopes 1, 2 and 3 emissions by 2030. Many more companies have similar targets. This is a tectonic shift in our export markets, meaning our farmers will have to reduce their emissions in order to sell to them”
<https://www.beehive.govt.nz/release/new-emissions-reduction-plan-will-future-proof-nz%E2%80%99s-largest-export-sector>. As you know, New Zealand now has tariff free access to the UK market.
- There are two recent EU developments of huge significance, that have gone relatively unremarked in the public domain: The first is the requirement in the Corporate Sustainability Reporting Directive that Scope 3 emissions, i.e., those that are farm-based, be included in reporting; the second is the so called ‘Greenwashing’ Directive, which will prohibit spurious climate and environmental claims. Both

credible measurement and penalties for erroneous green claims are two new realities for the Irish food industry and Irish farmers.

2. The sector also desperately needs 'public goods' success, defined as greenhouse emissions removed and carbon stored at scale, clean river catchments and vibrant nature especially around land-based Natura 2000 sites, for other reasons:

- Without it, the debilitating and psychologically destructive drum beat of media criticism will continue and is likely to grow as climate change impacts intensify in real time; the status of the profession falls, and succession challenges increase.
- With it, criticism evolves to admiration and disparagement is replaced by praise.

3. There has been important policy progress in Ireland including: development and presentation of evidence by Teagasc on many fronts; regulation supporting progress on nitrates reduction, including imposing requirements – e.g., Low Emissions Slurry Spreading (LESS) to qualify for derogation; large increase in climate-environment spending (funded by revenues generated by the carbon tax) in CAP 2023–2027; impressive developments in: on-farm emissions' measurement – [Gerry Boyle: 'When it comes to carbon, you can't manage what you don't measure' – 09 August 2023 Premium \(farmersjournal.ie\)](#); the actions of some courageous farmers (Signpost farmers etc.); the integration of clover and mixed swards, and developments in methane reducing genetics and farm demonstration; the coherence of the recommendations of the Food Vision Dairy and Beef groups; actions by coops and others and Bord Bia/Origin Green on bonus payments, rapid rise in membership of SDAS and SBLAS.

4. But this progress will not be anything like enough to ensure success and the reasons are simple:

- Because of the huge average income gap between dairy farming and cattle and sheep farming in Ireland, there is an understandable inclination in the design and delivery of climate and other policies to favour using the funding to help narrow the income gap. Pillar 1 (basic income) funded 100% by the Commission is a zero-sum game. The total amount is fixed, 130,000 farmers are beneficiaries, and if group A get more, then the rest must get less. It is a zero-sum game, and this makes the politics toxic.
- Pillar 2 (Rural Development) is co-funded, and this is where the main climate-environment support – ACRES in CAP 2023–2027 – comes from. The de facto main criterion for success is number of farmers participating, and this means spreading the money widely but thinly.
- There is not a mission focus on magnitude and quality of outcomes in terms of: greenhouse gas emissions reduced and carbon stored, number of river catchments whose water quality is conserved and improved, or the number of Natura 2000 sites whose habitats are protected and species restored.
- Future success will require designing and delivering policies that deliver these three missions.
- Except for policies that emerged in CAP 2014–2020 from the European Innovation Projects to protect nature, our current portfolio is not designed to succeed in these terms.

5. Because of the equity and political constraints noted above, it will be impossible to change policies and outcomes within the current CAP framework. New policies and new money will be required.

6. This will require changes in policy and evolution in the all-of-government approach:
Specifically:

- Policies that have a laser-like focus: discover where the best opportunities lie; directly incentivise outcomes at scale and delivering value for money (there are lessons on all three from California); climate and water quality improvement policies in some geographies are integrated to maximize synergies; accelerate progress on those Natura 2000 sites where payoff to effort is greatest, and remove the cap on payments – the focus here is on outcomes, not income support; mobilize innovation to widen and deepen choices and lower costs – we have made some good progress with R&D and demonstration, but see [Blog 11 Innovation](#) for thoughts on the other essential elements of a mission focussed innovation strategy that need addressing.
- Five departments – Taoiseach (integration and barrier removal) Finance (funding and tax expenditure instruments) Expenditure and Reform (value for money), Environment Climate and

Communications (climate strategy) and Agriculture Food and Marine (Implementation) – are essential for the *design and execution of policies* that deliver outcomes at scale in ways that are value for money.

- Three departments and their agencies – Housing Local Government and Heritage (water quality and Natura 2000 priorities), Environment Climate and Communications (climate priorities) and Agriculture Food and Marine (implementation) – are essential for the coherent and efficient integration of policies at river catchment level.
- Five other departments also have key roles – Foreign Affairs (bridge in real time to developments in key markets on climate-relevant technical and policy developments and consumer preferences); Rural and Community Affairs (Rural Action); Further and Higher Education Research and Innovation (Innovation strategy); Enterprise Trade and Employment (special support for companies excelling via Corporate Sustainability Reporting Directive and helping avoid non-compliance with the Greenwashing Directive); Tourism Culture Arts Gaeltacht and Media (Emotion matters).

7. Miscellaneous

The absence of an effective farmer lobby for policies that would deliver climate, water quality and nature conservation policies at scale that are cost-effective limits their prospects of being delivered. Unless they emerge, it will be difficult to succeed. For this reason, my final blog 13 (Farmers) is directed to farmers, in hopes that a significant minority will recognize that their commercial future and that of their successors is likely to be bleak unless they fight for policy change along the lines I outline.

How much money would it take to drive the change above? I have no idea how much will be needed, and there will be learning by doing as we proceed. **The important words are value for money.** If, and only if this is assured, then we need to spend whatever it takes, and it would be far better to spend nothing than to devote new money in ways that fail. The roles of Finance and DEPR are essential here, but for some context I note that €5 billion over 10 years (€500 million) is allocated from carbon tax revenues by the current government to drive emissions reduction from housing, and that 4% of our global export revenues of €10 billion generated by ruminant farming in 2022 is €400 million.

My only information on DAFM's cow cull proposal comes from *Farming Independent*, May 30, 2023 – [Revealed: €600m budget needed to cull 65,000 cows every year for three years to meet climate goals | Independent.ie](#) I have no basis for assessing it in terms of outcomes, rebound issues, cost effectiveness, opportunity cost in terms of other uses for the money etc.

In terms of delivering the Food Vision 2030 ambition of global leadership within a decade, it looks like we are on our own. The Commission is pressing ahead on metrics, which is essential, and their forthcoming study of emissions trading (due December 2023) will generate a lot of debate, but probably nothing of substance will be in place much before 2030 that will help do what we need to do to hold onto premium customers in key export markets.

Finally, I take inspiration from the well-known final farewell of Seamus Heaney to his wife Marie, texted to her from his hospital trolley on his way into theatre in Blackrock Clinic, 15 minutes before he died: "Noli timere." Do not be afraid.

Introduction

The final Blog 13 (Farmers) is devoted to farmers. This Blog 12 (New Instruments) is directed mainly at those in the Irish policy process. I apologise in advance to those many of you who already know much more than I do on this front; I just hope that pulling ideas and evidence together may also be of some marginal use to those many of you who are already way ahead of me on this curve.

In 2007, I with co-authors Susana Ferreira and Simon McDonnell published "The most popular tax in Europe? Lessons from the Irish plastic bags levy" *Environ Resource Econ* (2007) 38:1–11 [the unfair rules of the academy meant that Simon McDonnell (the student) did 90%+ of the work]. [The-Most-Popular-Tax-in-Europe-Lessons-from-the-Irish-Plastic-Bags-L Levy.pdf \(researchgate.net\)](#).

Noel Dempsey was the Minister at the time, and he and his civil servants deserve a lot of credit for its success. Consultants who were asked to advise on the idea recommended to him that he apply the levy upstream, on the suppliers of bags, rather than downstream at consumer level. He rejected this advice: He wanted consumers to get a strong and immediate message: 'Most plastic bags end up wasting precious resources and blighting our ecological and aesthetic environment. I want you to know that every time you shop, and your purchases are to be plastic-bagged, you will be directly incentivized to make a better choice.' Internationally, a few local jurisdictions had introduced levies, but Ireland was the first nation-state to do so. There are a few lessons here for all who are responsible for shaping Irish climate policy for farming:

- Courage is the first pre-requisite. Dempsey and his team went where no one had gone before.

- Small countries can lead when they have a mind to. I just had a look at 'Google Scholar' and see that our paper has been cited 520 times, many of those reading it no doubt wanting to know how it was done.
- Incentives that reward positive performance and penalize the opposite were the most important ingredient.

Framing is hugely important. Dempsey did not engage with the public to ask them whether they would agree with such a levy. He was familiar with Edmund Burke's famous insight: "To tax and to please, no more than to love and be wise, is not given to men" and knew that they would have rejected it; its popularity came later. However, in engaging with the retail sector, he was open to discussions around the 'how'. In New Zealand's shaping of its climate policy, all sectors, including agriculture, were initially included in their national emissions trading scheme. When farmers vigorously objected, they were allowed to take time to propose to government an alternative scheme with the huge condition that the alternative(s) proposed be at least as climate-effective as inclusion in the trading scheme. The scheme they came up with – obligatory participation rather than 'opt in', and imposition of a levy on emissions – was accepted by the government. More details at: [Blog 7 NZ](#).

- Some of the framing we observe around the Food Vision working group proposals is similarly wise.

The Three Challenges for the Irish Policy System and the Benefits of Meeting Them

There are three challenges: find ways that work to: reduce greenhouse gas emissions and remove carbon at scale; improve water quality in key catchments; conserve nature, with Natura 2000 sites prioritized. If you deliver these three outcomes, it will deliver five benefits:

1. Discerning consumers (who are mainly richer than you and me, people with plenty of choices) in our premium export markets will stay loyal and their numbers are likely to expand. Sellers of Irish food in premium markets will be able to say to current and new consumers that, while they are paying more, they are buying nutritious food that tastes wonderful, which is produced by happy cows, while: lowering pressures on our precious climate commons – reducing greenhouse gas emissions and increasing carbon storage at scale – while increasing the competitiveness of our carbon footprint, improving water quality (nitrates↓), and restoring nature (Natura 2000↑). And these achievements are independently verified. This narrative will be very well received.
2. At the next assessment, Irish derogation farmers will hold onto their 220 Kg/Ha derogation and the associated cost savings relative to having to operate within the 170 Kg limit. The latter is likely to be the consequence if nitrate concentrations in key catchments do not fall very significantly by the time of the next review.
3. A step change in conservation of nature will see Irish farming moving towards compliance with the EU's Nature Restoration Law
4. Compliance with the 'Green Claims Directive' which is expected to be operational in 2026.
5. The constant carping in the Irish media about Irish farmers and their doings will disappear like snow off a ditch, and the status of the farming profession will rise in esteem and attractiveness.

If you fail, the opposite happens: premium customers leak away, derogation farmers incur added costs, the Irish rural economy begins to wilt, a court challenge becomes likely, and the drum beat of criticism of farmers and farming intensifies with continuing and increasingly high psychic and other collateral damage borne mainly by farmers.

Mind Set

- This is a battle you must win: it will require change, which is always hard, and coordinated/integrated action across a number of departments which is always difficult.
- Remind those who care to listen, and those who don't, that, as well as being in a battle for hearts minds and pockets, we are in a world where litigation is likely if a gap emerges between our climate claims and our performance. A lot of the claims I hear in public would not survive the forensic scrutiny they would receive in Justice Marilyn Huff's court (on February 3, 2019, in her California court, she found in favour of Ornuá (Kerrygold) when its grass-fed claim was challenged in a class action suit) or meet the requirements of the Greenwash Directive ; a loss in a court anywhere would do huge reputational damage and must be avoided.

1. Bill Clinton won the US Presidency with one simple slogan: "It's the economy stupid." The equivalent in this battle is: "It's the market stupid". For nearly 5 years while living in New York city (2014–2018) I regularly paid about 60% more for a pound of Kerrygold butter than I would have paid for its main domestic rival (Land O Lakes). Premium markets for Irish food exist, and if they shrink, the future prosperity of Irish farming will atrophy also. If you don't believe me do some comparison shopping on Walmart's website – [kerrygold butter – Walmart.com](#)

2. The EU is by far our biggest market – it is a huge net exporter of dairy products and is almost self-sufficient in beef. Climate policy in our top three export markets – in rank order EU, UK and US – is driving emissions reduction and carbon removal by their farmers at scale – the carbon footprints we will be competing with in the future in these markets will be much lower than they are at present, competition which will be intensified in the UK by tariff free competition from New Zealand and Australia.

Your policy mix needs to drive change in the three areas above, which means: generating action at scale in terms of emissions reduction and carbon removal; nitrates must decline sharply in key river catchments; conservation of nature in a growing number of flagship sites will capture positive international attention (Natura 2000 sites etc.). See; Figure 3 in: O'Rourke, Fiona, Claire Byrne, Gavin Smith, 2023: [Land Use Evidence Review Phase 1 Synthesis Report Government of Ireland](#), p. 83

- It needs to deliver value for money. At this point, I believe that the crowd on Hill 16 at Dublin's GAA games – most of whom see themselves as Ireland's over-taxed taxpayers – will support serious new taxpayer investment in Irish farming, but only if they see it delivering the above results.

As I have done with the rest of the blogs, I first present key findings, adorned at times with some evidence, followed by a longer 'Evidence' Section in which I provide much more ballast in support of my conclusions. There is also a long Annex A which summarises the current and prospective roles for 11 government departments. Both sections are organized around the following headings: scope of opportunity; criteria for assessing performance'; instrument menu and assessment; whole of government.

Key findings

A. Scope of Opportunity

Climate: Farmers have two broad opportunities to reduce climate pressure. The first is reducing greenhouse gas emissions, the second is storing carbon (mainly afforestation) and reducing carbon losses (mainly raising the water table in peaty soils). There is still a question mark as to how different jurisdictions will count (or not) on-farm carbon removals and reducing carbon losses in their determination of carbon footprint, and this may evolve over time. Policy must deliver outcomes that perform across various metrics and in different jurisdictions.

Emissions' Reduction: The sector is obliged by law to reduce emissions by 25% by 2030. Farmers and their food companies will need to achieve large reductions in order to deliver a carbon footprint that is competitive in future key export markets.

Carbon Removal: I apologise in advance for the too many pages I devote to this issue in the 'Evidence' section. My excuse is two-fold: I did forestry at UCD, and subsequently worked in this field in Germany, France, Switzerland and England, and saw how farmers and their communities embraced tree culture as integral to their business and social model. Secondly, it disturbs me greatly to listen to various voices make the case in Ireland that trees are the enemy of grass and therefore a threat rather than an opportunity. The new grant package (funded entirely by the Irish Exchequer, and recently approved by the European Commission) is very generous. It will be a tragedy and a huge own goal if the opportunity is not taken by many farmers to make carbon-removing trees part of their future business model. The losses of inaction would include foregoing: the resulting improvement in their carbon footprint due to carbon removal; tax free income in the range of €746 (Mixed high forest, mainly spruce) to €1,037 (mainly oak and beech) per hectare per annum for 20 years; future revenues from wood sales; opportunity for their successors to convert to agro-forestry.

Water Quality: The focus needs to be on reversing the performance that has resulted in reduction in the derogation from 250 Kg/ha to 220 Kg. There are 9 catchments of concern – Maigne Deel, Bandon, Slaney, Blackwater, Suir, Nore, Barrow, Slaney, and Boyne. Between 2013 and 2019, these catchments showed nitrate-increasing trends, and ~85% of the nitrogen came from agriculture, from chemical and organic fertilizers. [Catchment-nitrogen-reductions-assessment---June-2021.pdf \(epa.ie\)](#)

Nature Conservation: As is the case with water quality, we know where to look to find the biggest challenges and opportunities: 'The Status of EU Protected Habitats and Species in Ireland, 2019' [Microsoft Word 01_AR1719_hab_1110_Sandbanks.docx \(npws.ie\)](#) tells us about the full population of habitats and species that are recognized by the EU as being priorities. Only a subset of these is directly influenced by farming.. And there are habitats and species of concern that are not on this list which will need to be included.

Implications for the Irish Policy Process

There are two:

You need to fill Information gaps: What gets measured gets done. The main gaps at farm level are lack of data on carbon losses and removals and biodiversity at farm level. If farmers are to take these into full consideration, they need to know where they stand, and the outcomes they can influence. It would also be very helpful if you could promote the creation performance labelling of farms akin to

the carbon efficiency ratings of buildings (A through G). A Working Group in Denmark has recently recommended this model for action by the Danish government See: <https://fvm.dk/klimamaerke> (use Google Translate to give you this in English or Irish)

- The EU’s Sustainability Reporting Standards (recently issued – see later) give you the tools to recognize the sustainability achievements of Irish food companies and to help them maximize the benefits thereof.
- **You need to find and implement an effective mix of incentive and innovation policies:** ‘effective’ means policies that will maximize the prospects of delivering the climate, water quality and nature conservation outcomes above and Food Vision 2030 ambitions to be a global leader.

B. Criteria

1. **Geography:** The first step is to begin identifying where and what interventions are most likely to deliver the best value for money. An obvious place to start is the quality-challenged catchments, because this is where multiple benefits – reduced greenhouse gas emissions, and improved water quality – are to be found. The good news is that there are well-developed structures in place to both frame the challenges, and identify pathways for making progress at scale: [How do we manage our catchments? - Catchments.ie - Catchments.ie](#) and of course the list of EU Habitats and Species of Concern guide us to where the biggest payoff to efforts are likely to be in the biodiversity space. This framing is not evident in CAP 2023–2027. I share Brendan Dunford’s criticism: the imposition of a €7k payment ceiling on results-based payments, which is a de facto quota on ecosystem services. <https://www.agriland.ie/farming-news/acres-transition-described-as-deja-vu-for-farmers-in-the-burren/> A key and understandable motivation in ACRES is to maximize the number of farmers taking up the scheme, and given the low incomes of many of the beneficiaries in the cattle and sheep sectors (Table 1) – there is a clear equity logic here, which is why new money and new ways of allocating it are needed to deliver ecological outcomes at scale.

