An Taisce
The National Trust for Ireland

Submission to the Joint Oireachtas Committee Agriculture and Marine Meeting 4th May 2021

Implications of the Climate Action Plan for the Agriculture Sector, Impacts of Farming Practices, and Discussion of Carbon Sequestration in Farmland

OVERVIEW

We face a global and national Climate and Biodiversity Loss Emergency.

The current direction of Irish agriculture is multiply unsustainable. In 2020 the Director of the Environmental Protection Agency highlighted issues facing Irish agriculture in the EPA submission to the AgriFood 2030 Strategy Committee: *"Taking the sector as a whole, the economic growth in recent years is happening at the expense of the environment as witnessed by the trends in water quality, emissions and biodiversity all going in the wrong direction… Business as usual will not reverse these trends."*

The EPA Director added: *"In our view, this is a serious reputational risk for the agri-food sector in Ireland. Pending evidence and implementation of effective solutions to ongoing unsustainable air and water emissions, any plans for further intensification/expansion of the dairy herd would be difficult to sustain."*

For this reason the 30-strong members of the Irish Environmental Pillar exited from representation on the AgriFood 2030 Committee.

Investment and Legal Action Risk

Current Irish dairy production and processing intensification is exposing the Irish family farms and the food processing sector to serious financial risk of investment assets becoming redundant. The two now rusting 15 year-old ESB owned and Bord na Mona supplied peat power plants in Counties Offaly and Longford present a warning to the Irish agriculture sector on the consequence of misdirected investment and ill-advised subsidy use.

At EU, transboundary and national level legal infringement actions are mounting on failure of governments to take climate action, reduce health-damaging air pollution including agricultural ammonia, nitrates and water quality impacts, reverse peatlands damage, loss of nature and the diversity of species upon which all life depends.

Ireland's agricultural strategies, the existing FoodWise 2025 and the current advancing of a new AgriFood 2030 strategy, are exposed to multiple legal infringement actions on failure to comply with Article 10 of the Strategic Environmental Assessment (SEA) Directive obligations on monitoring and mitigation of significant adverse effects. The implications of the Netherlands' curtailment of bovine agriculture needs to be addressed in consideration further Irish agricultural investment.

In May 2020, the EU Court of Auditors published a report on the EU wide failure of successive agri environmental schemes, including in Ireland, under CAP to reverse biodiversity loss. The report was effectively summarised in Agriland[1]: "*The Common Agricultural Policy (CAP) was not effective in reversing the decades-long decline in biodiversity – and intensive farming remains a main cause of biodiversity loss, according to a new report by the European Court of Auditors (ECA).*"

The current Irish CAP subsidy regime needs to be urgently reviewed to ensure it is protecting biodiversity and soil carbon and not incentivising and driving uncontrolled fires. The cause of the April 2021 devastation of half the land area of the Killarney National Park needs to be investigated and addressed.

Carbon Sequestration in Farmland

This submission gives particular consideration to the potential level of and limits of carbon sequestration in agricultural land management. There are current unrealistic assumptions that a significant level of Irish agricultural greenhouse gases can be "offset" by carbon soil management, additional forestry or hedgerow planting and bioenergy.

The Irish industrial bovine agricultural sector is advancing "*carbon sequestration*" in grasslands as a means of offsetting methane and nitrous oxide emissions. It is surprising that at the same time the carbon leakage from peat soils and bogs is not addressed by the sector, particularly (1) land drainage and soil fill impair to accommodate shallow rooted nitrate fertilised perennial rye grass monoculture, (2) hill burning and (3) peat extraction for horticulture and animal bedding.

The priority for Irish land management is to protect and enhance organic soil carbon in peatland and the peat soils which comprise 20% of the national land area, but 75% of total organic soil carbon. This means addressing land drainage and reclamation; peat extraction for domestic burning, horticulture or animal bedding; and land burning which may create exposed soil and cause erosion.

Food processing brands may be exposed to legal actions on "greenwashing" if marketing claims of carbon neutrality or offsetting are not validly based. Teagasc as well as An Taisce has critiqued the current Bord Bia "Origin Green" marketing and branding label, which is not based on any internationally recognised certification (SEE APPENDIX 1).

European Green Deal and Common Agricultural Policy

The European Green Deal and the review of the CAP subsidy regime in advance of the next CAP National Plan provides Ireland an opportunity to take leadership on climate action and sustainable food production. This will require measurable action to advance the 14-point "*Nature Restoration Plan*" under the *EU Biodiversity Strategy 2030 Bringing Nature Back into Our Lives*, which requires reversing decline in pollinators, reduce the risk of and use of chemical pesticides by 50%, at least 25% of agricultural land under organic farming

[1] https://www.agriland.ie/farming-news/cap-not-effective-in-reversing-biodiversity-decline-court-of-auditors/

management, restoration of pollution damages rivers, reversal of endangered species loss, reduction of the use of and impact of chemical fertilisers.

"Towards a New Agricultural and Food Policy for Ireland"

On 27 April 2021, three civil society coalitions, the Environmental Pillar, Stop Climate Chaos and the Sustainable Water Action Network, released a joint report "*Towards a New Agricultural and Food Policy for Ireland*" setting out policy recommendations for changes in the agriculture sector. The joint coalition represents 72 different groups, including environmental NGOs, development NGOs such as Trócaire, faith-based groups, community groups, etc. The report's high-level recommendations are presented as the conclusion of this submission, and the report in its entirety is attached as APPENDIX 3.

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1. Ireland's Agri-Food Strategies and the Strategic Environmental Assessment Directive

Irish food, agricultural and marine policy has been driven by a succession of ten-year industry growth led strategies, which are replaced after five years with new superseded ten-year strategies

In 2015, a Ministerial appointed industry-led AgriFood Committee developed the ten-year FoodWise 2025 strategy, which was adopted by the Department of Agriculture. This promoted growth in the agricultural sector, particularly in dairy production, with significant climate and other sustainability impacts resulting.

As demonstrated in Figure 1 below, the growth in Ireland's dairy herd is exceptional when compared to the other EU nations. Total dairy cow numbers have reached approximately 1.57 million as of June 2020[2], an approximately 3.7% increase on the 2019 figures. This growth was driven in large part by FoodWise 2025 after the lifting of milk quotas.

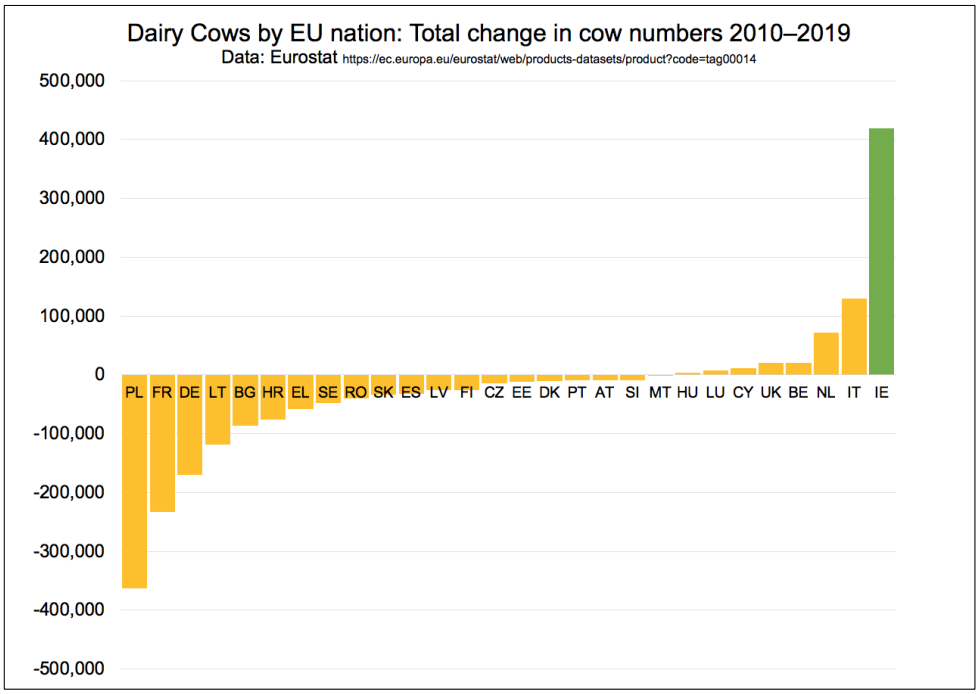


***Figure 1**. Total change in dairy cow numbers 2010–2019 by EU Member State, with Ireland shown in green. Chart by An Taisce, data from Eurostat[3].*

[2] Total dairy cow numbers in Ireland: https://www.icbf.com/?p=17201#:~:text=Total%20dairy%20cow%20numbers%20for,3.7%25%20from%201%2C514%2C617%20in%202019; There are some differences in dairy cow numbers from different data sources but all seem to hover around 1.5 million in 2020 (see additional data in note 2 below)

[3] Eurostat data on changes in European dairy cow numbers: https://ec.europa.eu/eurostat/web/products-datasets/product?code=tag00014

FoodWise 2025 was subject to Strategic Environmental Assessment (SEA) in 2015. The monitoring of FoodWise, which has been carried out by a committee within the Department of Agriculture, Food and the Marine, shows a range of unforeseen adverse effects which were not projected in the 2015 SEA process:

- Greenhouse gas emissions projected by FoodWise for 2020 to be 18.9 tonnes CO_2e reached 20.633 tonnes CO_2e in 2019;
- Total cattle numbers as having increased on 2020 projections with dairy cows projected in 2015 to reach 1.395 million by 2020, and actually reaching 1.465 million in 2019;
- Nitrate fertiliser use was also shown to be 367.364 tonnes by 2019, having exceeded the figure projected in FoodWise 2025 for 2020, which was 345,558 tonnes.

In addition to this, Ireland breached the ammonia air pollution emission ceiling limit in 2016 with 99% of the cause being agricultural sources, EPA data show continuing decline of high status water bodies, and NPWS and National Biodiversity Data Centre data show continuing loss of nature including pollinators and birds common in farmland areas.

However, the required actions action on remediating those impacts, as required by Article 10 of the SEA Directive, was not taken. Article 10 sets out the provisions for the monitoring of a programme subject to SEA and the obligation for remedial action where unforeseen adverse effects arise:

1. *Member States shall monitor the significant environmental effects of the implementation of plans and programmes in order, inter alia, to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action.*
2. *In order to comply with paragraph 1, existing monitoring arrangements may be used if appropriate, with a view to avoiding duplication of monitoring.*

Furthermore, Annex 1(f) of the SEA Directive requires the provision of baseline data in the SEA Environmental Report.

The provisions of Article 10 are not just for monitoring but, notably, for the remediation of unforeseen adverse effects. Section 8.12 of the 2001 European Commission guidance states that "*Unforeseen adverse effects is better interpreted as referring to shortcomings of the prognostic statements in the environmental report (e.g. regarding the predicted intensity of the environmental effect) or unforeseen effects resulting from change of circumstances."*

This breach of the SEA Directive is currently being investigated by the Legal Affairs Unit of the European Commission creating exposure for Ireland to infringement proceedings.

Ireland continues to act pre-emptively by progressing a new ten-year national agriculture strategy, AgriFood 2030, without addressing the unforeseen adverse impacts of FoodWise 2025 or integration with the new CAP Strategic Plan.

The Department of Agriculture Food and Marine has published the strategy drawn up by the Ministerial appointed AgriFood 2030 Committee setting out the content of a new ten-year AgriFood 2030 Strategy for consultation in April 2021. This is proposed to take over from FoodWise 2025, which still has four years left to run and which will be adopted as Government policy through DAFM endorsement.

This process is being advanced without regard to or integration with the ongoing the CAP National Plan process, which will need to be subject to EU regulation and where major consideration of integration with *"A Farm to Fork"*, the European Biodiversity Strategy to 2030, and climate action remain unresolved.

In December 2020, prior to the development of AgriFood 2030 and again not integrated with the CAP national plan processes, DAFM adopted Ag-Climatise, a strategy produced by Teagasc[4] as *"a roadmap designed to help all stakeholders to work together to tackle climate change and air pollution, by clearly explaining what we need to do and when we need to do it by."* Ag-Climatise proposed only to "stabilise" methane emissions, and provided for continuing cattle herd increases to 1.65 million by 2027. The focus of climate action was on gaining efficiency through breeding, fertiliser changes, grassland carbon sequestration, and other land use offsetting**.** It should be noted that Ag-Climatise is already being used to justify ongoing dairy expansion in production and processing.