Table 1. Average Family Farm Income and Farm Size by Farm System, 2016–2023, Ireland

Farm System	Average Family Farm Income (FFI)(000s €)								Average Farm Size (Ha)	
	2016	2017	2018	2019	2020	2021	2022	2023*	2021	2016
Dairy	54.0	90.2	63.3	69.2	79.0	98.7	148.0	105.0	64	56
Cattle Rearing	11.7	10.7	8.3	9.2	8.2	10.9	8.7	9.7	33	36
Cattle Other	15.0	16.3	15.1	14.1	15.5	17.2	16.9	17.3	36	37
Sheep	15.6	17.4	13.4	15.0	17.9	20.8	19.9	19.4	45	51

*Projected

Sources:

Income data for 2022 and 2023 (prospects): [Outlook 2021 \(teagasc.ie\)](#), pp. ii, iii

Income data 2016–2021 and Farm Size 2021: Dillon, Emma, Trevor Donnellan, Brian Moran and John Lennon, 2022. *National Farm Survey 2021*. [2022 - Teagasc National Farm Survey 2021 - Teagasc | Agriculture and Food Development Authority](#), p. xii

Farm Size 2016: [Microsoft Word – NFS 2016 cover pages_long \(teagasc.ie\)](#), p. 3

2. **Incentives Alignment:** A second step is to map the existing incentives facing farmers and their food companies to take action or not in the most favourable geographies. For companies that sell to premium consumers e.g., dairy coops and their members that are benefitting from the ~60% premium in the US butter market, the incentives are aligned. However, there may be coops and companies who are selling mainly into commodity markets where their meat and/or milk is blended with product from many disparate sources and who have limited if any interest in premium markets.
3. **Value for money:** I make the case above.
4. **Inclusivity:** While it is true that you won’t deliver the outcomes at the scale and cost you need unless policy drives change in the most favourable geographies, it is essential that it also be framed to support and incentivise farmers who are outside these boundaries, and support needs to reflect the income realities of their situation.
5. **Innovation:** Climate policy would have failed for: *energy and industry* in the absence of an innovation strategy that first developed renewables that were technical substitutes for fossil fuels, and then dramatically reduced their costs; *transport* until batteries were developed that were technical substitutes for diesel and petrol, and then ways were found to dramatically increase their range and reduce their costs. The EU has an Innovation Fund which continues to

channel billions of Euros (funded by top slicing of auction revenues from EU ETS) to further support innovation in these sectors. There is no equivalent for farming. R&D is necessary but not sufficient to drive innovation. Denmark (population 5.8 million) led the world in development and commercialization of wind energy. The key characteristics that maximize the prospects of successful innovation are: crisis, good policies that are sustained, mission focus, learning by doing, relevant research and development, direct 'outsider' involvement, global reach, luck. The biggest challenge we face is that the biggest investments in innovation globally are happening where indoor containment farming dominates and advances are likely to be best suited to this sort of farming, which in time could deliver them carbon footprint competitive advantage. See [Blog 11 Innovation](#).

Implications for the Irish Policy Process

- **Small countries matter most globally when they innovate.** The EU should have an innovation fund for farming equivalent to what is provided for the rest of the economy and Ireland should be an innovation leader generating new and better options for grass-fed farming.
- **Get the incentives right**, especially where the payoffs to effort are likely to be greatest.
- **River catchments** are emerging as an important geographic identity in Ireland, where progress especially on reducing climate pressure and improving water quality can be combined.

C. Policy Instruments

Milton Friedman observed that: "When crisis occurs, the actions that are taken depend on the ideas that are lying around." In the case of climate policy for Irish farming, those 'lying around' and therefore in use, are subsidies (mainly CAP), regulation (mainly the Nitrates Directive), information (mainly Teagasc) innovation (mainly R&D), increased efficiency (mainly R&D and advisory), voluntary agreements (mainly bonus payments by coops for climate and environmental actions). Those not yet in use include *tax/levy on emissions* (to be applied in NZ); *emissions trading* (the potential for an EU-wide scheme specific to agriculture is being considered by European Commission); nine categories of *tax expenditure* two of which delivered significant commercial benefits to farming in 2021 (value in brackets) namely CAT - Farm Relief (€199.7 million) - and Reduced Rate on MOT (Green Diesel) (€522 Million); zoning/spatial (e.g., environment compliant concessions for ruminant farmers whose farms have very low carbon footprint); green purchasing (e.g., government only buys food from companies who have high ratings under the recently issued Sustainability Reporting Standards, 2023 [European Commission ANNEX I Regulation for European Reporting Standards, 2023 - Search \(bing.com\)](#) which requires of companies with more than 500 employees that (p. 72) "GHG emission reduction targets shall be disclosed for Scope 1, 2, and 3 GHG emissions, either separately or combined").

Learning from Experience

At a meeting of the Food Vision Committee, a member asked (I am paraphrasing) 'Who has successfully addressed the climate challenge in farming, and what can we learn from them'? It was amongst the most important interventions I heard, and it was never systematically addressed. The EU has benefitted hugely from such learnings in other climate policy areas: Its design and delivery of its greenhouse gas emissions trading scheme (EU ETS) to deliver emissions reduction at scale from the power sector and heavy industry benefitted hugely from the success of the US in the design and delivery of its acid rain (SO₂) emissions trading scheme, which reduced emissions from the power sector by 40% faster and at much lower cost than alternative policies and its regulation of the carbon efficiency of light vehicles was informed hugely by the success of the US regulation of Corporate Average Fuel Efficiency (CAFÉ). Unfortunately, I was late in the day seeking out documented examples for farming from which we could learn, but I did find material on a few that are useful which I summarize below, and reference to others that I did not get to, but which could be a useful source^[3].

The California Experience: Details are available at: Jimenez, Frank, 2021. *Assessing California's Climate Policies—Agriculture*, Legislative Analyst's Office, (LAO), California, [Assessing California's Climate Policies—Agriculture](#), December 22 pages

Beginning in 2015, it has had two grant aided programmes - the Dairy Digester Research and Development Program and the Alternative Manure Management Program. The criteria by which applications will be judged are based on points out of 100 allocated in the case of the Alternative Manure Program as follows:

Outcomes (50): Estimated greenhouse gas emissions reduction (35); Environmental co-benefits 10); Benefits to priority populations (10)

Quality of inputs (50): Project plan and long-term viability (25); budget and financials (15); project readiness (10). Details at: [2023 AMMP Request for Grant Applications](#). For those whose bids were successful, the Dairy Digester programme provided two financial benefits to farmers: on the supply side, they benefitted from subsidies, and on the demand side, they benefitted from (1) revenues

generated from selling biomethane (or electricity generated from biogas) and (2) environmental credits under the state's Low Carbon Fuel Standard (LCFS) Program and the federal Renewable Fuel Standard (RFS) Program.

Emissions reductions achieved by 2022 were ~3.5 Million tons of CO₂e, of which ~1/3 was a result of cow number reductions. There is not much to be learnt from what they fund, but there is a lot to know about how they do it, mainly: the inclusion of dairies and farmers in the invitations to bid; the fact that the process is designed to 'discover' where the best value for money is likely to be; the transparency of the process; and the fact that we can see the ex-ante estimates of outcomes and their ex post achievement.

The French Offset Programme (Label Bas Carbone): This was initiated in 2018, so there is 5 years of experience. It puts a lot of effort into ensuring additivity, creating a market (airlines have to buy offsets to cover emissions by domestic flights and the two coal power plants have to do likewise to cover their emissions) and documents outcomes (Forestry 843,000 tonnes of CO₂e removed and Agriculture 734,000 tonnes of CO₂e emissions reduced), and prices secured per tonne (€8-125). I will provide more details on request.

European Innovation Projects: Brendan Dunford (co-founder and former manager of the Burren Programme) observed that there were three parts to their success in delivering nature conservation at scale: information, incentives, and heart. He also noted that: "Farmers do not respond to being told what to do but instead, having learned about biodiversity, they respond to being told what the result should be. Farmers were also provided with clear information, were helped with paperwork and participated in a variety of community projects. The final element of the work was recognising the identity and heart of the farmers as critical". Citizens' Assembly, 2023. *Report of the Citizens' Assembly on Biodiversity Loss*, March [Report-on-Biodiversity-Loss_mid-res.pdf \(citizensassembly.ie\)](#) p. 85

Learning from Farm-Foresters: a total 25,000 (mostly farmers) benefitted from planting grants since 1990. A detailed interrogation of a small sample of this population would yield fascinating and useful insights about how best to design and deliver the new programme. Find them and learn from them.

Learning from Doing: Many Irish farmers are getting on with reducing emissions and nitrate pollution of rivers, and conserving nature. We need to keep learning in real time about their successes and failures and adapt policy to reflect these learnings.

Implications for the Irish Policy process

- **Exploring new combinations:** There are a very large number of policy instruments available for use by the Irish policy process, many of them under the aegis of the Department of Finance. It would be a very useful exercise to interrogate each separately and in combination to explore what range of outcomes might be delivered. Examples on the tax expenditure side: adapt the Farm Relief (CAT) tax expenditure to favour farms with a carbon performance rating of B or above; remove the VAT exemption on chemical fertilizers, and recycle all the revenues accruing back to farmers proportionate to their reduction in the use of fertilizer [Sue Scott, then at ESRI recommended a version of this in 2004 ([Fertiliser taxes - implementation issues | ESRI](#))]. The first-round effect (higher prices) would reduce use (stick) and this would be amplified by recycling the revenues to those who reduced chemical fertilizer use (carrot).
- **A new subsidy programme designed along California lines** – available to individuals and combinations of individuals, farmers and coops and companies – which has two strands – climate and water quality; nature conservation – and is designed to discover what applicants are willing to do at what cost, and support those whose combination of outcomes and means of achieving them are most promising and best value for money.
- **Openness to the New.** Examples: The EU is studying the creation of an emissions trading scheme for farming only; NZ will be reporting lessons from its emissions' levy approach etc.; and the US is driving its Agriculture Innovation Mission for Climate ([AIM for Climate](#)) which since COP 26 has invested more than \$8 billion [USDA Highlights AIM for Climate Accomplishments, Announces 2023 Plans | USDA](#).

D. All of Government approach

The current Irish government identified 12 cabinet posts as members of its Cabinet Committee on the Environment and Climate Change. The departments represented in the Cabinet Committee are matched by the relevant Secretary Generals of these departments, who form the Climate Action Delivery Board. In the Annex of the Climate Action Plan 2021, details are provided of each of the 493 actions proposed, including department responsible for each. These are important steps. Below a few ideas, accepting that I am in 'teaching grandmother to suck eggs' territory here.

Building on this Progress

It is essential to prioritize – out of the 493 actions what are the 10-20 that are crucial to making progress and scale, and how can we maximize the prospects that these will be delivered on time?

In Annex A below, I identify 11 of these government departments, summarize their key roles and (if stated) their climate specific commitments, and then assess their roles include some suggestions for prioritization. I found it useful to group the 11 departments into three categories:

The Core (4): Taoiseach, Finance, Expenditure and Public Reform, Environment Climate and Communications

Direct Action (2): Agriculture, Food and Marine and Housing Local Government and Heritage – but of course DECC also has responsibility for direct action by the energy and transport sectors.

Support Action (5): Foreign Affairs, Rural and Community Development, Further and Higher Education Research and Innovation, Enterprise Trade and Employment, Tourism Culture Arts Gaeltacht Sports and Media.

Implications for the Irish Policy process

I read somewhere that the Climate Action Delivery Board (Sec Generals) has never met. This is encouraging. The opportunity costs of their time are huge and what issue would justify them all getting together? There is a strong case however for sub-groups meeting to address key barriers and opportunities. A few thoughts amplified by some suggested priorities in Table 2.

- I noticed in the Taoiseach's 'Statement of Strategy 2023-2025' that a role of its Climate Unit is "unlocking barriers in our transition to a low-carbon, climate-resilient, resource efficient and environmentally sustainable economy and society". It could be hugely useful if it engaged bilaterally with some of the members to identify one priority action they each could lead on that would relax one barrier that is inhibiting progress, and then find ways that work to do so.

Table 2 Supporting Climate Action by Irish Farmers – and all of government responsibility.

Department	A Key Existing Priority	Future Priority	
CORE		Action	Thought Leadership
Taoiseach	Whole of government effectiveness and unlocking barriers	Set up and manage two sub-groups of the Climate Action Delivery Board: (1) Core and (2) Direct Action	Small countries can make big difference
Finance	Carbon tax and its ring-fencing of ensuing revenues for climate action	Exploring new direct and tax expenditure instruments options that would drive climate/water quality/nature conservation at scale	Generate an evidence-based national conversation on options that will reduce emissions and store carbon at scale, and then make decisions. In the Climate Action Plan 24 draft I read: "CP/24/2 Consider a number of reforms to the taxation system under relevant indirect tax heads from an environmental perspective". "CP/24/26 Consider further opportunities for issuing new Irish Sovereign Green Bonds, and monitor the allocation and impact of funds raised through existing Irish Sovereign Green Bonds" These are important ideas.

DEPR	Ensuring value for money, and using a shadow price for carbon applied in its economic appraisals of public policy	Upgrade IGEES and especially its ex-post assessment capacity and link it to the work of the 'new Climate Science & Policy Analysis unit within the EPA's Climate Change Programme' proposed in the government's CAP24.	Value for money matters.
DECC	Ensuring progress on sectoral targets	Celebrating achievement and innovation	Yes, we can.
DIRECT ACTION			
DAFM	Emissions↓ Removals↑ Selected River quality↑ Selected Natura 2000↑	Payment for performance	The commercial case for supporting the farming transition to high quality stewardship of climate water and nature is compelling.
Housing Local Government and Heritage	Selected River quality↑ Selected Natura 2000↑	Prioritization of and investment in key opportunities for improvement at scale. Zoning for conservation is welcomed by most farmers	Geography matters. The quality of rivers and of natural habitats as a source of pride and distinction and economic and social advantage
KEY SUPPORT			
Foreign Affairs (DFA)	Using Irish Aid to support farmers like Constance Okollet*	Key bridge between Irish farming and emerging technologies, policy and consumer sentiments in four key markets – EU, UK, US, China	Irish grass-fed farming can show the way
Rural and Community Development	Sustainable inclusive and empowered communities: Build local capacity in relation to climate change adaptation and mitigation	Celebrate communities and especially their farmers in whose catchments water quality is improving, climate pressure is falling and nature conservation is expanding	Find ways that work to bring community talents and energies into driving both adaptation and mitigation.
Further and Higher Education Research and Innovation:	Funding 'Farm Zero C'	An Innovation Strategy that maximizes the prospects of new and lower cost ways of reducing and storing carbon at scale in Irish grass-fed farming.	Ireland (pop 5.1 million) can do for global ruminant farming what Denmark (Pop 5.8 million) did for wind energy
Enterprise, Trade and Employment (DETE)	"Advance the green and digital transitions to ensure the competitiveness and sustainability of Irish based enterprise	Special tax and support arrangements for Irish food companies that deliver and sustain outstanding climate and environmental performance	Irish food internationally epitomizes the highest standards of climate water and nature stewardship. It is an ambassador for Ireland as a whole.

Tourism Culture Arts Gaeltacht Sports and Media		Mobilise emotion and sentiment to engender action [Fear ('we are doomed unless...') is not working]	Fight for nature like a hero**
--	--	---	--------------------------------

* Constance Okollet is a small-scale farmer and community organizer: "In eastern Uganda, there are no seasons anymore. Agriculture is a gamble... This is outside our experience..." Climate change is already destroying the lives of those who have done nothing to cause it" quoted in: Robinson, Mary, 2018: *Climate Justice – hope, resilience and the fight for a sustainable future*, Bloomsbury.

** This is a riff from George Bernard Shaw: "This creature man, who in his own selfish affairs is a coward to the backbone, will fight for an idea like a hero."

- If you agree that making parallel progress on climate water and nature is essential, and that river catchments and Natura 2000 sites are key geographies for doing so, then a sub-group of General Secs from DAFM, DECC and Housing Local Government and Heritage and the relevant agency heads could set strategic direction and TORS for a Working group to find ways that work to convert ambition into outcomes.
- In policy design and delivery, Finance (allocation direct funding or tax expenditure) and DEPR (value for money) have to be always in the room as have key agencies (Revenue Commissioners were crucial in successfully shaping the plastic bags levy). It would be great if we could act on Sue Scott's proposal in 2004 to remove the VAT exemption in fertilizer and re-cycle the ensuing proceed to farmers proportionate to extent to which they reduce use. Better late than never.
- An outlier: We are not winning the battle for hearts and minds. Fear is not doing it. I suggest that Tourism Culture Arts Gaeltacht Sports and Media be asked to find a way that works better.

Evidence and Assessment

This addresses scope for action; criteria for assessing performance; policy instrument menu, institutional arrangements.

Scope for Action

There are two broad opportunities where dairy, beef and sheep farmers can address climate change: The first is to reduce greenhouse gas emissions, and the second is to remove carbon dioxide and reduce carbon losses. Both involve the use of land. Below, I first summarise the land available, and who owns it, and then turn to the first opportunity, emissions reduction. The Food Vision 2030 report recommended that separate groups be formed to address how to meet the 25% emissions reduction target. This is the first time that the potential was formally addressed with stakeholders. I summarize the measures that these groups recommended. I then address carbon removal, with the focus on forestry, both the existing estate, and increasing it by afforestation. Because the data are under review, I do not address the opportunities to reduce carbon losses.

Land Use

The total area available for land-based emissions' reduction, carbon removal and reduction of carbon losses is 7.1 million hectares. Its distribution by land use and by ownership is shown in Tables 3 and 4: As regards ownership, it is striking how much land (13.8%) is classified by the authors as 'unmapped'.

Table 3. Land Use by Category (% of Total) and Total Land Area (000s Ha), Ireland 2020

Year	Grassland	Wetland & Peatland	Cropland	Forestry	Settlement	Other	Total Land Area (000s Ha)
2020	59	17	10	11	2	0	7,112
1990-94	62	19	10	7	2	0	7,112

Source: [Land Use - CSO - Central Statistics Office](#)

Table 4. Private and Public Land Ownership, Ireland

Land Use	% of total
----------	------------

Private	
Farmland (Not Commonage)	67
Farmland (Commonage)	7.2
Forestry	3.4
Total Farmland and Forestry	77.60
Total Private	77.68
Public	
Forestry	5.7
Local Government	1.7
Fuel and Energy	0.7
Central Government/Agency	0.7
Total Public	8.47
Unmapped	13.8
Total	100

Source: Byrne, Claire, Thomás Murray 2023: [Land Ownership Analysis, National Land Use Evidence Review Phase 1 Document 03](#), p. 6

The three largest categories – pasture, wetlands, and forestry – together account for 87% of Ireland’s land, and most of this is owned by farmers.