Relying heavily on Ag-Climatise, the draft of the AgriFood 2030 Strategy sets out an agenda for developing '*A Climate Smart, Environmentally Sustainable Agri-Food Sector*', a key goal of which is to: *"Develop a climate neutral agri-food system so that by 2050, the climate impact of methane is reduced to zero and remaining agricultural emissions are balanced by removals; and improve air quality."*

This goal is fundamentally flawed and likely to undermine climate action more broadly in Ireland. The strategy proposes net zero carbon neutrality by 2050 but only a 10% reduction in emissions on an as yet unstated baseline by 2030. It does not show how continued levels of and ongoing dairy expansion can be compatible with claims that reductions in methane and nitrogen inputs will be achieved.

1.1 Greenhouse Gas Emissions Since 2015: Continued Increases

Despite national EU Effort Sharing Regulation (ESR) emissions reduction requirements the annual limit values have been exceeded since 2016. Provisional figures for 2020 indicate that agricultural emissions will exceed 37% of total national greenhouse gas emissions and are now approaching half of the ESR emissions. Agricultural emissions increased by 8.7% over the five-year period 2014-19; the sector's methane emissions have increased by 10% and nitrous oxide (N_2O) emissions have increased over 7.7%. Cattle emit over 90% of agricultural methane.

[4] https://www.gov.ie/en/publication/07fbe-ag-climatise-a-roadmap-towards-climate-neutrality/

As shown in Figure 2 below, Ireland's agriculture sector greenhouse gas emissions (GHG) emissions had decreased steadily from 2005 until 2011 under the EU milk quota constraining milk production and EU policies in support of beef cattle extensification. However, from 2010 Irish Government policy continued with the ten-year FoodHarvest 2020 plan, had endorsed an industry-developed agri-strategy targeting increasing agricultural growth, particularly dairy expansion and continued levels of beef production.

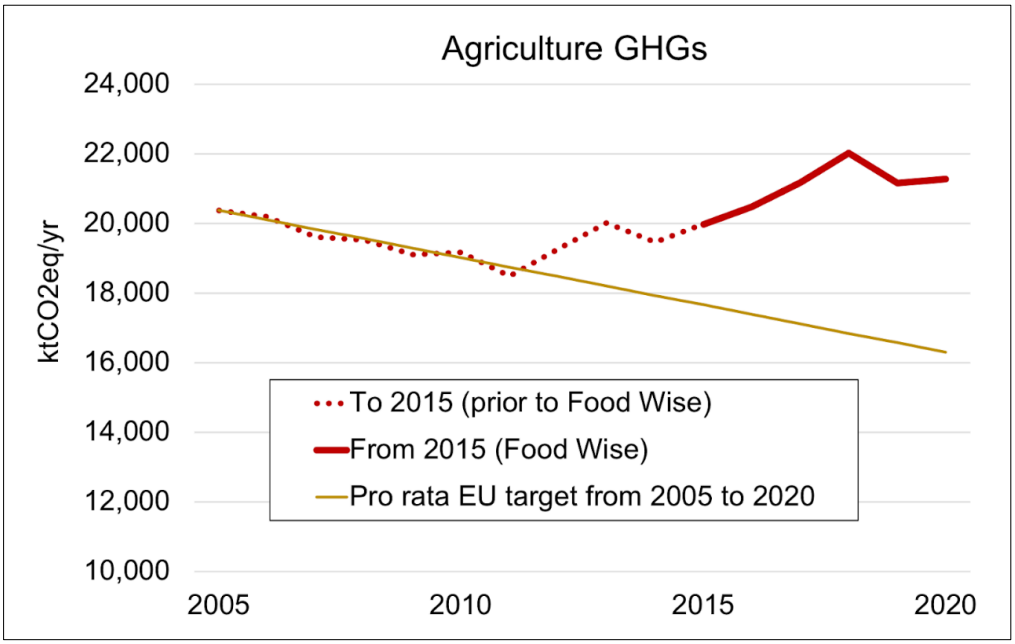


***Figure 2**. Ireland agricultural GHGs in ktCO2eq/year from 2005–2020.*
Chart by An Taisce from EPA 2020 data[5]. 2020 value is only approximate and is likely an under-estimate as it fails to account for the rise in dairy numbers.[6]

Despite the clear commitment to dairy expansion, the FoodWise strategy document placed a repeated emphasis on lowering emissions and the FoodWise Strategic Environmental Assessment[7] stated:

> *"Actions within Food Wise 2025 in connection with policy development and recognition of agriculture's role in formulating energy policy have the potential to be significantly positive in relation to GHG emissions and moderately positive in relation to climate change. All other actions are deemed to moderately positive or imperceptible in relation to GHGs. As a result of uncertainty undefined growth opportunities are deemed to represent a slight moderate threat."*

[5] EPA, 2020. Ireland's Provisional Greenhouse Gas emissions 1990-2019 [WWW Document]. Environmental Protection Agency (EPA). URL https://www.epa.ie/pubs/reports/air/airemissions/ghgprovemissions2019/
[6] Environmental Protection Agency and Sustainable Energy Authority of Ireland (2021) The impact on 2020 greenhouse gas emisions of COVID-19 restrictions: https://www.epa.ie/pubs/reports/air/airemissions/ghgcv-19/SEAI-EPA%20Bulletin%20v1.7.pdf
[7] Philip Farrelly & Co Limited, 2015. FOOD WISE 2025 Strategic Environmental Assessment Environmental Report.

Responding to this SEA, minutes[8] of a Department of Agriculture's FoodWise High Level Implementation Committee attended by the Minister of Agriculture state:

> *"The analysis provides a high level of protection to the environment and ensures the integration of environmental considerations into the preparation and adoption of specific policy actions. They emphasised that the work of the Environmental Analysis fed into and influenced the text of the Food Wise report published in July."*

However, to the contrary, the SEA assertion of "*moderately positive [lower impact] or imperceptible*" effect on GHGs was inexplicable, it made no scientific sense. Given the plan's commitment to substantial dairy herd expansion, maintaining beef numbers, and that dairy cattle had 2.4 times higher per head methane emissions and nearly double the nitrogen excretion as other cattle, it was inevitable that agricultural emissions and nutrient pollution would rise significantly with increasing dairy cow numbers. In feedback to the draft SEA, An Taisce pointed out that in the SEA, "*reasonable alternatives not involving growth in ruminant herds are ignored*" and "*no estimates of GHG emissions from the scenarios considered are provided*", and stated:

> *"A reasonable environmental baseline for GHG emissions should have been a continuation of the long-term decreasing pathway of emissions from 1999 to 2009. Instead a baseline of increasing production since 2010 has been used. This baseline selection can all too easily be interpreted as one that has been deliberately selected to bias the outcome of the assessment in favour of preferred forms of agri-business, and aiming to downplay the environmental impacts of FW2025."*

The EPA[9] likewise commented in their submission on FoodWise and toward the SEA, warning that damage to Ireland's environment would seriously damage the credibility of FoodWise, particularly given the EPA's judgment that:

> *"There are very significant risks to the environment associated with increasing animal numbers, the associated intensification and associated increases in food processing. These risks are to water quality, air quality, soil quality, biodiversity and climate. They are driven by:*
> - *Increases in the quantities of slurry (from cattle, pigs and poultry),*
> - *Increased greenhouse gas emissions,*
> - *Increased air pollution including particulate matter,*
> - *Increased nutrient inputs,*
> - *Increased effluent volume from increased food processing."*

[8] DAFM, 2015. Food Wise 2025 High Level Implementation Committee (HLIC) Meeting 25th November 2015.
[9] EPA, 2015. Submission to Food Wise 2025 and associated Draft Environmental Analysis.
European Commission, 2020a. REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the progress made on the implementation of Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants.

From 2014, dairy cow numbers increased, as a result of FoodWise's "Vision for Growth", by 24% (288,000 cows) to 1,465,000 in 2019, while beef cattle numbers had only decreased by 0.4%. As predicted by the EPA and An Taisce in 2015, and then clearly documented in a 2016 NGO coalition report – *Not So Green*[10], all of the EPA's documented threats have indeed occurred as a result of FoodWise.

Irish agricultural growth policy has depended on efficiency measures proposed by the state agency Teagasc[11,12,13] to cut emissions. These "*marginal abatement cost curve*" (MACC) reports mention but do not make clear that the measures will *only* result in sectoral absolute emissions if dairy cow numbers *decrease*, contrary to policy and the MACC reports do not set out any regulatory options to ensure that this would occur.

As a result – in the absence of a milk quota, carbon taxes or nitrogen caps – the cost-savings and production increases from GHG intensity improvement measures such as the Carbon Navigator[14] and dairy and beef breeding indexing[15] have been reinvested in more fertiliser inputs and more cattle, resulting in rapidly rising GHG and ammonia emissions under FoodWise.

1.2 EPA 2019 Recalculation: Upward Revision of Agricultural Emissions

While the EPA Greenhouse gas figures for 2019 published in 2020 showed a decline in agricultural emissions relative to previous year, mainly as result of fertiliser management, the EPA accompanying statement was clear that Irish Agriculture was not on a sustainable trajectory for GHGs.

It is important to note that in November 2020, based on research findings the Environmental Protection Agency announced a significant update to the agricultural emissions timeseries showing that agricultural methane and nitrous oxide emissions since 2000 are substantially greater than had been thought. Figure 3 shows the previous and updated time series for 2000–2019. The sector's 2018 emissions were previously reported to be 20.6 $MtCO_2eq$, but the updated time series revises this to 22.0 $MtCO_2eq$, a substantial increase of 1.4 $MtCO_2eq$. This means that the climate impact at the beginning of FoodWise 2015 was underestimated and this should have been clear to government and industry experts as the basis for EPA reporting was from the early 2000s.

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[10] https://environmentalpillar.ie/not-so-green-debunking-the-myths-around-irish-agriculture/
[11] Teagasc is the state funded Agriculture and Food Development Authority – is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities.
[12] Teagasc, 2012. A Marginal Abatement Cost Curve for Irish Agriculture.
[13] Lanigan, G.J., Donnellan, T., 2018. An Analysis of Abatement Potential of Greenhouse Gas Emissions in Irish Agriculture 2021-2030. Teagasc.
[14] Murphy, P., Crosson, P., O'Brien, D., Schulte, R.P.O., 2013. The Carbon Navigator: a decision support tool to reduce greenhouse gas emissions from livestock production systems. Animal 7, 427–436. https://doi.org/10.1017/S1751731113000906
[15] Teagasc, 2020. 2020 - ICBF: Breeding for more Sustainable Beef Production - Teagasc | Agriculture and Food Development Authority [WWW Document]. URL https://www.teagasc.ie/publications/2020/icbf-breeding-for-more-sustainable-beef-production.php

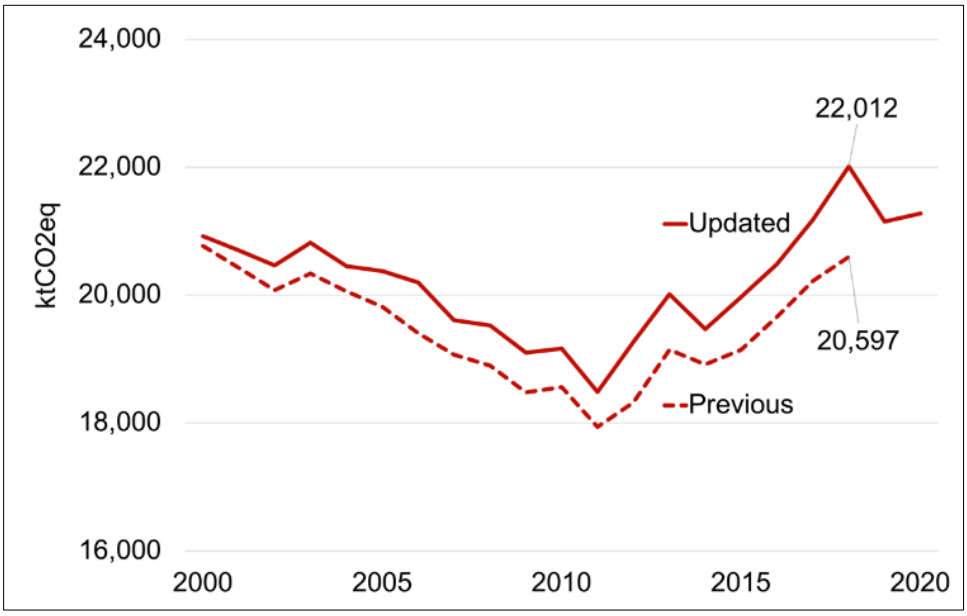


Figure 3. *Comparing previous and revised timeseries for agricultural GHG emissions in ktCO2eq Chart by An Taisce from EPA data[16]. Since 2000 previously reported agricultural emissions have been underestimated due to outdated low per cow dairy input feed data. The 2020 value is only approximate and is an under-estimate as it fails to account for the rise in dairy numbers[17]*

The agricultural emissions time series required the EPA Recalculation and upward revision because the rising per head annual methane emission and nitrogen losses from dairy cows were being significantly underestimated by the use of outdated methane and nitrogen values, as shown in the EPA presentation charts in Figure 4.