Scope-Emissions reduction

The Emissions baseline in 2019 for the 3 ruminant farming systems are shown below:

Table 5. The Baseline: Scope for Climate Action – Addressing Emissions from Ruminant farming Ireland 2019

Category	Million Tons CO2e
Dairy	8.2
Beef	7.4
Sheep	1.9
Total Farming	+22.1*

*Of which enteric methane is 13.6 million tons, 61.5% of total.

Sources: Total Farming –Table Blog 1 (Looking Back); Dairy and Beef – [Table 1 Blog 10 \(CAP 2023-2027\)](#).

The two most specific and important proposals to address reducing emissions from ruminant farming are the Food Vision reports produced by the stakeholder groups for dairy and beef:

Table 6. Direct Measures proposed in the Report of the Food Vision Dairy Group

Direct Measures	Impact (Mt CO2 eq)	Cost
1. Reduce chemical nitrogen use by 27-30% by end 2030	0.37	30% reduction in chemical nitrogen reduce profitability per hectare by 15%, in a scenario where cow numbers are held constant, and the reduced grass production was made up by purchased feed. But: increasing the adoption of Low-Emissions Slurry Spreading (LESS);improve Nitrogen Use Efficiency; encouraging Clover Adoption and Multi-Species swards (MSS) will reduce these costs
2. Target a 100% replacement rate of CAN with Protected Urea by the end of 2025	0.33	No additional cost. Protected Urea is cheaper than CAN on a cost per kg of Nitrogen basis
3. Development of methane mitigating feed technologies	0.43-1.00	Initial manufacturer reports suggest €75 – 100 per cow per year

4. Develop methane Mitigating Breeding Strategies	0.30-0.400	Genotyping strategy initial costs is estimated by ICBF at €19m/ per annum for the dairy herd with cumulative cost estimates at €152m for dairy sector to 2030
Total 1-4	1.43-2.10	
5. Voluntary Exit/Reduction Scheme	0.45 per 100,000 dairy cows reduced	

Source: [Report of the Food Vision Dairy Group, October 25, 2022](#), p. 2-4. Shown as Table 12 in [Blog 10 \(CAP 2023-2027\)](#).

Table 7. Direct Impact measures Food Vision Beef Sector, 2022

Measure	Emissions reduction	Cost
	Million Tonnes CO2e	€ Millions
1. Improve liveweight performance	0.57-0.82	0 (No regrets)
2. Reduce age of first calving of suckler beef cows	0.05-0.12	0 (No Regrets)
1. Develop methane-mitigating technologies	0.15-0.30	11.3-29 million
2. 90% replacement of CAN by protected urea	0.20	0 (No regrets)
3. Chemical U use ↓ by 27-30% by 2030	0.26	To be determined
4. > Organic beef prod to 180,000 hectares	0.20	€37 million provided in CAP 2023-2027. Net private costs to be determined
5. Breeding strategies (carbon sub-index) and building efficiency traits	0.10-0.30	€80.9 million by 2030
TOTAL	1.53-2.18	
6. Voluntary Diversification Scheme	0.6/100,000 suckler cows	€1,080/suckler cow for farms exiting
7. Voluntary Extensification Scheme (< no suckler cows)	0.6/100,000 suckler cows	€1,380/ suckler cow for farms reducing

Source: Government of Ireland, 2022: [Report of the Food Vision Beef and Sheep Group to mitigate Greenhouse Gas Emissions from the Beef Sector](#). Food Vision 2030. November 30. Also shown as Table 13 in [Blog 10 \(CAP 2023-2027\)](#).

Scope – Carbon Removal and reducing carbon losses.

The carbon removal issue arises on two fronts: the existing forestry stock, and the increase in this stock from afforestation.

The Existing Forestry Stock

Total Stock: In Table 8, I show the carbon removals (with negative sign) and CO2e emissions from forestry, wood harvest, crops, grass and wetland and the total net removals for Ireland, as estimated and projected by the European Environment Agency (this data will have been provided by the EPA).

It is striking how quickly emissions from forestry are expected to change from net CO2 removals of over 2 million tons in 2020 to net losses of over 2 million tonnes in 2025, increasing to projected carbon losses of over 4 million tonnes in 2035. These radical changes appear to be a product mainly of better estimates of CO2 losses^[4] from trees planted on blanket bog. However, the sharp decline in planting in recent years, and the harvest of trees that, if left growing, would continue to remove carbon, are also likely to be relevant. The carbon embedded in some wood products that are a product of such harvesting is shown in 'wood harvest'; such removals are expected to increase to 2025 and fall back to 2022 levels in 2030 and 2035.

State Forest Stock: In August 2022, Coillte published [Forests for Climate – Report on Carbon Modelling of the Coillte Estate](#). This report details an assessment undertaken to determine the current Greenhouse Gas profile of Coillte's existing managed forest estate (see especially section 4.1) and to identify and assess the GHG mitigation potential of silvicultural management options based on a number of assumptions.

Private Forest Stock: There are two main sources of private stock: the first is the existing small but important number of forests which were retained in private ownership when, until it was dissolved in the late 1990s, the Land Commission was buying up landlords' estates with a view to transferring the ownership to farmers who could draw down loans from it for part of the price. The second is the small forests created by the over 25,000 landowners (most of whom are farmers) who have benefited from afforestation grants and annual (premium) payments, covering ~285,000 hectares. Because much of this planting took place in the west of Ireland - ~104,000 (36% of the total) were planted on Cork, Kerry, Clare, and Mayo[5]- a significant share of this was likely planted on blanket bog.

Adding to the Forest Stock

In its assessment of land suitable for afforestation, Teagasc concluded that: An area of 3.75 M hectares is deemed suitable for afforestation; Productive land represents 2.45 M hectares and marginal land represents 1.3 M hectares; An area of 178,000 ha currently classified as unimproved land may offer a significant potential to increase afforestation rates; A total of 450,000 ha (12% of the 'suitable land') are required to increase the area to 18% forest cover.[6]. However, the Haughey et al (2023) report notes that: "This level of afforestation falls short of the rates compatible with net-zero targets by mid-century (based on the indicative scenarios developed in this report), which are between 20,000 and 35,000ha/yr- depending on whether or not CH4 (methane) is included in net-zero targets".[7]

Table 8. Removals and Emissions Land Use and Land Use Change, 2020 to 2035, 000s Tonnes CO2e, Ireland

Year	Forestry	Wood Harvest	Crops	Grass	Wetland	Total
2020	-2085	-819	-111	6895	2760	6926
2022	363	-1609	5	7569	1665	8046
2025	2065	-1954	14	7663	1637	9654
2030	2832	-1606	97	7817	1677	11063
2035	4219	-1665	167	7899	1677	12568

Source: European Environment Agency, 2022. [GHG projections – 2022 – EEA .csv](#)

From Row numbers beginning at 2356, and columns B, D and G.

Note: Emissions from 'Settlements' not shown, but included in 'Total'

A tool is available that provides estimates of emissions removal (sequestration) by: species, their productivity (Yield Class) and the soil type (mineral, peaty mineral, eligible peaty soils) in which they would be planted - [Forest Carbon Tool – Teagasc | Agriculture and Food Development Authority](#). I show a few examples in Table 9

Table 9 Estimated mean average annual sequestration (removal) rate, by selected species and soil type.

Species (Yield Class)	Mean Sequestration Rate (Tonnes CO2/Ha/Year) by Soil Type			Remarks
	Mineral	Peaty Mineral	Eligible Peaty Soils	
Sitka Spruce (YC 24)	8.32	6.54	4.76	
Sitka Spruce (YC 12)			2.48	Estimates only available for peaty soils
Oak (YC 6)	2.31			Estimates only available for mineral soils

Source: [Forest Carbon Tool – Teagasc | Agriculture and Food Development Authority](#).

CHOOSE: Click [HERE](#); Accept Assumptions; Approved Species; Category; Soil Type; Calculate

ALERT: The carbon tool was developed in 2015, before the latest research on carbon losses from blanket peat was available: as noted, the latter has changed the estimates of CO2 losses and so the estimates above for peaty mineral and eligible peaty soils are likely to change. Also, it does not include the categories listed in the menu proposed for support under CAP 2023–2027.

Although the numbers are expected to change for peaty soils, the table does highlight the large range of carbon removals by productivity and soil type.

A programme which increased the amount of the initial grant, and the amount and duration of the annual premium payments has recently been approved by the European Commission: which are likely to stimulate to increase the range and diversity of the planting. I show a few examples in Table 10. These were recently approved by the European Commission.

Table 10. Grants available for Afforestation, Ireland, 2023–2027

Forest Type	Grant/Ha €	Premium/Ha €	Duration of premium (years)	
			Farmers	Non-Farmers
Native Forests	6744	1103	20	15
Agroforestry	8555	975	10	10
Mixed High Forest (mainly Sitka Spruce, 20% broadleaves)	3958	746	20	15

Source: [Afforestation-Rates-for-the-Forestry-Programme-2023-2027.pdf \(teagasc.ie\)](#)

The new planting grants are very generous, and with the licensing process improved, it is reasonable to expect a rise in planting rates. Since 2017, there have been guidelines in place to restrict planting on unsuitable sites.^[8] These are due to be updated for the next forestry programme which is due to commence this year. As part of the development of the Forest Strategy 2023 to 2030, the Department is reassessing its policy as regards future afforestation on organic soils.

An important recommendation of the Citizens' Assembly Report on Biodiversity loss is:

“As a matter of urgency areas and species of High Nature Value, including but not limited to the national network of Natura 2000 sites and protected species, should be protected from further degradation through the implementation and enforcement of existing legislation and directives.”^[9]

O'Donoghue (2022) assesses the economics of afforestation by land type.^[10] The key finding is that incomes from farming are such that, with the grants then applying, for many such farms, there is limited short-term commercial case to convert land now producing milk and meat to producing wood. However, he notes that Department of Public Expenditure and Reform uses a shadow price for carbon which it has used in its economic appraisals of public policy; these rise from €46 per tCO₂e in 2022 to €100 in 2030 and to €265 in 2050. If farmers were rewarded per ton of CO₂e removed at this rate: “About 50% of all farms would have a higher income from forestry than agriculture for Sitka Spruce and about 30% have a higher return for broadleaf; 11% of specialist dairy farms would have a higher return from forestry, while nearly 80% of cattle rearing farms and 70% of cattle finishing farms would have a higher return from forestry.” (see p. 5 of summary report). These calculations were published before the new grant rates were announced (see above) which will be wholly funded by the Irish Exchequer, and which will cost ~€1.3 billion up to 2030. Also, there is no discussion of the potential effects of carbon footprint, and how this could influence access to premium markets and their prices.

Assessment of Scope

1. Farmers own most of the land (of which ~ 4 million hectares is grassland) and are therefore in pole position to play the key role in reducing emissions, removing carbon (mainly afforestation), and reducing losses (mainly raising the water table of carbon rich soils).

Reducing Greenhouse Gas Emissions

2. The Food Vision reports identify the measures that could reduce emissions by ~25% by 2030 by the dairy and beef sectors, but they do not discuss the policy instruments that could be mobilized to deliver these measures. Discussion thereon is deferred until I address the relevant policy instruments (both current and potential) below.

Carbon Removal and Reducing Carbon Losses

The Existing Stock of Forests:

3. Continue to improve the metrics of carbon removal and carbon losses in aggregate by Coillte (state) and at farm level (private).
4. For those forests (mainly planted on blanket peat) that are losing carbon, identify the best practises to reduce these losses over time. For those that are removing carbon, find ways that work to continue to do so, while integrating the delivery of other commercial (mainly wood) and public (mainly biodiversity and water quality) services. We can see the beginnings of this work in: [Forests for Climate - Report on Carbon Modelling of the Coillte Estate^{\[11\]}](#) and a sense of its complexity in Ken Byrne's (University of Limerick) statement to The Oireachtas Committee on Environment and Climate Action, 22 November 2022 available [here](#).
5. A particular focus should be on learning from those 25,000 landowners who planted forests since 1990. They need to know the carbon removal/losses of their forests and they deserve to get help in either optimizing removal and/or reducing losses.

6. At present, agriculture is a separate 'pillar' to land use, land use change and forestry (LULUCF) and so carbon removed by farmers will not be counted towards emissions' targets for farming. However, removals by farmers (categorized as 'Scope 3') who are supplying a food processor are likely to be counted in the computation of the food's carbon footprint in some markets. [Silver Fern is New Zealand's largest livestock processing and marketing company, owned in equal partnership by Silver Fern Farms Co-op Ltd, a cooperative of 16,000 New Zealand sheep, cattle and deer farmers and Shanghai Maling Aquarius Ltd. This company claims to produce "New Zealand's first certified Grass-Fed end to end Net Carbon Zero red meat, where 100% of end-to-end emissions have been offset within the farms where the animals were raised... It purchases this carbon from farmers to account for the emissions associated with the meat produced within the program...We have labelling approval from the USDA on our Net Carbon Zero claims."]
<https://silverfernfarms.com/us/en/our-range/net-carbon-zero-science>.
7. Farm owners have important advantages over others in terms of tree planting: they own the land, and don't need to incur the capital costs of acquisition; they are in place, and this reduces the costs of managing the forest; the carbon removed will contribute to their net emissions' status, and this will help them in some markets retain or achieve 'premium' status as regards product prices; they can produce commercial output, which complements other income streams, and can also deliver other public goods, including biodiversity.
8. The more productive the soil, the greater the diversity of tree species that will thrive, and other things being equal, the greater the volume of carbon removed.
9. But there are trade-offs: More productive land for trees is also usually more productive for grass; some species (mainly coniferous) deliver more carbon removal earlier than do others (mainly broadleaves), but the latter continue doing so for longer; diversity of species is valuable ecologically but can incur diseconomies of scale.
10. Important trade-offs are posed by the need to address the imperative of the Citizens Assembly that 'areas and species of High Nature Value, including but not limited to the national network of Natura 2000 sites and protected species, should be protected from further degradation through the implementation and enforcement of existing legislation and directives.' Policies must be designed and implemented that support farmers in these jurisdictions to do so. The trees that such farmers are allowed to plant are likely to deliver high biodiversity benefits but provide relatively lower carbon removals in the medium term. The grants for both nature conservation and afforestation should be integrated, and reflect the income foregone from conventional farm practises. There is some recognition that farmers in such areas need more support; the cap on payments for such farmers is increased from €7,000 to €10,000 annually.[12] However, given the constraints such farmers are likely to face, the prospects of success would have been greatly enhanced if the payment levels were much higher, and (if justified ecologically) perhaps confined to a small number.
11. Delays in securing licenses to plant have been a factor in the sharp fall in planting in recent years. One constraint has been the shortage of forest ecologists to assess the habitat and other environmental issues arising. This is being addressed by DAFM, which in 2021 recruited 27 ecologists, and there has been progress also in developing a list of (47) independent experts.[13]
12. There will be competition from 'outsiders': Private investors are likely to decide to buy land and plant trees, and the new grant rates are likely to encourage this to happen at scale; non-profit groups, communities and local authorities are also likely to become more engaged, especially if farmers opt out. From a climate point of view, it does not matter who does the carbon removal.
13. But it will matter for those farmers who chose not to engage and thereby forego the associated benefits, including especially the carbon removed, which in turn will reduce their carbon-competitiveness in some premium markets. Presumably this is part of the reason why the period for which the annual premium is payable is biased in favour of farmers (typically providing an additional 5 years of payment compared with non-farmers).
14. There are economies of scope and scale: it could help if groups of farmers, perhaps members of a coop, decided to aim for a shared planting and carbon removal target, and mobilized together to secure it, and together claimed the aggregate removals of the shared effort.
15. There are risks and uncertainties to manage. These include: diseases, such as the fungal pathogen *Hymenoscyphus fraxineus* which has in recent years devastated the native ash[14]; forest fires, which in future are likely to increase in intensity and duration; future decisions in some markets not to allow carbon removals by farmers to be credited towards their carbon footprint.

Grassland and Wetlands: the net carbon losses from these two sources are large, together amounting to close to 10 million tonnes annually over the period, with some growth in emissions from grassland compensated by equivalent reduction in losses from wetland. However, research on the extent of these emissions is also ongoing, so these estimates may be revised. Because both the metrics and the choices to reduce emissions are still under review, I do not address this opportunity.

Criteria for Assessing Performance

Much of the text below is taken directly from Blog 9.

Evidence on what works from climate policy experience in the energy, transport, industry, and buildings tell us that the following criteria will be relevant to the shaping of climate policy for ruminant farming.

1. **Achieve Outcomes at Scale:** the volume of greenhouse gas emissions reduced, and carbon dioxide removed; degraded rivers restored to ecological health; Natura 2000 sites restored.
2. **Deliver Value for Money (Cost-Effectiveness)** – the cheaper it is to reduce emissions and improve rivers and nature, the more you can reduce for a given amount of expenditure. To the extent that they must pay for this themselves, this also matters hugely to those doing the abating, and to governments when they are sub-venting action and have to raise the revenues necessary to do so.
3. **Provide Fairness** – this has at least three dimensions. Are those who are most responsible for the problem doing most to address it? Secondly, are those who have the most capacity to do so being asked to do most? Are the needs of the most vulnerable being addressed?
4. **Relax the Critical Constraint(s):** The payoff to effort will be magnified if policy finds ways to remove the constraints that are most inhibiting effective action. The lack (apart from > efficiency) of low cost means of reducing enteric methane is a key constraint.
5. **Achieve Multiple Benefits:** in addition to reducing emissions and storing carbon, climate policy can also deliver other benefits, such as: commercial returns in markets where carbon footprint per Kg of product is important; public goods produced by farming, including more nature conservation, reduced air pollution (ammonia) and water pollution (excess N and P).
6. **Participation required above a certain scale.** Where participation is voluntary, those who opt in may lose their ambition and enthusiasm if/when they observe others opting not to engage.

C. Policy instruments

Economies of Scale and Scope

In the delivery of both climate (emissions reduction and carbon removal) and biodiversity (diversity of species supported) ambition there are economies of scale – which can reduce costs – and scope – which can widen and deepen the variety and quality of outcomes delivered. These very large benefits can better be delivered with a group of farmers – e.g., those in a dairy co-op who are members of a co-op, or those who are supplying meat to a company that aims to be globally competitive in terms of its carbon footprint. However, I accept that some farmers will prefer to act alone.

Using Subsidies to deliver Scale and Scope

Note: There is a wider discussion on subsidies and emissions trading below.

Groups of farmers, ideally in cooperation with a processor (co-op or company) and in a catchment, would be invited to bid for grant support. Inter alia, their tender would identify: the individual farmers who are party to the bid; their baselines (climate, water, biodiversity); the mix of abatement and carbon removal measures envisaged to be undertaken, implications for water quality, and their estimated capital and operating costs; how effort will be distributed across farms from most to least prosperous; organization (structure, skills, budget) that will deliver these outcomes; business plan that will maximize the benefits of the climate, biodiversity and other outcomes. For suitable short-listed candidates, funds will be made available to help prepare the bid and decisions on those to be funded will be made by independent assessors, based on the overall credibility of the bid, its ambition and cost effectiveness, fairness in terms of how effort is allocated and innovation.

Funding: The above approach has the following advantages over the subsidy approach being used in [CAP 2023-2027 \(details in Blog 10\)](#). It will help: 'discover' those who are willing to do most; integrate water quality and biodiversity into decision-making; deliver public goods outcomes that are value for money; and achieve scale in terms of outcomes both in terms of reducing carbon footprint and aggregate net emissions (reductions and removals)

Comparative Advantage: enable farmers to do what they do best – e.g., some will have an obvious comparative advantage at doing emissions reduction (both technical measures and changes in farm system) and others at removal, and still others will find that their niche is habitat conservation. A coop could create a framework for finding what worked best, and this could include an informal emissions trading scheme, where farmers of a certain scale could trade internally, where those who could reduce emissions at low cost could be compensated for doing so by those for whom costs were high, so that overall ambitions were delivered, at much lower aggregate costs than if each farm had to deliver the same reduction.

The Policy Instruments being applied to Climate Policy for Ruminant Farming at Present

Milton Friedman observed that: "When crisis occurs, the actions that are taken depend on the ideas that are lying around." The most important idea 'lying around' is a regulation – the Nitrates Directive. The other instruments that are already in use to address climate change in agriculture and land use are Information, innovation, subsidies and increased efficiency. Taking each of these in turn:

Regulation

A core aim of the [Nitrates Directive \(91/676/EEC\)](#), which has been in place since 1991, is 'to **protect water quality from pollution by agricultural sources and to promote the use of good farming practice.**' The crisis is the evidence (see above) that, since the removal of the milk quotas, it has failed to do so. All EU Member States are required to prepare National Nitrates Action Programmes (NAP) that outline the rules for the management and application of livestock manures and other fertilisers.[\[15\]](#)

Derogation

Ireland is one of four member states – the others are Belgium (Flanders), Denmark, and the Netherlands – who avail of it. Member states applying for a derogation (or a renewal of a derogation) 'must make a presentation on the environmental situation, the need for the derogation and actions undertaken to ensure that the higher nitrogen limit is not and will not contribute to higher pollution.'[\[16\]](#) The directive sets a limit on organic (manure) deposits of N per hectare per year on grass land of 170 Kg per hectare, but if certain conditions are met, the limit can be increased. A key condition imposed in 2022 in Ireland is "All slurry applied on the farm must be by applied by Low Emission Slurry Spreading (LESS) equipment."[\[17\]](#) The increase allowed for 'derogation farmers' is at present 250 Kg N per hectare, but it has been reduced to 220 Kg N for 2024: As we know, Ireland failed the essential 'will not contribute to higher pollution' test, with the inevitable outcome that the derogation has been reduced.

Extension of the Industrial Emissions Directive (The European Commission agreed this proposal April 5, 2022).

Inter alia, it aims to: "Cover additional intensive farming and industrial activities, ensuring that sectors with significant potential for high resource use or pollution also curb environmental damage at source by applying Best Available Techniques."[\[18\]](#) A threshold of >150 cows is proposed as the determinant for inclusion.[\[19\]](#) Commission proposals are decided jointly by the Council of Ministers (member states) and the European Parliament' Agriculture Committee proposes the exclusion of all extensive farming, small-scale family farming, and organic farming from the scope of the IED. [EU parliament agri committee rejects 'permits' for family farms \(agriland.ie\)](#)

Assessment

1. After years of ineffectualness, the Nitrates Directive is now the most binding and important provision currently driving emissions reduction, as a by-product of protecting water quality. I say this for the following reasons: investment in Low Emissions Slurry Spreading (LESS) applied to slurry by dairy farmers has gone from 5% by volume in 2018 to 67% in 2021 (Table 11, [Blog 10](#)); it has focussed attention on the largest and most concentrated emitters; it will deliver multiple benefits for climate and water and air quality; although it is not obligatory – farmers are free to opt out, and comply with the 170 Kg N limit, the derogation is so valuable commercially that most are choosing not to do so – de facto, it is close to being obligatory. As we know these measures were too little too late to prevent the reduction of the derogation from 250 Kg to 220 Kg, and we are likely to lose the new derogation rate unless we can reverse the decline, and this means going to the catchments where quality has deteriorated and doing so. Because they are also the locales where the best opportunities arise to reduce greenhouse gas emissions at scale, there is an obvious opportunity to capture multiple benefits. In broad terms, the EPA rates ecological status in catchments in four categories – high, good, moderate, and poor. From an outcomes point of view, it would be ideal if the choices facing farmers were framed so that they knew (a) what outcomes would allow them to maintain the 220 Kg rate ('Good?') and what would allow restoration of the 250 Kg rate ('High?') and (b) what mix of policies and measures would maximize the prospects of these being delivered at acceptable cost. However, I do understand these issues are likely to be complicated with different stretches having different ratings. What is essential is that the incentives favour cost effective action at scale.
2. The fate of the Commission's proposal to extend the Industrial Emissions Directive to include intensive ruminant farming is still uncertain. However, it seems that, if enacted, the thresholds for inclusion will be much larger than those proposed by the Commission. It deserves serious consideration, for one key reason: it would by law include the biggest emitters, and thereby help limit the damage that can be inflicted by the free rider problem whereby farmers who decide to opt out or only undertake minimum actions undermine those to opt in and take vigorous and effective actions. For those Irish farms that are included, it would impose additional costs in the short term, but in the longer term, if they use it to improve their carbon footprint at scale, it will help them to successfully manage the risks of carbon competition in key markets, including discouraging legal challenge under the 'Greenwashing Directive' thereby ensuring continued access in premium markets, and to be in good standing with their local communities for whom water quality and nature conservation will grow in importance over time.

Information

Without information that is relevant credible and timely, we will make poor decisions, and these will be costly. We are lucky in Ireland: for 50 years, we have been collecting and publishing data that is relevant credible and timely concerning the private costs and returns in farming. The National Farm Survey (NFS) has been conducted by Teagasc on an annual basis since 1972. The survey is operated

as part of the Farm Accountancy Data Network (FADN) of the EU[20] and fulfils Ireland's statutory obligation to provide data on farm output costs and income to the European Commission. These relate mainly to private (commercial) costs and benefits. Since at least 2013, the process of integrating sustainability into the national farm survey has been underway, and today includes metrics relating to climate air and water quality.[21] In addition to the integration of climate and environmental performance into the Survey, recent issues of Teagasc's annual *Outlook – Economic Prospects for Agriculture*, also include a chapter devoted to sustainability.[22] Two crucially important performance indicators – carbon removals, and biodiversity – are yet to be included. The Department of Agriculture Food and the Marine (DAFM) *Annual Review and Outlook* is a valuable source of credible information on farming and forestry,[23] while the National Parks and Wildlife Service provides an assessment of the status and trends regarding key habitats and the EPA does likewise for water quality including the sources of degradation.[24] The Central Statistics Office (CSO) is a great source of trade data (volume, value, by commodity and country) – just send your query to Trade@csso.ie and an actual person will reply quickly with all that you need.

As noted, most dairy farmers have joined Bord Bia's Sustainable Dairy Farms Assurance Scheme (SDAS); they have their emissions measured every 18 months. Similarly, many beef and sheep farmers have joined the Sustainable Beef and Lamb Assurance Scheme (SBLAS): "Under the SBLAS, data is assembled from all available sources relating to the performance of the farm (live sales, slaughtering, farm inputs, etc.). This information is then merged on the Bord Bia database with the additional data collected by the Bord Bia farm auditor during audit. Calculations are performed on this database using the combined data in accordance with the accredited Bord Bia Carbon Footprint Model. These calculations provide the carbon footprint of the meat produced. *This is a key indicator of the sustainability of the farm* (emphasis added)".[25]

For more on the major developments proposed by the EU as regards measurement of emissions at farm level, including carbon removal, and for consumers, see [Blog 2 \(Metrics\)](#) and [Blog 3 \(EU\)](#).

Data is also becoming available on carbon removal by trees. On a recent visit to Fernhill (a park owned and managed by Dun Laoghaire County Council) I noticed that many of the individual trees had labels showing how much CO₂ they removed, and Teagasc has a tool that allows estimation of carbon removal per hectare by different mixes of species and site types – [Forest Carbon Tool – Teagasc | Agriculture and Food Development Authority](#).

Assessment

1. Key Point: Teagasc has been compiling credible data of Irish farming performance for 50 years; since 2012 it has been integrating performance measures on public goods including ammonia (air quality), fertilizer efficiency (water quality) and greenhouse gas emissions (climate change burden) by farm system. My guess is that it is in the top tier in terms of credibility within the EU and internationally, and that it would have high credibility in a court challenge. This is an invaluable national asset to be fostered and developed; the suggestions below are directed mainly to this end.
2. Greenwashing: On September 19, 2023, the European institutions reached agreement to make it an offence to make spurious environmental claims, to come into effect in 2026 ('Greenwashing Directive'). EU member states will have two years to implement the changes in national legislation. [Council and Parliament reach provisional agreement to empower consumers for the green transition – Consilium \(europa.eu\)](#). Companies that wish to claim that their products are climate-neutral will have to provide evidence. The law still requires approval by member states and the parliament's plenary assembly.
3. While at national level, progress is notable there are two important arenas where further progress is needed: the first is integration of carbon removals and biodiversity into the reporting in the annual sustainability reports of Teagasc; the second is to continue to make progress on its Navigator system for measuring emissions and removal at farm level such that Teagasc is comfortable with the results.[26]
4. The commitment to produce farm-based carbon footprint metrics at farm level by Bord Bia's Sustainable Dairy (SDAS) and Beef and Lamb (SBLAS) is important; as the methodologies evolve and improve, this needs to be reflected in these metrics. Also, the footprint metrics required are likely to differ in Ireland's top four markets (rest of EU, UK, US and China) and the measurement and labelling will need to be customized for each. As noted above in 'Key Points' in- [Gerry Boyle: 'When it comes to carbon, you can't manage what you don't measure' – 09 August 2023 Premium \(farmersjournal.ie\)](#). Boyle provides an interesting update on the state of play and the issues around measuring carbon removals.
5. It is critical that the EU deliver on its proposals to ensure that data on farm level emissions and removals are available by 2028. Without that, its wider ambitions to reduce emissions and increase removals are unlikely to be delivered.

Innovation

This is about finding new and better ways to reduce emissions and store carbon at scale, and in Ireland's case, to do so in ways that meet the particularities and needs of pasture (grass-fed) ruminant farming. A key priority is addressing enteric methane emissions, which in 2021 amounted to 14.0 million tonnes of CO₂e, 60.1% of the sector's total emissions. At present the choices are to: change

farming system: increase efficiency (see below); and/or to feed a methane reducing additive. The only additive yet EU-certified for use in Ireland is Bovaer, which is been tested by Peter and Paula Hynes on their dairy farm in Aherla in County Cork. [See more in Blog 6](#). It is also seen in the Farm Zero C project as a key instrument for reducing emissions ([see more on this in Blog 11](#)). Successful innovation at scale typically requires the following: mission-focus; crisis; research and development; smart policies that are sustained; global reach. There is much more on what, why and how of this in [Blog 11 \(Innovation\)](#).

Assessment

1. Act on the proposals shown under 'assessment' for the Department of Further and Higher Education Research and Innovation (See Annex A).

Cash Subsidies/Grants: The benefits of cash transfers are clear: they are popular, and appeal in particular to those farmers whose incomes are low, and for whom such transfers are crucial if they are to continue farming. Their limitations as a means of achieving 'public goods' outcomes include: They are most attractive to those for whom the effort required is least, which means that the additivity achieved by the subsidy is limited. In their assessment of the Green Low-Carbon Agriculture Scheme (GLAS) in CAP 2014–2020, IGEES noted that "Survey data indicates that some of the actions incentivised under GLAS may already be in place on participating farms with additionality ranging from 20% to 67%", i.e., many farmers would have taken the actions anyway as part of their regular farming routine.^[27] A second limitation is lack of focus on the opportunities where the payoff in terms of public goods outcomes is greatest. A third is lack of encouragement of innovation – a farmer may have better ideas that are not included in the list of activities that are eligible for support. A final issue is the transaction costs and associated monitoring, reporting and verification (MRV) can be very high.

Beginning from 1992, subsidies have been the main instrument of the EU to shape policy outcomes generally, and since 2014, to also address the delivery of public goods, notably reduced pressure on climate change and improving environmental quality. As noted in Blog 10, there is a step change in the increase in volume of spending proposed for such purposes in CAP 2023–2027; the requirement that 25% of direct payments (€297 million annually) be allocated to such purposes, together with increased payments under Rural Development (Pillar 2) means that total annual subsidies in the forthcoming CAP for public goods increase from €234 million in 2014–2020 to €700 million in 2023–2027, an annual increase of €466 Million (see Table 6, Blog 10). There have been learnings from the European Innovation Projects that are likely to improve outcomes, but the climate outcomes are likely to be much less than is necessary (much more detail in Blog 10). This is because the subsidy instrument as applied is not designed and implemented to deliver outcomes at scale. This will need to change. I accept that the logic of transferring fund to low-income farms on the basis of equity, which is why I propose that new funding will be needed to deliver the climate and nature conservation agendas

Discovery: The most useful climate and environmental subsidies are those which 'discover' where the best opportunities are to be found, 'best' in this context meaning those that deliver emissions reductions and carbon removal at scale and at reasonable cost and support them to do so. Up to now, as I elaborate above, the on-farm earnings gap between dairy and beef and sheep is such that most of the climate-specific funding has been devoted to those whose incomes need support, and not as a means to deliver emissions reductions at scale. Also, support for food processors has not been included, which narrows the scope of action. There are lessons in this regard from California and France.

California

Details are available at: Jimenez, Frank, 2021. *Assessing California's Climate Policies—Agriculture*, Legislative Analyst's Office, (LAO), California [Assessing California's Climate Policies—Agriculture](#), December 22 pages and CARB 2022. [Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target \(March 2022\)](#). (ca.gov).

The key points here are that (a) the dairies are included as partners in the subsidy initiatives and (b) there is direct payment for performance.

In California, the legislation (AB 32) that underpins and shapes climate policy requires that GHG emissions be achieved by "the maximum technologically feasible and cost-effective reductions." This simple and crucially important requirement is missing in Ireland. The legislation requiring achievement of State-wide methane emissions reduction by 40% by 2030, which includes associated obligations by the farming sector, whose target is a reduction of 40 percent below 2013 levels, i.e., a reduction of 9 million metric tons carbon dioxide equivalent (MMTCO_{2e}) by 2030.

Beginning in 2015, it has had a two grant aided programmes – the Dairy Digester Research and Development Program (installation of dairy digesters which will result in reduced greenhouse gas emissions) and the Alternative Manure Management Program (pasture-based management; alternative manure treatment and storage (such as compost bedded pack barns); and solid separation or conversion from flush to scrape in conjunction with some form of drying or composting of collected manure) to help farmers reduce their emissions. These schemes are both administered by the California Department of Food and Agriculture (CDFA) via its Office of Environmental Farming

and Innovation, whose mission is to “serve California by supporting agricultural production and incentivizing practices resulting in a net benefit for the environment through innovation, efficient management and science.”^[28] The most recent call for applications for grant support for the alternative manure management program was released on June 28, 2023, with a closing date of August 28, 2023. Applications are welcomed from individual farmers, dairies, or clusters thereof.

The criteria by which applications will be judged are based on points out of 100 allocated as follows:

Outcomes (50): Estimated greenhouse gas emissions reduction (35); Environmental co-benefits 10); Benefits to priority populations (10)

Quality of inputs (50): Project plan and long-term viability (25); budget and financials (15); project readiness (10). Details at: [2023 AMMP Request for Grant Applications](#)

The California Air Resources Board (CARB) is the agency mandated by the legislature to reduce greenhouse gas emissions. In March 2022, CARB produced its assessment of progress. Key conclusions were that, as regards reduction of methane emissions, California’s dairy and livestock sector: made significant progress since 2015 with emissions but will not meet the 2030 target without almost a doubling of emissions reductions projects; substantial public and private funding has been utilized to support methane emissions reduction projects. Emissions reductions achieved by 2021 were ~3.5 Million tons of CO₂e, of which ~1/3 was a result of population reductions.^[29] Each project funded is reported on separately, with name of the dairy, the amount of the request and the matching funds, the primary practise funded, and the greenhouse gas reduction to be achieved.^[30] The report also identifies technical and market barriers inhibiting progress, and has recommendations as to how they should be addressed.

France (Label Bas Carbone)

This was initiated in 2018, so there is 5 years of experience. It is a government programme which aims to reward farmers and foresters who reduce emissions and/or increase removal of carbon. It puts a lot of effort into ensuring additivity, creating a market (airlines have to buy offsets to cover emissions by domestic flights and the two coal power plants have to do likewise to cover their emissions) and documents outcomes (Forestry 843,000 tonnes of CO₂e removed and Agriculture 734,000 tonnes CO₂e emissions reduced), and prices secured per tonne (€8-125). I have asked for more details. For example, the coal power plants are in EU ETS, and must already cover their emissions with allowances – will they in effect be paying twice?

Reducing Cow Numbers

In the [Report of the Food Vision Dairy Group, October 25, 2022](#), a voluntary exit reduction scheme (Measure 5) is proposed, estimated to reduce emissions by 450,000 tonnes of CO₂e per 100,000 dairy cows, an average reduction per cow of 4.5 tonnes CO₂e. This proposal is being assessed by Teagasc, which is reported on by Ciaran Moran in the *Farming Independent*, May 30, 2023 – [Revealed: €600m budget needed to cull 65,000 cows every year for three years to meet climate goals | Independent.ie](#). CAVEAT I haven’t seen the Teagasc assessment – the comments below are based on the Farming Independent report. The costs of reducing cow numbers by 195,000 over three years are estimated to amount to €600 million. If we apply the average emissions per cow of 4.5 to this number the result is a reduction of 877,500 tonnes of CO₂e.