Figure 4 from the EPA's provisional emissions shows that dairy methane emissions are directly and linearly related to milk yield. Increased milk production results in increased methane emissions. The EPA 2019 Recalculation excreted also shows that nitrogen excretion per dairy cow has steadily increased with increasing milk yield. Excreted nitrogen results in nitrous oxide, ammonia air pollution and nitrate water pollution.

Notably the EPA data for 2018 and 2019 in Figure 4 and Figure 5 below show a substantial rise in methane emissions and nitrogen excretion rates relative to the per cow and milk yield trendlines. This indicates that, contrary to the environmental claims of FoodWise, milk production is being prioritised despite increased GHG emissions and nitrogen pollution per litre of milk.

[16] EPA, 2020. Ireland's Provisional Greenhouse Gas emissions 1990-2019 [WWW Document]. Environmental Protection Agency (EPA). URL https://www.epa.ie/pubs/reports/air/airemissions/ghgprovemissions2019/
[17] Environmental Protection Agency and Sustainable Energy Authority of Ireland (2021) The impact on 2020 greenhouse gas emisions of COVID-19 restrictions: https://www.epa.ie/pubs/reports/air/airemissions/ghgcv-19/SEAI-EPA%20Bulletin%20v1.7.pdf

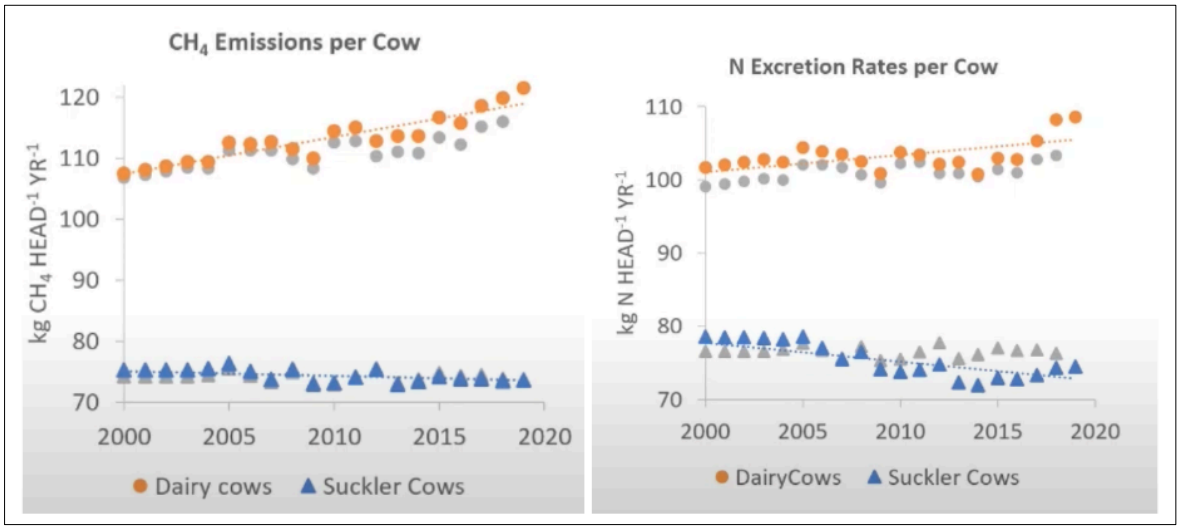


Figure 4. *EPA presentation charts showing updated time series for cattle annual per head methane and nitrogen excretion rates by the Environmental Protection Agency. Grey markers based on previous data, coloured markers for revised data*[18]



Figure 5. *EPA presentation charts showing 2019 Recalculation updated time series for cattle annual per head methane and nitrogen excretion rates by the Environmental Protection Agency*[19]

[18] EPA, 2020. EPA's James Murphy presents "Improvements to the Agriculture Inventory.
[19] Ibid.

1.3 Ammonia Air Pollution Since 2015: Increasing Steeply

Over 99% of Irish ammonia emissions are emitted by the agricultural sector[20]. Ammonia emissions had decreased from 1998 to 2011, but emissions increased after 2011 and, since 2015, emissions have increased even more rapidly than 2011–2015. FoodWise has evidently aggravated rather than mitigated ammonia emissions. Ireland exceeded its NEC ammonia emission ceiling in 2016, 2017 and 2018.

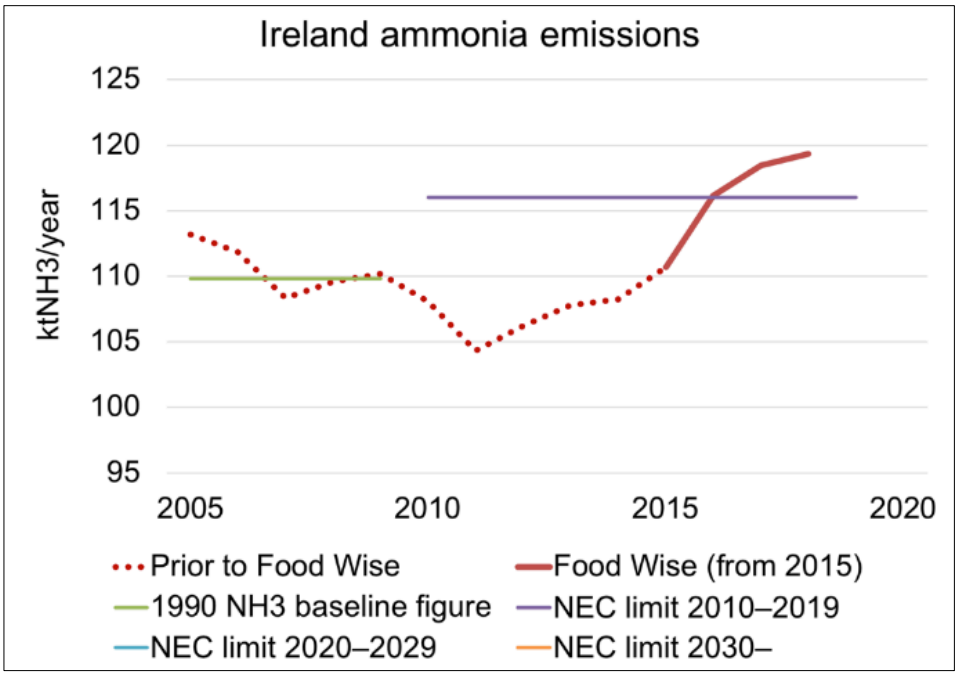


***Figure 6**. Ireland ammonia emissions from 2005, including NEC baseline and ceiling limits up to 2030. An Taisce chart using EPA data[21].*

The EPA[22] have stated:

> *"Our figures show that ammonia levels are on an upward trend, in tandem with increased agricultural production, and that they breached national limits in 2016 and 2017. This has implications for air and water quality. The National Air Pollution and Control Programme, currently out for public consultation, will need to address these emissions particularly as they are projected to increase further to 2030. The underlying driver for these*

[20] EPA, 2020. Ireland 2020 GHG projections submitted under Article 14 of the EU Monitoring Mechanism Regulation: Table 1. Environmental Protection Agency (Ireland).
[21] EPA, 2019a. NECD Submission: Table 5.2. NH3 Recalculations for Agriculture 1990−2017. Enviromental Protection Agency (Ireland)
[22] EPA, 2019. EMISSIONS OF AMMONIA CONTINUE TO RISE: IRELAND'S AIR POLLUTANT EMISSIONS ON THE WRONG PATHWAY FOR CLEANER AIR [WWW Document]. URL https://www.epa.ie/mobile/news/previouspressreleases/name,65887,en.html

emissions is the application of more animal manure to soils — mostly as an organic fertiliser — and the increase in the use of inorganic fertilisers."

In its Review of EU Air Policy the European Commission[23] has assessed Ireland as being at high risk of non-compliance with agreed air pollution reduction commitments before and after 2030. Ireland's policies and measures to address ammonia pollution are deemed inadequate to meet the required limits even With Additional Measures[24]. An Taisce has repeatedly pointed out that Irish agriculture needs to make immediate cuts in intensive ruminant production if ammonia targets are to be met[25], rather than depending on unproven future measures.

The EPA's substantial upward adjustment of past and current dairy cow per head nitrogen excretion (Figure 5) appears certain to further increase ammonia emissions as well as nitrous oxide.

1.4 FoodWise 2025 GHG and Ammonia Emission Trends: Ineffective Measures and Growth Policy

Ireland's agricultural greenhouse gas and ammonia emissions continue to be strongly correlated with reactive nitrogen inputs to intensive pasture dairy and beef production from chemical fertiliser to increase grass growth, and feed concentrate. In 2011 and 2012 chemical nitrogen use was 296,000 ktN, in 2018 and 2019 it was 408 ktN and 367 ktN, respectively with increasing usage projected. In addition to initial soil emissions, more chemical nitrogen produces more grass resulting in more carbohydrate for cattle enteric fermentation to methane and more manure with methane and nitrous oxide emissions.

In its 2020 roadmap for dairy, the state agency Teagasc, in support of Government policy continues to anticipate a further 12% increase in dairy cow numbers before 2027[26]. Teagasc claim that measures – efficiency gains, such as improved breeding, low emissions manure spreading, modest decrease in suckler numbers and changing fertiliser type, from CAN and

[23] European Commission, 2020a. REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the progress made on the implementation of Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants

[24] European Commission, 2020b. ANNEXES to the Report from the Commission to the European Parliament and the Council on the progress made on the implementation of Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants.

[25] An Taisce, 2019, Comment on: Code of Good Agricultural Practice for Reducing Ammonia Emissions from Agriculture; An Taisce, 2020a. Department of Agriculture not doing enough to reduce ammonia emissions - The National Trust for Ireland - An Taisce [WWW Document]. https://www.antaisce.org/ag-department-not-doing-enough-on-ammonia; An Taisce, 2020b. Silent killer - spiralling agri pollution threatens rural and urban lives - The National Trust for Ireland - An Taisce [WWW Document]. URL https://www.antaisce.org/ammonia-air-pollution-health-hazard

[26] Teagasc, 2020. 2020 - ICBF: Breeding for more Sustainable Beef Production - Teagasc | Agriculture and Food Development Authority [WWW Document]. URL https://www.teagasc.ie/publications/2020/icbf-breeding-for-more-sustainable-beef-production.php

urea to Protected Urea – will offset the policies of continued expansion[27]. In response, An Taisce[28] has questioned how Teagasc's climate mitigation projections can be credible, given the evident failure since 2012 of past similar measures to offset output growth[29]. An Taisce has also repeatedly attempted to engage with the state agency on a scientific basis without any substantive reply[30].

Despite exceeding the mandatory ammonia ceiling since 2016, repeated warnings from the EPA, and the evident ineffectuality of measures to date, Ireland's new *Code of Good Agricultural Practice for reducing Ammonia Emissions from Agriculture* merely sets out guidance for more voluntary measures[31]. Moreover, the change to protected urea (PU) fertiliser advocated by Teagasc is intended to reduce nitrous oxide emissions but PU has higher ammonia emissions than the most used CAN fertiliser so any reduction depends on standard urea being removed from the market entirely. Neither FoodWise nor recent Department of Agriculture or Teagasc documents display any understanding that a mandatory ammonia ceiling means meeting this binding target now (requiring ruminant output reduction), not just at some point in future.

1.5 Water Quality Deterioration

The national coordination of the technical aspects of the Water Framework Directive (WFD) falls under the remit of the Environmental Protection Agency, including the establishment of programmes for the monitoring of water status in order to establish a comprehensive overview of water status for assessing WFD compliance.