A few normative considerations:

The implicit assumption is that the emissions per cow stay constant, but we know that this has not the case for enteric methane: average emissions per cow have increased by ~20% since 1990, and by ~7% since 2016. Note: The difference between Food Vision’s estimate of 4.5 tonnes of CO₂e per cow and the estimates for methane below are presumably a consequence of the fact that nitrous oxide emissions are included in the former.

Table 11. Enteric Fermentation, Average for Dairy Cows, Ireland, 1990–2021, Kg Methane/Head/Yr. and Tonnes per cow, Ireland.

Unit	1990	2000	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Kg/Head	101.31	107.53	112.02	110.48	111.28	111.25	114.17	113.28	116.05	117.40	119.35	119.92	121.12
T/Head	2.84	3.01	3.14	3.09	3.115	3.115	3.20	3.17	3.25	3.29	3.34	3.36	3.39

Tonnes per head derived by converting Kg to Tonnes (x1000) and then Multiplying the CH₄ emissions by the AR5 GWP100 metric value of 28.

Source: [NIR-2023-Final_v3.pdf \(epa.ie\)](#), p. 159

The cost per tonne of CO₂e abated is high: Even if we assume that (a) total emissions per cow remain constant at 4.5 (b) there is no increase in cow numbers elsewhere (c) the total costs provided stay at €600 million, the average cost per tonne of reduction would be 600,000,000/877,500 i.e.~€684 per tonne. Which raises the question. Are there other ways we could use €600 million that would reduce emissions more permanently and/or at lower costs?

The two jurisdictions that are most advanced in reducing greenhouse gas emissions at scale are California and New Zealand, and in both cases, their policies focus directly on emissions reduction, the former since 2014 via cost-sharing with farmers who reduce emissions at scale, and the latter (from 2025) via imposing a levy on emissions. In both cases, stock numbers are likely to fall, but this will be a decision farmers make based on the incentives they face, not a product of a destocking policy per se.

Forestry

The Irish government's Forestry Programme 2023-2027 has 8 interventions of which half - forest creation, agroforestry, sustainable forest management, and climate-resilient re-forestation - are directly relevant to carbon removal.[31] The costs of grant and annual premium support are estimated to amount to €1.3 billion, all of which will be borne by the Irish Exchequer.[32]

Reasons for the new rates include: the fall in afforestation rates from 6500 hectares in 2016 to 2434 in 2020 (Blog 1, Table 5); the rise in costs for inflation and other reasons; delays in the licences required for planting and felling. As regards the latter, the regulatory process was assessed[33] and changes, including recruitment of many ecologists to expedite the environmental assessment process, improve the prospects that this constraint will be removed.

Carbon Losses

In Table 8, we saw that net CO2 losses in 2022 are shown as 8.05 million tonnes, of which 7.6 million are attributable to grassland. These data are being reassessed, and it is expected that we have more reliable numbers by 2025.[34]

Assessment

California

1. For scale and technical reasons, the abatement choices favoured in California are not those that would work best in Ireland; for an indoor containment system with very large number of cows, dairy digestion works, while with Ireland's grass-fed system it is more challenging. Also, in addition to getting the input subsidy, farmers who invest in digestors also benefit from methane sales generated by the Low Carbon Fuel Standard (LCFS) Program and the federal Renewable Fuel Standard (RFS) Program. It is also a process that has engendered considerable local opposition (odours, water contamination) and some analysis that the incentives are too generous. It highlights that the solutions, and the associated innovations, needed for pasture-based ruminant farming are different from those that work for indoor-containment systems. It is a mistake to depend wholly on innovations that come from the latter to find ways that work for us. However, the 'discovery' process they use has two huge benefits - it gets the food industry directly into the action tent with farmers, and it helps discover where the most important payoffs to effort and value for money for taxpayers (a big consideration in California) are likely to be found.
2. Even when the policy is 'opt in' it is possible to get considerable farmer engagement.
3. To deliver outcomes at scale, policy needs to be attractive to those farmers who have large emissions, and therefore the potential to reduce emissions (a) at scale and (b) at relatively low cost.
4. Learning by doing is the most important form of learning. Both farmers and the policy system learn as action replaces rhetoric and visions confront reality.
5. Transparency as regards beneficiaries of grant support, the grant amounts and matching funds, reductions aspired to before and delivered after.
6. The carbon footprint of some products produced by milk supplied by Californian farmers in the future is likely to be low and create a very demanding benchmark for Irish suppliers.
7. In the California model, methane emissions are the enemy, not cows. The numbers of the latter have fallen, but this is a product of decisions farmers are making on many fronts, including water scarcity, but also including methane abatement options.

French Case

1. The volumes are much smaller than California, but the programme has been underway for a shorter time (8 years in California vs 5 in France), it is combining information (low-carbon label) with outcomes, it addresses removals as well as emissions' reduction, and it may be an important source of emulation as the EU programmes evolve.

As in the case of California, creating a demand is very important.

Irish Farming

1. Pay for performance: This means targeting where emissions are greatest, and then designing and delivering subsidies that reduce emissions at scale.
2. Now that almost all dairy farmers have joined Bord Bia's Sustainable Dairy Assurance Scheme (SDAS), and many are members of a co-op, there is an institutional framework for progress at scale in the case of dairy products. There is less clarity around the developments and potentials in the case of beef and lamb.

Increased Efficiency

Over the 31-year period from 1990 to 2021, average milk production per cow increased from ~4,200 to 6,000 litres, a compound annual average increase of ~1.2%. In the six years from 2015–2021, the average per cow production increased from ~5,300 to 6,000 litres, a compound annual average of ~2.1%. However, the average emissions per cow also increased; there was not a commensurate gain in methane efficiency.

Assessment

1. Output and CO₂e efficiency gains, being mostly ‘no regrets’, are hugely valuable, and should be vigorously pursued. That’s the good news; the bad news is that they are necessary, but not sufficient. And it is clear from Table 11 that unless methane reduction is incentivized, the reductions delivered by commercial efficiency gains are likely to be partially offset by increase in methane emissions per animal.

Voluntary Agreements

This is a relatively recent development In Ireland, epitomized by the decision by Dairygold to ringfence up to €10 million per annum for a new ‘Grassroots Milk Supplier Sustainability Bonus’ programme. To qualify for the bonus payments, Dairygold suppliers must commit to six separate requirements, including: a water quality farm visit; the purchase of qualifying protected urea products; a soil health programme; farmer training; milk recording; herd health.^[35] The voluntary agreements being reached by companies which buy Irish food are emerging as an important stimulus for action. These include a commitment by Danone (France), in partnership with the Environmental Defense Fund, to reduce methane emissions from its supply chain by 30% by 2030, and a similar commitment by Walmart (US) to reduce annual greenhouse gas emissions from its supply chain by 1 billion tonnes of CO₂e by 2030.

Assessment

1. Voluntary agreements by some buyers of Irish dairy and meet products are likely in the future to favour products that have a low carbon footprint. If farmers want access to these markets, they will need to deliver a carbon footprint that reflects what they want and be able to prove it.

Policy Instruments yet to be Mobilized to Advance Climate Policy addressed to Ruminant Farming in Ireland

Tax/Levies

I noted how effective the plastic bag levy has been in reducing their use. There are no such taxes or levies applicable to farming that would directly influence greenhouse gas emissions. The New Zealand government has proposed levies to be applied on short lived gasses (mainly methane) and long-lived gasses (mainly nitrous oxide), payable by all farms above a size threshold. See Blog 7 for more details.

Tax Expenditures

The Revenue Commissioners recognize 9 tax expenditure categories,^[36] and in 2021, within these categories, there were about 250 specific reliefs, starting with ‘Microbrewery excise relief’, and ending with ‘VRT Export Repayment Scheme’. See details for 2021, 2020, and 2019 at [Costs of Tax Expenditures \(Credits, Allowances and Reliefs\)](#).^(revenue.ie), p. 2.

The two largest benefitting agriculture in 2021 were under CAT – Farm Relief (€199.7 million) – and Reduced Rate on MOT (Green Diesel) – €522 Million. Of relevance for climate performance is the zero VAT rate which applies to fertiliser, provided such fertiliser is supplied in units of not less than 10 kilos^[37].

Forestry (carbon removal) is also a major beneficiary, with exemption of income and corporation tax on profits under certain conditions. [Forestry and taxation – Teagasc | Agriculture and Food Development Authority](#).

Emissions Trading

The advantages of this instrument as applied in EU ETS to energy, heavy industry and internal EU air travel are elaborated above.

There are no plans at present to introduce this instrument in Ireland. It was proposed by Alan Matthews to the [Food Vision Dairy Group](#). [The Interim Report 27 May, 2022](#) pp. 24–25 provides some detail:

“Urgent work is required to explore the potential of a Cap-and-Trade model for methane and nitrous oxide emissions, under which farmers would be assigned emission rights and allowed to trade their rights within an overall annual or multi-annual cap. This model is proposed for further research with a view to reviewing literature to-date and establishing an understanding of the

challenges of implementation and the economic and social implications for dairy and the wider agriculture sector, while recognising that a comprehensive Cap and Trade model would need to include LULUCF emissions and is dependent on the availability of farm-level emissions data.”

Stakeholder reaction was noted, which included:

“A number of stakeholders represented on the Group have raised concerns about potential for a Cap-and-Trade model equating it to a de facto restriction in cow numbers and/or production. They were also concerned that carbon credits could leak from Agriculture to other sectors...The early adopters of climate efficiency measures must be recognised in the event of a future Cap-and Trade scheme coming into place”.

The European Commission commissioned a consultancy study to examine implementation of a trading scheme to put a price on agricultural emissions while rewarding carbon removals in the land sector (an agriculture ETS) which would be separate from the standard ETS. Publication of this study is expected by December 2023

Assessment (Taxes/Levies, Tax Expenditures, Emissions Trading).

1. There is a reason why economists favour these instruments. They provide an incentive, 24 hours a day, 365 days on the year, to reduce emissions, and revenues generated can be used to fund further action and reductions. The allowance price in EU ETS on Sept 22 2023 was €85.48 per tonne of CO₂e ([Carbon Price Tracker | Ember \(ember-climate.org\)](#)), a share of the revenues from auctioning of allowances is used to fund the Innovation Fund and the rate of shrinkage in the cap on emissions can be adjusted to automatically deliver the emissions' target.
2. If the climate performance of a farm were captured by a credible independently verified performance label, analogous to the A through G-rating of buildings (BER) which tell the world how carbon efficient they are, tweaking of the Capital Acquisition Tax or other tax expenditure categories to favour those rated B or over would provide a considerable incentive to act.
3. If it becomes clear from 2025 that New Zealand's levy system is delivering emissions reduction at scale, and giving their farmers global leadership in carbon footprint outcomes, then, if Irish performance is lagging far behind, it should consider following suit.
4. Concerning emissions trading, the first step is to learn the lessons of the failure of the scheme considered and then dropped in the milk quota era. If a coop decides to meet an ambitious emissions reduction/carbon removal target, it makes sense to consider creating an internal trading scheme for some of its members. When the EU report is tabled and debated, it is important to address it seriously, including how it could be designed and delivered over time to reduce emissions as scale.

Green Public Procurement (from 2023)

Green Public Procurement (GPP) is a process where public authorities seek to source goods, services or works with a reduced environmental impact. The Government of Ireland's annual public sector purchasing accounts for 10% to 12% of Ireland's GDP, a large part of economic activity and demand. [green procurement policy ireland – Search \(bing.com\)](#).

Zoning

This instrument is very widely used in Ireland to regulate what can be built, or not, on land. Securing planning permission, and the conditions that apply thereto, typically have large and important implications for both private and public wellbeing.

The Citizens' Assembly report on Biodiversity Loss^[38] lists 159 recommendations of which number 8 (p. 14) is:

“As a matter of urgency areas and species of High Nature Value, including but not limited to the national network of Natura 2000 sites and protected species, should be protected from further degradation through the implementation and enforcement of existing legislation and directives. Management plans should also include restoration programmes”.

Conventional zoning can confer very large financial windfalls on some landowners, where development is allowed and often facilitated by public investment in infrastructure and services, in contrast to others whose use is restricted because their property provides public nature conservation and ecosystem services. In the US, there are many interesting examples of cases where those providing such public goods are rewarded by those who benefit. Two examples: some farmers in upstate New York are paid by New York city for engaging in farm practises that protect the quality of the water in key catchments that supply the city;^[39] some developers pay landowners who forgo development rights and provide conservation services through a conservation easement or restrictive covenant when the developers are allowed greater density or intensity of development.^[40]

In its reply to a question as to whether there are implications for planning law, the National Parks and Wildlife Service responds as follows:

“The environmental implications of any development likely to have an impact on any SAC have to be assessed irrespective of the location of the development. In some cases this may require a full Environmental Impact Statement. Planning permission would be unlikely to be granted where such an assessment shows that the development would have a significant adverse effect on the NHA, SAC or SPA”.

Assessment (Green Public Purchasing, Zoning)

1. In its conditions of supply of food to publicly supplied catering and related services, the government could require that X% be supplied from farms and processors who were credibly certified as meeting a minimum carbon footprint, e.g., are from farms that have a better than ‘C’ rating. This would (a) create a local market and reward early movers, and (b) provide experience for farmers and processors as to how to engage successfully in this domain, which will be invaluable as they face increasing carbon footprint competition in export markets.
2. Zoning is hugely influential for private and public well-being. There is a strong case for at a minimum exploring how it could be adapted to favour those farmers who are delivering excellent outcomes in terms of climate water quality and/or biodiversity outcomes.

Public Funding

This is not a policy instrument per se, but it is so important that it deserves treatment under this heading. As noted in some detail in [Blog 10 \(CAP 2023–2027\)](#), by far the most significant channel for direct public funding of farming in Ireland is the Common Agriculture Policy, the main channels of which are the direct payments (Pillar 1) and funding for Rural Development (Pillar 2) – the former is 100% funded by the EU, while the latter is co-funded by the Irish Exchequer.

The amount transferred to beneficiaries (including co-payments from the Irish Exchequer) in 2021 amounted to €1.8 billion. The ~130,000 beneficiaries are ranked in terms of aggregate amount received, and the latter is broken down into 33 categories, which are listed alphabetically from ‘Advisory Service Farm Management and Relief’ to ‘Temporary Exceptional Aid’.

The ‘Top 50’ are mainly county-based community development (Leader) schemes, but also include conservation projects – the Hen Harrier Project, Galway (€5,197,488) and Pearl Mussel Project, Kerry (€2,109,816) – and Bord Bia (€3,316,770).

Although there are 33 categories of benefit: In 2021, three categories of benefit to farmers – direct payments, payment to farmers whose land included ‘Areas Facing Natural/Specific Constraints, and who participated in the Agri-Environment Climate (called ‘Green Low Carbon Scheme’) – dominate.

Table 12. Receipts from CAP Payments, Ranked by Amount Received (€) and Category, 2021

Rank of Beneficiary	Direct Payments	Areas Facing Natural/Specific Constraints	Agri-Environment Climate	Animal Welfare	Investment in Physical Assets	Total
50 th	218,837	2587	-	-	-	221,426
5000 th	39,004	1774			-	40,778
15,000 th	16,650	362	8830	-		25,841
25,000 th	8,863	5121	6216			20,200
35,000 th	9,601	4084	2946	200	-	16,831
45,000 th	6,108	3652	4342	-	-	14,247
55,000 th	4,713	3068	4272	-	-	12,052
65,000 th	4,611	1624	3218	-	667	10,119
75,000 th	5,582	2764	-	-	-	8,346
85,000 th	2,485	1010	3149	-	-	6,644
95,000 th	3,331	1680	-	-	-	5,011

Source: [CAP Beneficiaries Publication \(agriculture.gov.ie\)](#)

Note: to access amount, click ‘Total’ and for breakdown click ‘Details’. the farm beneficiary listed above is the last one on the last page as you scroll down to each rank category.

This table tells us that the first 5000 beneficiaries received at least €40,788; while those up to the 25,000th recipient received >€20,000; the minimum wage in Ireland in 2021 was €20,129, so this tier were all in receipt of at least this level. For the first 15,000 beneficiaries, the direct payments dominate the total, while from the 25,000th recipient on, payments for areas facing natural/specific constraints and for agri-environment climate (mainly GLAS), provide the majority of the total income with the total falling below the minimum wage.

The core aim of the direct payments has been to provide basic income support to farmers and contribute to viable food production in the EU without distorting production decisions; it has been designed to provide farmers with an income safety net; the amount of support received is not linked to the quantities produced. A key criterion determining the amount of the payment has been the number of hectares farmed, and payments were confined to land that was ‘actively farmed’, deemed

to be land where the farmer meets a minimum stocking level (0.10 Livestock Units per hectare). The minimum stocking rate of 0.10 Livestock Units per hectare applied also to land that qualified for payments under the 'Areas of Natural Constraints' scheme.

Over time, 'greening' of the payments has evolved, with the provisions described in [Blog 10 \(CAP 2023-2027\)](#), being the latest iteration, as have efforts to narrow the gap between those who receive most and the rest.

Although the payments under both the Areas Facing Natural/Specific Constraints and Agri-environment and climate schemes have provided an important cash flow to lower income farmers it is clear from Table 13 that (a) the family farm income gap between the average dairy farm and the rest (and in particular 'cattle rearing' has widened since 2016, and (b) while the size of the average dairy farm has increased over this period, average farm size for the cattle and sheep systems has decreased.

Table 13. Average Family Farm Income and Farm Size by Farm System, 2016–2023, Ireland

Farm System	Average Family Farm Income (FFI)(000s €)								Average Farm Size (Ha)	
	2016	2017	2018	2019	2020	2021	2022	2023*	2021	2016
Dairy	54.0	90.2	63.3	69.2	79.0	98.7	148.0	105.0	64	56
Cattle Rearing	11.7	10.7	8.3	9.2	8.2	10.9	8.7	9.7	33	36
Cattle Other	15.0	16.3	15.1	14.1	15.5	17.2	16.9	17.3	36	37
Sheep	15.6	17.4	13.4	15.0	17.9	20.8	19.9	19.4	45	51

*Projected

Sources:

Income data for 2022 and 2023 (prospects): [Outlook 2021 \(teagasc.ie\)](#), pp. ii, iii

Income data 2016–2021 and Farm Size 2021: Dillon, Emma, Trevor Donnellan, Brian Moran and John Lennon, 2022. *National Farm Survey 2021*. [2022 - Teagasc National Farm Survey 2021 - Teagasc | Agriculture and Food Development Authority](#), p. xii

Farm Size 2016: [Microsoft Word - NFS 2016 cover pages_long \(teagasc.ie\)](#), p. 3

Assessment of Public Funds:

1. It seems likely that we will continue up to 2030 to use subsidies as the main policy instrument to drive the climate performance of ruminant farming, and most of the climate/environment support (Pillar 2) and that under the existing CAP arrangements funding will continue to be directed at helping low-income farmers rather than driving emissions reduction and carbon removal at scale and nature conservation. This means that if we are to deliver the latter, and an average Irish carbon footprint for milk and meat products that is competitive in key international markets, we will need to find and spend additional public funds. Ideally this would be co-funded by the EU, but, if necessary, it would be 100% funded by the Irish Exchequer. I note that the recommendations in the Climate Action Plan for 2024 (CAP24) include "Consider further opportunities for issuing new Irish Sovereign Green Bonds and monitor the allocation and impact of funds raised through existing Irish Sovereign Green Bonds.
2. I, and I think many other taxpayers would support such additional taxation and associated expenditure but *if and only if* it was carefully designed and implemented to (a) deliver climate and nature conservation outcomes at scale and (b) do so in ways that were value for money, i.e., mainly going to support action where costs per unit of carbon removed and nature conserved are lowest. Anything less would be policy and political failure on a grand scale, and engender huge resentment disillusion and bitterness.

Overall Assessment

With the *current policy instrument mix* and (especially) how it is designed and delivered:

1. **Irish ruminant farming is unlikely to reduce aggregate emissions by 25% by 2030, or to ensure a national average carbon footprint for dairy and meat products that will be competitive with the best performers in key export markets.**

- However, some farm groups and the companies processing their food are likely to do so. In this scenario, Ireland Inc will fail, but sub-set(s) thereof will succeed and will brand its/their output in key markets accordingly.
- In the design and delivery of climate policy generally, it is important to distinguish between investment, which can be expected to payoff over several years, and current expenditure, which

requires annual replenishment.

- Given the very generous grants becoming available for tree planting, and the considerable efforts underway to addressing the licensing issue, it is likely that there will be a major expansion in afforestation and associated carbon removal. It remains an open question whether this will be done mainly by a combination of private investors, community groups and local authorities or by farmers. In some markets, including the EU, it is likely that carbon removals that can be attributed to investment by farmers will be allowed in the computation of carbon footprint. It will be an own goal of gargantuan scale if most farmers fail to take up the carbon removal opportunity at scale and thereby risk reducing the attractiveness of their output in premium markets, and perhaps the capital value of their farm in the longer term.

2. An integrated policy instrument mix with the following characteristics would maximize the prospects that Ireland overall will deliver Food Vision 2030's vision and be a global leader:

- In all cases, the following criteria should apply: performance will be judged independently, and the evidence will be credible in key markets; it will meet the following 3 criteria – deliver emissions reduction and carbon removal: at scale, acceptable cost; and in ways that are judged to be fair.
- There is a strong case for new funding, if and only if it is directed at greenhouse gas emissions and carbon removal at scale, at acceptable costs in ways that are fair.

This is because the amount of the EU funding envelope for Irish farming has been relatively stable over recent years, and how it is distributed is a zero-sum game; if some farmers get more, then others must get less, which makes the politics of change very difficult.

- Address climate change and biodiversity (nature conservation) as a joint package. I address the 'how' of that in [Blog 10](#).
- A psychology that embraces change: Some farmers assume that farming is exclusively food production. For many, shelter is as important as food, so providing wood products is a worthy endeavour, and reducing the risks of extreme climate change for the farm business and for our posterity is essential.

E. Institutional Arrangements – whole of government

Evidence and Assessment Cross-Government Functions

In the 1960s, value added by the Irish milk processing sector was very low. In 1973, Tom Jago, head of a British company (IDV) with an operation in Ireland, became aware of an initiative by the Irish Department of Finance, whereby export earnings from a new Irish alcohol drinks brand would be tax-exempt for 10 years. This led to the creation of Bailey's Irish Cream, a product which today is found for sale in most countries in the world, in outlets that range from the most salubrious to the meanest shebeen. This is one of the case studies I use in [Blog 11 Innovation](#) to help identify what a serious innovation strategy looks like. The success provides important insights: first, recognition that the value added in Ireland's milk processing industry was woeful; second, innovation was a policy instrument that could improve performance; third thought leadership by the Department of Finance (probably in tandem with other departments); finally, the conversion of thought into policy and action with spectacular results. We need this sort of thought leadership and execution from the key government departments that can help Irish farming get over the climate, water quality and nature conservation line.

It's hard: Designing delivering and implementing a climate policy for Irish farmers that: delivers emissions reductions and carbon removals at scale, reverses the decline in water quality in key catchments, and conserves nature. But it is essential if Irish farmers and their food companies are to hold onto premium customers in key export markets, and it will require coordinated and effective action across a wide range of government departments. What would this look like?

In the Annex of the Climate Action Plan 2021, details are provided for each of the 493 actions proposed: the steps necessary for delivery, the proposed output, timeline, lead department and key stakeholders. For 76 of these, the Department of Agriculture Food and the Marine is listed as the 'lead' department. The key step forward is the assignment of responsibility, which is amplified by the fact that sectoral targets now exist in law, with core responsibility assigned for their delivery. In addition, every government department now prepares a 'Statement of Strategy' in which inter alia it identifies its climate and sustainability ambitions; the next statement – for 2023–2025 – is either recently issued or under preparation.

Progress

The current Irish government identified 12 cabinet posts as members of its Cabinet Committee on the Environment and Climate Change. The departments represented in the Cabinet Committee are matched by the relevant Secretary Generals of these departments, who form the Climate Action Delivery Board. This is an important step.

Building on this Progress

It is valuable to identify the 493 actions needed, and who has responsibility to deliver them. However, it is essential also to prioritize – out of this 493 what are the 10-20 that are crucial to making progress and scale, and how can we maximize the prospects that these will be delivered on time?

In Annex A below, I identify 11 of these government departments, summarize their key roles and (if stated) their climate specific commitments, and then assess their roles, including some suggestions for prioritization. The 11 departments fall into three categories:

The Core (4): Taoiseach, Finance, Expenditure and Public Reform, Environment Climate and Communications

Direct Action (2): Agriculture, Food and Marine and Housing Local Government and Heritage – but DECC also has responsibility for direct action by the energy and transport sectors.

Support Action (5): Foreign Affairs, Rural and Community Development, Further and Higher Education Research and Innovation, Enterprise Trade and Employment, Tourism Culture Arts Gaeltacht Sports and Media

Progress always requires prioritization: In 'Key Points' I very tentatively suggest what priorities individual departments could take on that would help the overall climate and environmental strategy for the sector to succeed and below in the Annex I go into more detail.

ANNEX

INSTITUTIONAL ARRANGEMENTS – WHOLE OF GOVERNMENT

Evidence – General

The current Irish government identifies 12 cabinet posts as members of its Cabinet Committee on the Environment and Climate Change. One of these – the Department of Environment, Climate and Communications – has two key roles – strategic leadership for the delivery of the Ireland's climate ambitions, and sectoral responsibility for doing so for the energy and transport sectors, which together accounted for 34.4% of total greenhouse gas emissions in 2021.^[41] Six departments have broad government-wide responsibilities – Taoiseach (Prime Minister), Finance, Public Expenditure and Reform, Foreign Affairs, Further and Higher Education Research and Innovation and Environment, Climate and Communications – two have direct relevance to farming and land use – Agriculture Food and Marine, and Rural and Community Development – one – Housing Local Government and Heritage – has responsibility for biodiversity The two remaining are Enterprise, Trade and Employment and Tourism Culture Arts Gaeltacht Sports and Media. The departments represented in the Cabinet Committee are matched by the 12 Secretary Generals of these departments, who form the Climate Action Delivery Board.^[42]

In the Annex of the Climate Action Plan 2021, details are provided for each of the 493 actions proposed: the steps necessary for delivery, the proposed output, timeline, lead department and key stakeholders. For 76 of these, the Department of Agriculture Food and the Marine is listed as the 'lead' department.^[43] The key step forward is the assignment of responsibility, which is amplified by the fact that sectoral targets now exist in law, with core responsibility assigned for their delivery. In addition, every government department now prepares a 'Statement of Strategy' in which inter alia it identifies its climate and sustainability ambitions; the next statement – for 2023-2025 – is either recently issued or under preparation.^[44]

Climate policy – both emissions reduction and carbon storage at scale – for agriculture is challenging, but it is essential if we are to successfully manage: the commercial risks for the sector posed by losing the carbon footprint competition in key markets and increased costs if the derogation provisions are lost, and the associated loss of income flow to rural Ireland; the risks of antagonisms that could emerge in the future if/when the flooding/drought costs of climate change rise; and the reputational risks within the EU and wider afield if our climate policy as a whole fails. It is going to take a lot of skill resources and support from many departments if we are to succeed.

What these 493 action obligations and strategy statements lack is a sense of priority and the starting point for prioritization is volume of emissions reduction and carbon removal and value for money (cost effectiveness)

Below, for the government departments and agencies that are most relevant to the delivery of an ambitious climate outcome in agriculture, I do my best to identify the most important priorities.

Evidence and Assessment Cross-Government Functions

1. **Department of Finance (DOF):** It has the key roles of raising the funds needed to finance public expenditure via various tax provisions and borrowing, and deciding on the broad allocation of such funds, including deciding on the taxpayers that benefit from tax exemptions, called ‘tax expenditures.’

Public Expenditure: In his budget speech for 2023, Minister Michael McGrath provided €90.4 billion in public expenditure. He noted that ‘As set out in the Programme for Government, every additional euro raised in carbon tax (now €41 per ton of CO₂) will be returned to the people of Ireland through energy efficiency upgrades, social protection schemes to protect the most vulnerable and measures to incentivise farming in a more environmentally friendly way. The total carbon tax revenue available in 2023 for investment is €623 million, of which €337 million will go towards grants for energy efficiency. He allocated €2.14 billion for the Department of Agriculture, Food and the Marine for 2023, an increase of €283 million on the 2022 allocation.

“Over €500 million of the allocation will further strengthen the sustainability of Irish agriculture and drive the sector’s climate ambition. In recognition of its exposure to the potential adverse impacts of Brexit, I am allocating €238 million from the Brexit Adjustment Reserve (BAR)....In line with the Programme for Government’s undertaking on Carbon Tax, the 2023 portion of the Carbon Tax Funds for Agriculture are included in the allocation for the new ACRES agri-environmental scheme as part of the CAP Strategic Plan 2023-2027.”^[45]

Tax Expenditure: The Revenue Commissioners recognize nine tax expenditure categories,^[46] and in 2021, within these categories, there were about 250 specific reliefs, starting with ‘Microbrewery excise relief’, and ending with ‘VRT Export Repayment Scheme’. See details for 2021, 2020, and 2019 at [Costs of Tax Expenditures \(Credits, Allowances and Reliefs\) \(revenue.ie\)](#), p. 2. The key tax expenditures that benefit farming and forestry are reduced rate on MOT (‘green diesel’), CAT (farm relief) VAT exemption on fertilizer. In 2021 the exemption from CAT – Farm Relief was worth €199.7 million – and Reduced Rate on MOT (Green Diesel) was worth €522 Million (the excise duty paid by farmers is about 30% that paid by other purchasers); VAT exemption for fertilizer was in the past worth about ~€27 million annually, a concession which is available to those for whom fertiliser is supplied in units of not less than 10 kilos.^[47] Forestry (carbon removal) is also a major beneficiary, with exemption of income and corporation tax on profits under certain conditions.^[48]

2. **Department of Public Expenditure National Development Plan (NDP) and Reform (DEPR):** which is responsible for the Vote (budget allocation) of the departments ‘responsible for’ the main sources of emissions [Departments of: Agriculture, Fisheries and the Marine; Communications Climate and the Environment (responsible for overall strategic direction and emissions reduction by transport and energy)] and the Office of Public Works, which has core responsibility for flood protection which is seen as the main adaptation challenge. It also, via the Irish Government Economics and Evaluation Service (IGEES) is responsible for assessing the performance/value for money of public expenditure, including large expenditures by the Department of Agriculture Forestry and the Marine. In their assessment of the Green Low-Carbon Agriculture Scheme (GLAS) in CAP 2014-2020, which cost €1.54 billion, IGEES concluded that the impact on greenhouse gas emission was very modest and that “Survey data indicates that some of the actions incentivised under GLAS may already be in place on participating farms with additionality ranging from 20% to 67%”, i.e., many farmers would have taken the actions anyway as part of their regular farming routine.^[49]

Assessment

1. It is hard to overstate how important is the decision in the Programme for Government to ring-fence the revenues from the carbon tax for use to address climate change. The antipathy to raising taxes is unrelenting,^[50] only exceeded in intensity by the public’s enthusiasm for increasing public expenditure. This decision means that (a) There is (slightly) more public tolerance for the carbon tax, knowing that it is being recycled to reduce emissions (b) it is possible to dedicate investment long term to particular functions; €5 billion Euro is dedicated up to 2030 to subsidize retrofit of >energy efficiency/emissions reduction in the housing stock (c) the carbon tax increases the incentive, 24 hours a day, 365 days a year, to reduce emissions.
2. DOF’s Tax Strategy Group Paper on climate action is an invaluable resource as are DEPR’s expenditure assessments.
3. It is clear from the IGEES assessments that the very considerable public expenditures which has already flowed to farming to reduce emissions are not working for this purpose, and that the changes in CAP 2023-2027, while an improvement, are not close to being sufficient. I elaborate on the reasons for this policy failure in Blog 10 (CAP 2023-2027) when I address policy instruments. DOF and DEPR are ultimately responsible to the electorate for ensuring that they get value for the money expended on their behalf, and specifically for insisting that when it comes to climate action and conservation, incentives are aligned. They should also insist that, before funding (either cash subsidies or tax expenditure) is allocated, estimates of costs per ton of CO₂e reduced or removed are provided, and in the ex-post expenditure assessment the same data are provided.
4. Regulation is a potentially powerful policy instrument. It would be very valuable if DEPR could extend its ex-post assessment of expenditures to include regulatory assessment.

5. **Department of the Taoiseach (Prime Minister):** Every Taoiseach has huge convening power, sets the tone and style for progress, decides on priorities, and has the core roles of monitoring progress, challenging failure, and demanding improvement. The department's key roles include monitoring and driving implementation of Climate Action Plans and supporting the Cabinet Committee on the Environment and Climate Change and the Climate Action Delivery Board. The department has a Climate Action Unit which plays an important role in ensuring whole-of-Government co-ordination. "The work of the Unit is broad and cross-cutting, supporting policy delivery and unlocking barriers in our transition to a low-carbon, climate-resilient, resource efficient and environmentally sustainable economy and society."

Assessment

1. The Climate Action Delivery Board (the 12 Secretary Generals) seems to be inactive. Given the huge challenges faced in delivering emissions reductions and removals at scale by agriculture, establish a small sub-group of the Board with only one mission: Find ways that work to reduce emissions and store carbon at scale by the farming sector that deliver value for money. Given the reduction in the Nitrates derogation, as a co-benefit, it is also imperative to reverse the decline in water quality in key catchments.
2. H.L. Mencken observed that: "Conscience is the inner voice which warns us that someone may be looking". The Taoiseach's office is the 'someone who may be looking', and it also happens to be the place from which cabinet appointments are made and unmade.
3. **Department of Foreign Affairs (DFA):** It has a Climate Unit in place which focuses on Ireland's international climate contributions and commitments including the delivery of Ireland's International Climate Finance Roadmap, with an emphasis on adaptation to climate change. Mary Robinson quotes Constance Okollet, a small-scale farmer and community organizer: [51]. "In eastern Uganda, there are no seasons anymore. Agriculture is a gamble... This is outside our experience..." Climate change is already destroying the lives of those who have done nothing to cause it.

Assessment

1. There is nothing noble about poverty; as the song says: 'You ain't poor if you're poor by choice.' DFA understands the realities Okollet faces and helps ensure that her voice heard in the Irish policy process.
2. It is great that there is a very well led climate unit in place, and that in developing countries a key Irish focus is supporting adaption to the climate change that is already upon us.
3. The European External Action Service (EEAS) is the European Union's diplomatic service. Its embassies abroad will typically have in-house substantive expertise on climate policy and trade and be a fulcrum for up to date and detailed knowledge as to what is happening in both the EU and the country hosting its embassy.[52]. One example: In the Inflation Reduction Act (IRA) signed by President Biden, a small sliver (~\$19.5 billion) of the total IRA funding is to be devoted to 'climate smart farming practises', with the first toe in the water – just under \$1 billion – being spent in 2023. In parallel, the US is driving its Agriculture Innovation Mission for Climate (AIM for Climate) which since COP 26 invested more than \$8 billion.[53]

Where will this money go, on what basis will decisions be made, how will monitoring be undertaken, how, over time, might this influence policy from product labelling to trade, what new policies, monitoring systems, abatement and carbon storage technologies are emerging or in prospect? The American giant has awakened; I will be very surprised if over the next 5 years we do not see revolutionary changes emerging with huge potential for good or otherwise for Irish ruminant farming. In its key export markets (including other EU member states), the Irish climate policy process, Irish ruminant farmers and their food industries have a huge interest in knowing in granular detail and in real time what is underway at the interface between climate action and their competitors today and especially what is in prospect tomorrow. The Department of Foreign Affairs is the obvious place to orchestrate the knowing.

4. When Ireland finds ways that work to reduce greenhouse gas emissions from ruminant farming and store carbon at scale, DFA will have a key role in globalizing this knowledge.
5. **Department of Further and Higher Education Research and Innovation:** it has lead responsibility for implementation of Ireland's *Impact 2030: Ireland's Research and Innovation Strategy*, which has 5 pillars: research and innovation on our economy, society and the environment; research and innovation structures on excellence and outcomes; innovation on enterprise success; talent at the centre of the research and innovation ecosystem; research and innovation on Ireland's all-island, EU and global connectivity: "Through Impact 2030, research and innovation in Ireland will demonstrate and deliver impact to respond to the twin transition challenges of climate change and digitalisation and the many other national priorities such as competitiveness, health, food security, biodiversity, equality and inclusion." [54] Under its 'Innovate for Ireland' programme, it envisages funding 400 PhD students to address key challenges, including climate change and climate adaptation.