The most recent data on water quality was provided from 2019 by the EPA in the Water Quality Indicators report[32], which highlighted that agricultural activities are the most significant source of pollution for Irish waters, with a direct impact on 53% of the 1,460 water bodies monitored. Critically the report outlines:

> *"Of significant concern is the finding that nitrate is increasing in nearly half of our river sites. Phosphate levels are also on the rise in a quarter of river sites. This is in sharp contrast to the picture prior to 2015 when only a small proportion of sites had increasing nitrate and phosphate concentrations (1.4% and 4.2%, respectively)."*

[27] AgriLand, 2019. Frank O'Mara: Is reduction in the national herd needed? [WWW Document]. Agriland.ie. URL http://www.agriland.ie/farming-news/frank-omara-is-reduction-in-the-national-herd-needed/
[28] An Taisce, 2019, Are Teagasc's climate mitigation projections credible? An Taisce.
[29] Teagasc, 2012. A Marginal Abatement Cost Curve for Irish Agriculture.
[30] An Taisce, 2019c. 2017 Correspondence between Teagasc and An Taisce regarding agriculture and greenhouse gas emissions [WWW Document]. URL https://www.climatechange.ie/2017-correspondence-between-teagasc-and-an-taisce-regarding-agriculture-and-greenhouse-gas-emissions/; An Taisce, 2019d. An Taisce raises serious concern at recent reported remarks by Teagasc Director [WWW Document]. An Taisce - The National Trust For Ireland. URL https://www.antaisce.org/news/at-questions-teagasc-director-remarks
[31] DAFM, 2019. Code of Good Agricultural Practice for reducing Ammonia Emissions from Agriculture.
[32] Environmental Protection Agency (2020) Water Quality in 2019: An Indicators Report. https://www.epa.ie/pubs/reports/water/waterqua/waterqualityin2019-anindicatorsreport.html

This time period directly coincides with the lifting of dairy quotas in Ireland in 2015 and the publication of the FoodWise 2025 strategy, also in 2015.

These results build on those from the more comprehensive EPA report in 2019[33], which presented the results of the second six-year assessment undertaken since the introduction of the Water Framework Directive (WFD) for 2013-2018[34], providing a full assessment of the state of Ireland's aquatic environment, including the ecological and chemical status of Ireland's surface waters and the quantitative and chemical status of its groundwater resource.

That report highlighted that more than half our rivers, lakes and estuaries (47%; 49.5%; and 62% respectively) are in less than good status. It outlined that while phosphate pollution can be attributed to agriculture, sewage and industry, levels of nitrate pollution are strongly linked to increasing dairy intensification, with clear trends of increasing nitrogen pollution in the south and south-east of the country, the area which has seen the fastest intensification of dairy farming. The following excerpt is particularly critical:

> *"there has been an overall decline in surface water quality, especially in our rivers, following a period between 2004 and 2012 when overall water quality levels had improved, albeit with persistent deterioration of our highest quality waters. This recent net decline in water quality means meeting the targets set in Ireland's River Basin Management Plan 2018-2021* ***will be extremely challenging unless urgent steps are taken to address the causes of deterioration****. The increase in nutrient concentrations, which coincide with areas impacted by agricultural activities, are a particular concern, in the context of the ambition for further growth in the sector under the FoodWise 2025 strategy."* [An Taisce emphasis]

The EPA began sounding the alarm on the risks posed by agricultural intensification under the FoodWise 2025 strategy as far back as 2016[35], to no avail:

> *"The ongoing and planned expansion in the agricultural sector under Food Harvest 2020 and its successor, Food Wise 2025 may threaten improvements in water quality, if not adequately managed.....Under the expansion plans, increased application of nitrogen and phosphorus to agricultural land is likely to happen in areas of the country where the concentrations of these nutrients in water are already elevated.....More targeted management measures are needed in the agricultural sector to accelerate the improvements required to achieve environmental targets set for waters"*

All of these waterbodies are subject to basic regulation, and as such these trends would appear to be indicative of the ongoing failure of the Good Agricultural Practice (GAP)

[33] Environmental Protection Agency (2019) Water Quality in Ireland 2013-2018. https://www.epa.ie/pubs/reports/water/waterqua/waterqualityinireland2013-2018.html
[34] Ibid.
[35] Environmental Protection Agency (2016) Ireland's Environment, An Asssessment: http://www.epa.ie/pubs/reports/indicators/SoE_Report_2016.pdf

Regulations implemented to prevent water pollution. Indeed, the Teagasc Agricultural Catchments Programme[36] showed that a pathway-receptor model should be implemented in order to address nutrient runoff, and that nutrient transfer pathways are key to understanding the transport of pollutants to water. Additionally EPA research highlighted that nutrient source pressures and transfer pathways vary considerably throughout different regions of the country depending on several factors, including soil type and geology[37].

The EPA State of the Environment Report 2016 highlighted that: *"the national farm inspection regime is currently focussed on the farmyard. However, a significant proportion of pollution can arise from agricultural land"*

And further EPA work from 2016[38] indicated that: *"achieving successful WFD outcomes depends on having a site-specific, three dimensional understanding of contaminant transfer pathways".*

Despite this, there has been no change in the GAP regulations, and no move to a three-dimensional pathway analysis, as repeatedly highlighted to be necessary.

Beyond the establishment of the Agricultural Sustainability Support and Advisory Programme (ASSAP)[39] in a very limited subset of areas (190 Areas for Action), there does not appear to be rigorous integration of WFD concerns in Ireland's ongoing expansion of the dairy sector, and general intensification of agriculture. EPA data clearly highlights that the Cross Compliance measures are not sufficient to protect water quality, but this does not appear to be hampering the ambitions of FoodWise 2025.

Worryingly, the Teagasc Strategy[40] for the dairy sector (launched in November, 2020) envisages yet further increases in dairy cow numbers to 1.65 million by 2027, which will further exacerbate the problem.

1.6 Biodiversity Losses

Habitat and species declines have been linked to changing agricultural practices over recent years, particularly of traditional farmland bird species and pollinator species. This has been

[36] Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford https://www.teagasc.ie/media/website/publications/2018/ACP_Phase_2_Report.pdf
[37] Archbold, M., Bruen, M., Deakin, J., Doody, D., Flynn, R., Kelly-Quinn, M., Misstear, B. and Ofterdinger, U. (2010) Contaminant movement and attenuation along pathways from the land surface to aquatic receptors - A Review. *STRIVE Report No. 56*. Environmental Protection Agency, Wexford. Available at: https://www.epa.ie/pubs/reports/research/water/STRIVE_56_Archbold_ContaminantsPathwaysReview_web.pdf
[38] Deakin, J., Flynn, R., Archbold, M., Daly, D., O'Brien, R., Orr, A., and Misstear, B. (2016) Understanding pathways transferring nutrients to streams: review of a major Irish study and its implications for determining water quality management strategies. Biology and Environment: Proceedings of the Royal Irish Academy, Vol. 116B, No.3 pp. 233-243
[39] https://www.teagasc.ie/publications/2020/agricultural-sustainability-support-and-advisory-programme-assap.php
[40] https://www.teagasc.ie/publications/2020/2027-sectoral-road-map-dairy.php

documented by the National Parks and Wildlife Service (NPWS), Birdwatch Ireland the National Biodiversity centre (referenced below).