As a 'new' department, it has taken on responsibility for Science Foundation Ireland (SFI), which was previously hosted by the Department of Enterprise Trade and Employment. SFI co-funds 16 research centres. None of these has as its central focus finding new and better ways of reducing greenhouse

gas emissions from pasture-based farming. However, in June 2021, led by Professor Kevin O'Connor (UCD), one of its research centres (BiOrbic), whose initial mission was to find ways to convert waste residues from the bioeconomy into high value products, secured funding of €2 million to help deliver a climate-neutral dairy farm in Cork ('Farm Zero C'). There are plans to extend the strategy to a further 5,000 farms within five years. in partnership with dairy producer Carbery Group. The project is studying how: "planting different types of grasses and clovers on pastures and supporting hedgerows can boost biodiversity and soil health; using renewable energy that reduces greenhouse gas emissions; changing what we feed livestock affects how much methane gas they produce. It is using Shinagh Farm near Bandon, County Cork, owned by the farmers of four West Cork co-ops, as a demonstrator for this project. The goal is that Shinagh will achieve net-zero emissions by 2027." [55]

An important paper – Rubhara, Theresa, Luis Alejandro Vergara and James Gaffney, 2023. "A business case for climate neutrality in pasture-based dairy production systems in Ireland: evidence from the Farm Zero C Project" – was presented at the ENVIRON conference, April 4, 2023. It is a work in progress, but its provisional findings are that a mix of measures applied to reduce emissions from a dairy herd of 93 cows on a 66-hectare farm in Cork delivered a 31% reduction in the carbon footprint of milk (Kgs of CO₂e per Kg milk LCA FPCM). Over 60% of emissions were a result of use of a methane reducing additive.

Assessment

More detail on the pre-requisites for innovation at scale, and progress on same to address greenhouse gas emissions at scale from ruminant farming are available in [Blog 11 \(Innovation\)](#).

1. Critically assess three innovation baselines to reduce greenhouse gas emissions from enteric farming:

- Those innovations that are happening today world-wide, in real time to reduce greenhouse gas emissions in ruminant farming, with particular focus on those that could be transformative for reducing emissions at scale (a) from existing farming systems, e.g., enteric methane reducing food additives and (b) by changing farming systems, e.g., agro-forestry, organic farming.
- Those that could emerge in the future, a product of new investment streams by the private and public sectors.
- Current innovation developments in Ireland.

2. Given the findings from the three baselines, decide and implement an innovation strategy for ruminant farming in Ireland, targeting those farms with the largest emissions, many of which are likely to be derogation farms.

It is intriguing that Farm Zero C plans to extend the strategy to a further 5,000 farms within five years; there is likely to be a lot of overlap with the 6,900 farmers who applied for derogation in 2022.

3. **Department of Environment, Climate and Communications** (DECC): the first two of its five strategic goals are: be a recognised leader in climate action; transform our energy system for a net zero emissions future. It provides direct leadership and decision-making for energy and transport, and strategic leadership on target setting and policy across all sources. The (Irish) EPA operates under the aegis of DECC; it has key responsibilities for monitoring recording and assessing climate performance, preparing reports for UNFCCC, supporting applied R&D, and integrating performance of air quality and water quality (and also nature conservation) into the mix spatially. The *Climate Change Advisory Council* is an independent advisory body tasked with assessing and advising on how Ireland is making the transition to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Council provides contributions in critiquing, informing and shaping Ireland's response to climate change. (Declaration of Interest: I was a member of the Council 2016–2021)

I like the fact that Simon Upton, the Parliamentary Commissioner for the Environment in New Zealand, recently provided estimates of the impact on global warming by agriculture and the other sectors in NZ. [56]

Assessment

1. In terms of achieving its first strategic goal – leader in climate action – it has made impressive progress in: leading the setting of ambitious national emissions reduction targets, giving them legal status, and breaking them down to sectoral level. Becoming recognized as a leader internationally will depend on (a) if it delivers its second goal – decarbonizing the grid [without which climate policy for energy, industry, transport and (to a lesser degree) buildings will not succeed] and (b) success in reducing emissions from Ireland's ruminant farming at scale.
2. The policies, and most of the funding, for climate policy for ruminant farming comes via the Common Agricultural policy, accepting that the co-funding for Pillar 2 (Regional Development) comes from the Irish Exchequer (including revenue from the carbon tax) as does all of the funding (€1.3 billion) for new afforestation programme. DECC, via Eirgrid, is using reverse

auctions to deliver its offshore wind supply.[57] This is designed to discover who are best at doing so, and ensuring that the energy provided, and the associated reductions in carbon dioxide emissions deliver value for money for Irish energy consumers and taxpayers. The success of the first offshore wind auction in May 2023 is notable [ie – Minister Ryan welcomes hugely positive provisional results of first offshore wind auction \(www.gov.ie\)](#). It is important that this principle – using ‘discovery’ mechanisms to learn where the best opportunities are, and then fund them – begin to characterise climate policy for farming, and that DECC engage in the discussions thereon.

- Given that DECC has ensured that Ireland now has sectoral greenhouse gas emissions’ targets for Ireland, it would be a very useful antidote to the self-serving line that ‘sure little Ireland has no effect on climate change – let’s leave the action to the big boys’ – for us to follow the precedent of the Parliamentary Commissioner for the Environment in New Zealand and provide estimates of climate impacts resulting from emissions from each of the sectors in Ireland.

Evidence and Assessment Agriculture and Rural Ireland (2 Departments)

- Department of Agriculture Food and the Marine (DAFM):** Its core climate activity is funded via the Common Agricultural Policy. In Blog 10 (CAP 2023–2027) I make the case that the climate policy provisions therein are an improvement on those that applied in CAP (2014–2020) – the latter delivered very little at considerable expense. The new CAP increases the annual funding flow for climate and environment by > €400 million, provides for group engagement and associated economies of scale and scope, and argues that funds will be allocated on a ‘pay for performance’ basis. In 2022, new conditions – nutrient management plan, use low emissions slurry spreading equipment, lime, incorporate clover into grass sward etc. – for qualifying for derogation from the Nitrates Directive were imposed, which are much more binding than heretofore. Its two most relevant agencies are Teagasc (Agriculture and Food Development Authority) and Bord Bia (Irish Food Board). A decade ago, Teagasc started integrating climate and environmental performance into its national farm survey data; it has produced a MACC curve (2023 update recently released), developed an on-farm emissions measurement system (‘Carbon Navigator’) and fostered the actions of climate and environment active farmers (‘Signpost farmers’). Bord Bia has responsibility for fostering the ‘Origin Green’ initiative whose mission is “Providing Ireland’s food, drink and horticulture producers with leadership and knowledge to embed sustainability into their businesses, enabling their industry achieve to achieve competitive advantage to continue to thrive on a global scale.”[58]

Assessment

- By some distance, the most important driver for climate action acted on by DAFM has been the new conditions which apply to qualify for derogation from the Nitrates Directive, complemented by the sharp rise in fertilizer prices, which provided a strong commercial incentive to apply it more parsimoniously.
- CAP 2023–2027 will be an improvement, but it will not deliver anything close to what is needed to be a ‘world leader’ by 2030, because it does not focus forensically on where the biggest payoffs to effort are to be achieved.
- A key factor shaping current policy is the felt need to benefit as many farmers as possible with EU Pillar 2 funding, especially those whose farm-based income and productivity are low.

The challenge low farm incomes pose by farm system is clear from Table A.1.

Table A.1 Average Family Farm Income and Farm Size, Ireland 2016–2023, Ireland

Farm System	Average Family Farm Income (FFI)(000s €)								Average Farm Size (Ha)	
	2016	2017	2018	2019	2020	2021	2022	2023*	2021	2016
Dairy	54.0	90.2	63.3	69.2	79.0	98.7	148.0	105.0	64	56
Cattle Rearing	11.7	10.7	8.3	9.2	8.2	10.9	8.7	9.7	33	36
Cattle Other	15.0	16.3	15.1	14.1	15.5	17.2	16.9	17.3	36	37
Sheep	15.6	17.4	13.4	15.0	17.9	20.8	19.9	19.4	45	51

*Projected

Sources:

Income data for 2022 and 2023 (prospects): [Outlook 2021 \(teagasc.ie\)](#), pp. ii, iii

Income data 2016–2021 and Farm Size 2021: Dillon, Emma, Trevor Donnellan, Brian Moran and John Lennon, 2022. *National Farm Survey 2021*. [2022 – Teagasc National Farm Survey 2021 – Teagasc | Agriculture and Food Development Authority](#), p. xii

Farm Size 2016: [Microsoft Word – NFS 2016 cover pages_long \(teagasc.ie\)](#), p. 3

In 2016, average family farm income from dairying was 4.4 times that of cattle rearing; by 2021, the ratio had increased to 11.3. Over the same period, average farm size of dairying had increased by 14.3% while the average size of the other three categories declined.

A farm business is defined as being economically viable if FFI is sufficient to remunerate family labour at the minimum wage in 2021 (which is assumed here to be €20,129 per labour unit) and provide a 5 percent return on the capital invested in non-land assets, i.e., machinery and livestock. In 2021, on this basis, 85% of dairy farms were economically viable, but this percentage falls to 14% in the case of cattle rearing and 33% in the case of cattle other and sheep.^[59]

The consequence for climate policy of this huge income asymmetry is that, to help stabilize or improve on farm incomes of beef and sheep farmers, the Pillar 2 climate and environmental programmes are designed to strongly favour their engagement, but dairy farms in aggregate emit more greenhouse gases than beef farms, and the average dairy farm emits ~4 times that of an average beef farm. The point here is not to argue with helping stabilize farm incomes in the beef and sheep sectors, but to make the point that, as designed and delivered, the climate policies fail to deliver emission reduction or carbon storage at scale for the sector.

4. It is encouraging to observe that Teagasc's work on farm level measurement is resonating in Brussels: in the European Commission's methane strategy it uses the 'carbon navigator' words: "To encourage carbon-balance calculations at farm level, the Commission will by 2022 provide a digital carbon navigator template and guidelines on common pathways for the quantitative calculation of greenhouse gas emissions and removals with every land manager to have verified emission and removal data by 2028" European Commission, 2020. Communication – an EU strategy to reduce methane emissions, [pdf \(europa.eu\)](https://ec.europa.eu/eip/comm/2020/11/2020-11-20-communication-reduce-methane-emissions), pp 13, 14. It is important to continue working on farm level measurement, to ensure that it is fit for purpose as a basis for rewarding farm-level achievement. The members of Bord Bia's Quality Assurance Schemes have their emissions assessed every 6 months, and in the Beef Data Genomics Programme (BDGP), over 24,000 beef suckler units had their farms assessed by Navigator with consultants who were paid €160 per assessment.^[60] This learning by doing is important as is making improvements as appropriate.
5. It is important also that the integration by Teagasc of climate and environmental performance into its National Farm Survey be extended to include both carbon removal and biodiversity.
6. **Department of Rural and Community Development:** The Department's Mission is: "To promote rural and community development and to support vibrant, inclusive and sustainable communities throughout Ireland." Its current portfolio draws on the following: Rural Development Policy 2021-2025; Sustainable, Inclusive and Empowered Communities: A Five-Year Strategy to Support the Community and Voluntary Sector in Ireland 2019-2024; National Social Enterprise Policy for Ireland 2019-2022; National Volunteering Strategy. It sees playing a particular role as regards climate adaptation: Ensuring that the climate agenda features strongly in consideration of policy development and implementation, and building capacity in local development and community organisations in relation to climate change adaptation and mitigation.

Assessment

1. Communities in rural areas have a direct incentive to be enablers of finding ways that work to both adapt effectively to climate change, and to be supporters of actions by farmers and food processors who have the courage and ambition to address the climate challenge with ambition. For the latter, this can be a lonely place, and overt encouragement and support from local people and organizations can make all the difference.
2. A few examples: support for: a group of farmers who wish to lease land for wind farming, and thereby improve their own carbon footprint and that of their communities while also generating income from leasing their land; for farmers' markets and stall holders to provide space and profile for farmers who are producing low carbon food; entrepreneurs and innovators who are working to find new and better ways to live on the planet, including how they farm, process and present food; help baseline the community's endowment of nature, and then engage with all who have a role in fostering its conservation; integration of town, village and farm and forestry life in ways so that, over time, whole is more than the sum of the parts.
3. **Department of Housing Local Government and Heritage:** The Department's mission is to "support sustainable development, with a particular focus on strategic planning, the efficient delivery of well-planned homes in vibrant communities, the sustainable management of our water resources, the nurturing of Ireland's heritage and the promotion of effective local government." As regards climate specific responsibilities, it plays three important roles: it has strategic responsibility for Met Éireann as the authoritative voice on meteorology and climatology in Ireland; it is responsible for the: "conservation, protection and management of Ireland's built, natural, archaeological heritage and our biodiversity", with the responsibility of the National Parks and Wildlife Service to designate and protect key conservation areas, with 'Natura 2000' being of particular relevance to farming; it sets the national planning framework for local authorities, within which development plans are prepared, planning permissions are decided and building regulations are determined.

Assessment

1. It is essential that on-farm performance as regards biodiversity and carbon removal be integrated into the metrics that inform how ruminant farming is performing (See above).
2. How best to integrate reduction of greenhouse gas emissions and carbon removal with nature conservation? The Natura 2000 sites provide a statement as to what are regarded as the priority areas for intervention. Identifying those where farming practises are central to outcomes, what policies would maximize outcomes and provide value for money, the trade-offs between commercial, biodiversity and climate outcomes are all crucial to the design and delivery of policy, and finding ways that work to deliver outcomes at scale.
3. Zoning decisions and associated planning permissions have major implications for community and individual well-being. For farmers who are making substantive efforts to reduce their emissions and remove carbon at scale, find ways that work by which the planning system can be configured to support them.
4. **Enterprise, Trade and Employment (DETE):** This department and its agencies have lead responsibility for what is the most successful strand of Ireland's economic policy, namely its attractiveness for inward foreign investment at scale, notably so in the case of US multinationals across a range of sectors, but with IT and pharmacy being especially notable. It also has responsibility for helping indigenous Irish business prosper, with Enterprise Ireland as a key agency driving this agenda. It has a particular awareness of the importance of competitiveness, and the key role of successful innovation in delivering this. In its draft strategy for 2023-2025 it includes the following goals:[\[61\]](#)

"Advance the green and digital transitions to ensure the competitiveness and sustainability of Irish based enterprise."

"Embed decarbonisation measures into enterprise policy and introduce supports for industry to transition to more sustainable environmental practice, reduce carbon emissions, and exploit the opportunities of the low carbon economy, including renewable energy opportunities."

It led the public consultation on the Corporate Sustainability Reporting Directive (EU) 2022/2464, ahead of its transposition into Irish law. Companies in scope (>250 employees, >€40 million turnover) will be required to report annually in their management/directors' report on environmental, social and governance (ESG) and human rights matters according to the EU mandatory standards to be known as the European Sustainability Reporting Standards. It is likely to be given responsibility for the implementation of the 'Greenwashing' Directive.

Assessment

1. Making sure that Irish ruminant food competes successfully in terms of carbon footprint in key markets is important for the commercial future of farmers, food processors and the vitality of rural economies. But Irish food is also an ambassador for Ireland as a whole. Being able to promote Ireland as a climate responsible global leader across a range of activities will be helpful in advancing DETE's wider mission of making "Ireland the best place to succeed in business across all parts of our country, with vibrant enterprises, more high-quality employment, growing trade, fair workplaces and higher productivity."
2. Based on ruminant exports valued at ~€10 billion in 2022, every 1% increase/decrease in average price adds to/detracts from annual gross revenue flow by €100 Million, much of which accrues to rural Ireland. DETE needs to help exporters avoid losses accruing in key markets if some consumers switch to more carbon efficient choices, and capture gains if they do the converse. This requires action on two fronts: Irish farmers need to reduce their carbon footprint; and marketing efforts need to be orchestrated that ensures that consumers know that they have done so. As regards the latter, the quality, skill and persistence of the support provided by DETE and its agencies will be crucial.
3. It will have the key role in helping Irish food companies to: lead in the reporting of their carbon footprint as they meet their reporting obligations under the Corporate Sustainability Reporting Directive; ensure that they avoid charges of greenwashing under the provisions of the Greenwashing Directive which is likely to come into effect in 2026.
4. Helping exporting companies understand in real time what their competitors are doing today, and (more important) are likely to do tomorrow, to compete in this space is essential. Only the paranoid survive.
5. Although domestic consumers account for a very small share of ruminant farm output, it is not zero. There is a strong case for using Ireland as a pilot that pioneers the marketing of climate efficient produce in the Irish market, with a portfolio of supports to advance both its supply and consumption. DETE has a key role in advancing the vitality of small and medium enterprises (SMEs). There is a case for incubating activity, including fostering new entrants.
6. **Department of Tourism Culture Arts Gaeltacht Sports and Media**

Its missions are to support the tourism industry, the use of the Irish language and the development of the Gaeltacht, promote culture, arts, and sports, and shape media policy. Its most evident climate specific commitment is Fáilte Ireland's new 'Climate Action Roadmap', with a suite of Climate Action Guides; Paul Kelly (CEO) notes that: "In the second half of 2023, we will have a dedicated marketing budget of €500,000 to support and promote businesses that are on their climate action journey."[\[62\]](#)

This series of blogs typifies a huge weakness in how climate is discussed, namely that it leans heavily into targets, budgets, percentages ('-51% by 2030') numerical obligations or all sorts, e.g., the nitrates directive [sets a limit on organic (manure) deposits of N per hectare per year on grass land of 170 Kg per hectare]. This is necessary (he said defensively) because courts demand credible evidence (ask Ornu how essential quality data proved to be in its successful defence of its grass fed claims for its butter when these claims were challenged in court),^[63] and climate policy's success or failure will be judged by independently verified quantified achievement – to what extent did you reduce emissions and/or remove carbon? However, we also know that, for most of us the emotional impulse is often the key to what we do and how we do it. George Bernard Shaw observed that: "This creature man, who in his own selfish affairs is a coward to the backbone, will fight for an idea like a hero" ('Man and Superman'). The emotional trigger that is most used to drive climate action is fear; unless we act now, it will be too late. And it is not working. We need a richer and more authentic way of framing the issues and choices.

Assessment

Government departments have a few big advantages over individuals, communities, and companies; if they decide to take on a mission, they can have the resources and ambition to capture economies of scale and scope, and, once embarked, they tend to persist.

1. This department is our best hope of making action on climate an idea that, in Shaw's language, we will fight for as a hero; it is responsible for fostering the talents of our artists, writers, singers, musicians, dancers, film makers, actors, and sportspersons and theirs is the well from which we all drink. My late father grew up on a (very) small farm in South County Derry, about a mile from Bellaghy, before he made the giant leap (courtesy of a 'King's Scholarship') from national school in Lavey parish to teacher training in Dublin. His favourite poet was Thomas Ledwidge (1887–1917), sometimes known as 'the poet of the blackbirds'. Ledwidge's friend and mentor, Thomas MacDonagh (1878–1916) was a leader of the 1916 Rebellion who was executed by firing squad on May 3, 2016, in Kilmainham. After MacDonagh's death, Ledwidge composed an elegy for his friend ('Lament for Thomas Macdonagh'). I still recall as a teenager reading its first verse:

"He shall not hear the bittern cry,

In the wild sky where he is lain,

Nor voices of the sweeter birds,

Above the wailing of the rain"

At the time, I understood, probably for the first time, something of the finality of death and wondered (since I had never heard it) what was so special about a bittern's cry. I think that my father's empathy with Ledwidge was their shared start in life and their deep love of nature, and the tragedy and pathos of the poet's ending – as a profoundly disillusioned private in the British army he was blown to smithereens by a German bomb in Flanders just over a year after his friend's death. Decades later, I developed some knowledge and empathy for MacDonagh; he taught at St. Enda's under Patrick Pearse's guidance and absorbed his passion for Irish nationalism and love for nature and how important both were for a full life; as a lecturer in English at UCD, he was in Yeats' words 'Coming into his force' as a poet and scholar [his translation from Irish of 'The Yellow Bittern' written in the 18th century by Cathal Buí Mac Giolla Ghunna^[64] is a masterful and (very) darkly humorous exposition of an alcoholic failing to get to grips with his addiction] and his lectures were remembered as 'never relevant and invariably interesting' a backhanded accolade that most of us academics would cherish; he was prone to depression, struggled with religious belief (evolving from simple naive belief to heterodox catholic mysticism) and with the tension between the reflective life of scholarship and the life of action and deeds; and posthumously there was the tragedy of his wife's (Muriel Gifford) early death; prone to illness and nervous disorder, and emotionally devastated by her husband's death, she drowned while swimming in the sea off Skerries, Co. Dublin (9 July 1917).^[65]

Why this self-indulgent ramble, I hear you ask? My point is this: we need to start telling real stories of real people whose personal and professional lives intrigue, and for whom connection with nature was integral to their thinking and doing. And use this to open a discussion of the whys and wherefores of climate policy and nature conservation for the countryside. Discussions could include provocative questions such as: if Patrick Pearse [leader of the 1916 Rebellion, and executed on the same day as MacDonagh (May 3)] were alive today, would he be an enthusiastic supporter of Greta Thunberg? [My view is an unambiguous 'YES'.^[66] Would it make sense to let us all know what Ledwidge was on about by re-introducing the bittern to Ireland? matched perhaps by hearing the 'voices of the sweeter birds'? Arguably, the early monastic period (450 – 800 AD) was Ireland's most important time as a 'global influencer': In: *Preoccupations: Selected Prose 1968–1978*, Faber and Faber, London and Boston, Seamus Heaney dwells on the period's early Irish nature poetry: "The tang and clarity of a pristine world full of woods and water and birdsong seem to be present in the words. Little jabs of delight in the elemental are communicated by them in a note that is hard to describe".

I have no idea how to convert this intuition into narratives that would lift the discussion from 'the end is nigh unless' to 'let's tell stories from the best we have to offer in our history, art, writing, music, dance, film acting, and sport that would help lift our game from mundane to special'. I do know that

this department is uniquely placed to find and to mobilize the talents of those who do.

2. As part of the offer to tourists to rural Ireland, a small but growing number of visitors will be interested in, and attracted by knowing more about those farmers and their families who are leading the world in reducing greenhouse gas emissions and fostering nature's diversity, and by delicious food that is produced by such farmers. The following could be supported by the department to present their achievements and to market their offerings: A network of farms or clusters of farms and associated food providers along the Atlantic Way could become destinations where: farmers and their families who had achieved and maintained independently verified certification of excellence; cafés and accommodation providers that provide delicious food from such farms.

The same model could be applied to farmers in catchments that have together led the delivery of independently documented scale improvements in water and air quality and nature conservation. It is conceivable that their products could qualify as 'protected designation of origin' under EU law.

How to cite this blog (APA): Convery, F. (2023, October 17). Climate Performance by Irish Ruminant Farming: New policies to drive emissions reductions and carbon removal at scale. *UCD Earth Institute Climate Policy for Ruminant Agriculture in Ireland*. <https://www.ucd.ie/earth/blog/climate-policy-agriculture-ireland-blog/climatepolicyforruminantagricultureinirelandblog12/>.

See <https://libguides.ucd.ie/academicintegrity> on how to cite in other formats.



Register for a weekly email notification when a new blog is published:

Email Address



Sign Up

I give my consent to join this mailing list. [Privacy Policy](#)

Biography

Frank Convery has degrees [B. Ag and M.Ag (Forestry)] from UCD. Encouraged by the late Seamus Sheehy, he went to the US and took a PhD in Forestry Economics (State University of New York). After a distinguished academic career in the US (Duke University) he returned to Ireland as research professor at ESRI before being appointed as Heritage Trust Professor of Environmental Studies at UCD where he led the successful application for the funding of the UCD Earth Institute. He chaired the boards of the Sustainable Energy Authority of Ireland (SEAI) (2002–2007), Comhar Sustainable Development Council (2006–2010) and served on the Climate Change Committee (2016–2020) chaired by John FitzGerald, and the AgriFood 2030 Committee chaired by Tom Arnold. The latter produced *Food Vision 2030*. From 2014 to 2018, he was chief economist with the Environmental Defense Fund, New York. His passion is finding ways to bring the weight of learning down to where things are done; his ambition for the sector is the same as Food Vision 2030's: "Ireland will become a **world leader** in Sustainable Food Systems (SFS) over the next decade. This will deliver significant benefits...and will also provide the basis for the future competitive advantage of the sector".

Footnotes and references

[1] [gov.ie - Food Vision 2030 – A World Leader in Sustainable Food Systems \(www.gov.ie\)](#), p.9 .

[2] [Remarks by President Biden to the Houses of the Oireachtas | The White House](#), April 13, 2023

[3] Some policies which I have not had the time to address include: Pierce, M. Hanna, and Aaron L. Strong. 2023. 'An Evaluation of New York State Livestock Carbon Offset Projects under California's Cap and Trade Program'. *Carbon Management* 0 (0): 2211946. <https://doi.org/10.1080/17583004.2023.2211946>; US Regional Greenhouse Gas Initiative – offsets allowed

outside the capped electric power generation sector include avoid agricultural methane (<https://www.rggi.org/allowance-tracking/offsets/offset-categories/agricultural-methane>); Van Wyngaarden, Sarah. 2022. *Carbon Credit Systems in Alberta Agriculture*. SPP Technical Paper Volume 15:18. The Simpson Centre for Agricultural and Food Innovation and Public Education, University of Calgary; Verschuuren, Jonathan. 2017. 'Towards a Regulatory Design for Reducing Emissions from Agriculture: Lessons from Australia's Carbon Farming Initiative'. *Climate Law* 7 (1): 1–51. <https://doi.org/10.1163/18786561-00701001>

[4] The initial estimates for carbon emissions from afforested blanket peat were based on research published in 2005, which estimated that carbon losses were 0.59 tonnes of CO₂ per ha per year. However new research (Jovani-Sancho et al. 2021) has concluded that forested blanket peatlands is emitting 1.68 tonnes of CO₂ per ha per year, i.e., the estimated loss of soil carbon from forested peatland has tripled.

[5] Department of Agriculture Food and the Marine, 2021. *Forest Statistics Ireland 2021*, p. 21.

[6] Intellectual Property checklist (teagasc.ie).

[7] Haughey, Eamon, David Styles, Matthew Saunders, Ruth Bennett Coady and James Moran, 2023. *Evidence Synthesis Report: 3. Land Use Review: Fluxes, Scenarios and Capacity*. EPA Research p. 64. [Evidence-Synthesis-Report-3.pdf \(epa.ie\)](#).

[8] DAFM 2017. [Land Types for Afforestation – DocsLib](#), Section 4 p. 10

[9] Citizens' Assembly, 2023. *Report of the Citizens' Assembly on Biodiversity Loss*, March [Report-on-Biodiversity-Loss_mid-res.pdf \(citizensassembly.ie\)](#) Recommendation 8.

[10] O'Donoghue, Cathal, 2022. *The Economics of Afforestation and Management in Ireland: future prospects and plans*. Auxilia Group. [The Economics of Afforestation – Auxilia Group](#)

[11] Black, Kevin, Kenneth Byrne, Daniel McInerney, John Landy, 2022. *Forests for Climate Report on Carbon Modelling of the Coillte Estate*, Coillte

[12] Map: DAFM reveals locations of farms eligible for €10,000 in new AECM - [Agriland.ie](#)

[13] DAFM to give 'higher priority' to afforestation in 2022 - [Agriland.ie](#); DIRECTORY OF Forest Ecologists (47) Dec 2022 - 109243_908f8782-a0e4-4032-a4d0-8daa66368eb8.pdf

[14] [Why the ash tree could disappear from the Irish landscape \(rte.ie\)](#)

[15] [gov.ie - Nitrates Directive \(www.gov.ie\)](#)

[16] [Derogation from the Nitrates Directive – Process Explained | News | Irish Co-Operative Organisation Society \(icos.ie\)](#)

[17] [DAFM-Derogation-Terms-and-Conditions-2022.pdf \(teagasc.ie\)](#)

[18] [The Industrial Emissions Directive – Environment – European Commission \(europa.eu\)](#)

[19] More detail at: Presentation to the Council Working Party on the Environment on IED scope widening_Livestock.pdf

[20] See: Buckley, Cathal, Trevor Donnellan, Brian Moran and Emma Dillon, 2022. *Developing Sustainability Indicators using the Irish FADN – a focus on environmental metrics*, Teagasc, Agricultural Economics & Farm Surveys Department Rural Economy and Development Programme, for a useful summary of the evolution of this important initiative.

[21] Hennessy, T., Buckley, C., Dillon, E., Donnellan, T., Hanrahan, K., Moran, B., Ryan, M., 2013. *Assessing the Sustainability of Irish Farms – Teagasc National Farm Survey*. Agricultural Economics & Farm Surveys Department, REDP, Teagasc, Athenry, Co. Galway. The first integration per se seems to have been for year 2015: [2015-sustainability-report.pdf \(teagasc.ie\)](#)

[22] See: [2022 - Outlook 2023 – Economic Prospects for Agriculture – Teagasc | Agriculture and Food Development Authority](#), pp. 95-100.

[23] Annual Review and Outlook for Agriculture, Food and the Marine 2022 available at: 238928_75008324-6f05-4f30-a9d3-6a9259371771.pdf; Department of Agriculture Food and the Marine, 2021. *Forest Statistics Ireland 2021*. 138951_ff44164f-1137-4482-90ae-371994a8dd97.pdf

[24] The Status of EU Protected Habitats and Species in Ireland, 2019 [Microsoft Word – 01_AR1719_hab_1110_Sandbanks.docx \(npws.ie\)](#); [EPA_WaterQualityReport2016_2021.pdf](#)

[25] [Sustainable Beef and Lamb Assurance Scheme \(SBLAS\) – Bord Bia](#)

[26] I note that, in the European Commission's methane strategy it uses the 'navigator' word...“To encourage carbon-balance calculations at farm level, the Commission will by 2022 provide a digital carbon navigator template and guidelines on common pathways for the quantitative calculation of

greenhouse gas emissions and removals with every land manager to have verified emission and removal data by 2028" European Commission, 2020. Communication – an EU strategy to reduce methane emissions, [eu_methane_strategy.pdf \(europa.eu\)](#) pp 13, 14.

[27] Cathal McDermott, 2019: [The-Green-Low-carbon-Agri-environment-Scheme.pdf \(igees.gov.ie\)](#), p. 2

[28] [CDFA – Office of Environmental Farming & Innovation \(OEFI\) \(ca.gov\)](#)

[29] [Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target \(March 2022\) \(ca.gov\)](#). Note: estimates of emissions reductions achieved and projected are interpolated from Figure ES-1, p. ES2

[30] [2022 AMMP Awarded Projects Updated March 2023 \(ca.gov\)](#)

[31] <https://www.gov.ie/en/publication/public-consultation-on-forestry/>

[32] [2022 – DAFM announces €1.3 billion for new Forestry Supports – Teagasc | Agriculture and Food Development Authority](#)

[33] Philip Lee, 2022: *Project Woodland Regulatory Review Report*, September. gov.ie – Regulatory Review of Forestry (www.gov.ie)

[34] Work that is informing this process includes: Renou-Wilson, et al, 2022. *Peatland Properties Influencing Greenhouse Gas Removal*, EPA, Report 401; Jovani-Sancho, Antonio Jonay, Thomas Cummins, and Kenneth A. Byrne, 2021: Soil carbon balance of afforested peatlands in the maritime temperate climate zone, *Global Change Biology*.

[35] Frances McDonnell Agriland, January 20, 2023: [Dairygold launches €10m sustainability bonus – Agriland.ie](#)

[36] Alcohol Products tax (APT); Capital Acquisition Tax (CAT); Capital Gains Tax (CGT); Corporation Tax (CT); Income Tax (IT); Local Property Tax (LPT); Minerals Oil Tax (MOT); Stamp Duty; VAT

[37] [FERTILISER \(Fertilisers, feeding stuffs, certain seeds, etc. \) \(revenue.ie\)](#)

[38] Citizens' Assembly, 2023. *Report of the Citizens' Assembly on Biodiversity Loss*, March [Report-on-Biodiversity-Loss_mid-res.pdf \(citizensassembly.ie\)](#)

[39] [How 300 farmers are saving New York City billions | Environmental Defense Fund \(edf.org\)](#)

[40] [Transfer of Development Rights : ConservationTools](#)

[41] Cabinet Committee on the Environment and Climate Change

[42] [gov.ie - Climate Action Delivery Board \(www.gov.ie\)](#)

[43] [207876_ab5e4b34-e381-4ee7-acf3-1e59e1a1b57d.pdf](#)

[44] See for example the Departments of Enterprise Trade and Employment draft strategy for 2023-2025 – Goal 2 Advancing the green and digital transitions to ensure the competitiveness and sustainability of Irish based enterprises. [dete-draft-statement-of-strategy-2023-2025.pdf \(enterprise.gov.ie\)](#)

[45] [gov.ie – Statement by Minister McGrath on Budget 2023 \(www.gov.ie\)](#) September 27, 2022

[46] Alcohol Products tax (APT); Capital Acquisition Tax (CAT); Capital Gains Tax (CGT); Corporation Tax (CT); Income Tax (IT); Local Property Tax (LPT); Minerals Oil Tax (MOT); Stamp Duty; VAT

[47] [FERTILISER \(Fertilisers, feeding stuffs, certain seeds, etc. \) \(revenue.ie\)](#)

[48] [Costs of Tax Expenditures \(Credits, Allowances and Reliefs\) \(revenue.ie\)](#), p. 2; [Forestry and taxation – Teagasc | Agriculture and Food Development Authority](#). See also: Tax Expenditures: Department of Finance, 2021. *Climate Action and Tax Paper Tax Strategy Group – 21/09*, September 198270_61142180-955c-458e-a7fb-695768ddd8e4 (7).pdf p. 4

[49] Cathal McDermott, 2019: [The-Green-Low-carbon-Agri-environment-Scheme.pdf \(igees.gov.ie\)](#), p. 2

[50] One thinks of Edmund Burke's observation: "To tax and to be please, no more than to love and be wise, is not given to men."

[51] Robinson, Mary, 2018: *Climate Justice – hope, resilience and the fight for a sustainable future*, Bloomsbury.

[52] In NZ, in terms of understanding the nuances of developments there and the interfaces with the EU, I benefitted hugely from insights from Caroline Lambert, Head of Trade for the Delegation of the European Union to Aotearoa/New Zealand who also leads climate, energy and other "Green Deal"

aspects of diplomacy and from Philip Ryan, Ireland's inaugural ambassador to NZ.

[53] [USDA Highlights AIM for Climate Accomplishments, Announces 2023 Plans | USDA](#)

[54] [224616_5f34f71e-e13e-404b-8685-4113428b3390.pdf](#), p. 2

[55] [gov.ie – Project to make 5,000 dairy farms climate neutral awarded €2 million by Minister Harris \(www.gov.ie\)](#)

[56] Upton, Simon Parliamentary Commissioner for the Environment (PCE) NZ, 2023. Some Observations from the PCE, New Zealand Agricultural Climate Change Conference, March 1, slide 3

[57] [gov.ie – Government approves Terms and Conditions for first offshore wind auction under the Renewable Electricity Support Scheme \(www.gov.ie\)](#)

[58] [Origin Green](#)

[59] [Microsoft Word – Final_2021_for_pub.docx \(teagasc.ie\)](#), p. 31

[60] Cawley, A., and A. Cronin. 2019. *Spending Review 2019: Beef Data Genomics Programme* [4092b0fc806495485644360f489c63c.pdf \(assets.gov.ie\)](#)

[61] [Public consultation on the development of the DETE Statement of Strategy 2023-2025 – DETE \(enterprise.gov.ie\)](#)

[62] More detail at: [Failte Ireland – Fáilte Ireland Driving Action on Climate Change in Tourism Businesses – Paul Kelly, Opening Address | Irish Tourism News | Tourism Features](#)

[63] The decision in favour of Ornu was delivered by Justice Marilyn Huff on Feb 3, 2019; [Grass Fed Dairy \(bordbia.ie\)](#) in Bord Bia's Sustainable Dairy Assurance Scheme (SDAS) has more details on the requirements that generated the necessary data.

[64] [The Yellow Bittern by Thomas MacDonagh – Famous poems, famous poets. – All Poetry – Search \(bing.com\)](#)

[65] [MacDonagh, Thomas | Dictionary of Irish Biography \(dib.ie\)](#)

[66] Patrick Pearse: "Far more effective than the mere didactic preaching of patriotism would be well directed efforts to bring the children into some direct relation with the country they inhabit – its natural beauty, its wild living things, its rocks, its rivers its ruins." (*An Claidheamh Soluis*, 1904).

"If our boys observe their fellow citizens of the grass and woods and water as wisely and as lovingly as they should, I think they will learn much". (*An Macaomh*, Christmas 1910).