1.6.1 Natura 2000 sites

The latest NPWS Article 17 report[41] (covering the period 2013 to 2019) to the European Commission on the status of EU protected habitats and species in Ireland highlighted that 85% of the 59 listed habitats in Ireland are in unfavourable status, with almost 40% of these described as being in 'bad' condition. 46% of habitats have demonstrated declines since the last reporting period (2007-2013). The predominant pressure on EU protected habitats is agriculture, which was found to impact on over 70% of habitats, being ranked of high importance in more than 50% of habitats.

Of the agricultural pressures, intensive grazing and overgrazing was the most prevalent pressure, recorded in 55% of habitats in which agricultural impacts are noted (39% of habitats overall). In regard to air pollution caused by agriculture, the three most vulnerable habitats exposed to exceedance of nitrogen deposition threshold were blanket bog, alpine heath and wet heath, all three of which are in bad status. Three marine habitats were also strongly affected by pollution from agricultural activities.

Grasslands, such as orchid-rich grasslands and hay meadows, have undergone significant losses over the last 10-15 years, with 31% and 28% of the area monitored respectively reported as being lost. These habitats are threatened either by intensification of farming or insufficient grazing and abandonment.

For EU protected species, impacts of agricultural activities, and to a lesser extent forestry, were reported as having a negative effect on a wide range of species, including fish, molluscs, terrestrial mammals and vascular plants. This is due to the wide sphere of influence of some of these activities which, though implemented at relatively local levels, may influence a much wider area, particularly if they affect groundwater supplies or nearby watercourses. Examples given by the NPWS included drainage, fertiliser application and clear-felling. The agriculture category represents the highest percentage of 'high-importance pressures' relative to other categories, with the incidence predicted to increase over the next 12 years; this has been linked to the threat from fertiliser and pollution on selected fish species.

The NPWS in the 6th National Report on the Convention on Biological Diversity (2019)[42] voiced concern about the safeguards built into FoodWise 2025:

> *"In particular, agriculture, forestry and aquaculture are all aiming for significant target increases in output, or output value, under the Food Wise 2025 strategy.*

[41] National Parks and Wildlife Service (2019). Available from https://www.npws.ie/publications/article-17-reports/article-17-reports-2019

[42] DCHG 2019. Ireland's 6th National Report to the Convention on Biological Diversity. Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/NPWS%20Biological%20Diversity%20web.pdf

Although in principle, the strategy contains safeguards for biodiversity, water quality and carbon emissions, it is often unclear how these will be applied at producer level."

It also noted that the environmental assessment of FoodWise 2025 was of high relevance to biodiversity, while at the same time acknowledging that agricultural market forces and policy continue to push farmers towards more capital-intensive systems or intensive use of land.

1.6.2 Countryside Birds

Two thirds of Ireland's regularly occurring wild bird species are Red or Amber-Listed Birds of Conservation Concern in Ireland[43]. Farmland birds in particular are continuing to show declines and no recovery from the catastrophic and steady crash in populations since the 70s and up to this day. Habitat loss/change and change in farming practices are leading causes of losses[44].

The NPWS[45] outlined that:

"the decline or loss of farmland bird species such as corncrake, yellowhammer and corn bunting, are indicative of changes in agricultural practice and a nationwide reduction in mixed farming with small scale cereal growing, moving instead to specialisation in livestock production."

1.6.3 Pollinator Declines

One third of our 99 wild bee species are threatened with extinction by 2030. Reasons for decline include: loss of habitat through conversion of low-intensity farmland and semi-natural land to intensive farmland, forestry and urban/ industrial use; loss of flowering plants as a food source due to changing farming practices are reasons for decline; poisoning from pesticide use[46].

The NPWS[47] further highlighted that:

"The decline in bees, butterflies and other insects has largely resulted from the effect of monoculture and the drive to ever higher levels of productivity characterised also by a loss or neglect of hedgerows, farmland edges and scrub."

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[43] Colhoun K. & Cummins, S. 2013 Birds of Conservation Concern in Ireland 2014-19. Irish Birds 9:523-544. Available from: https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland-2014-2019/

[44] Ibid.

[45] DCHG 2019. Ireland's 6th National Report to the Convention on Biological Diversity. Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/NPWS%20Biological%20Diversity%20web.pdf

[46] FitzPatrick Ú., Murray T.E., Byrne A., Paxton R.J., Brown M.J.F. (2006) Regional Red List of Irish Bees, Publ. Rep. to National Parks and Wildlife Service (Ireland) and Environment and Heritage Service (N. Ireland).

[47] DCHG 2019. Ireland's 6th National Report to the Convention on Biological Diversity. Department of Culture, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/NPWS%20Biological%20Diversity%20web.pdf

2. Carbon Sequestration and Offsetting

2.1 Carbon Sequestration in Grasslands

The Irish industrial bovine agricultural sector is advancing carbon sequestration in grasslands as a means of offsetting methane and nitrous oxide emissions. It is surprising that at the same time the carbon leakage from peat soils and bogs is not addressed by the sector, particularly land drainage, hill burning and peat extraction for horticulture. Irish bovine agricultural intensification has been based on the planting of nitrate-fertilised, shallow rooted perennial rye grass monoculture.

In September 2019 the Irish Creamery Milk Suppliers Association conference "*Climate Change and Dairy Farming in Ireland*" hosted Dr. Dario Fornara, Principal Scientific Officer for the Agri-Food and Biosciences Institute (AFBI). He outlined in a presentation on soil carbon sequestration under grassland intensification[48] that: "*Carbon sequestration is the accumulation of carbon in organic soil and the retention of the carbon over hundreds of thousands of years*";

and:

> "*It's more relevant to natural and semi-natural grasslands as opposed to agricultural grassland";*

and concluded:

> "*The long-term effects of grassland management – the combination of the different practices – on soil carbon stocks are unknown*."

The following considerations apply.

Land-stored carbon built up through sequestration removals from atmosphere into trees and soils is highly vulnerable to re-release to the atmosphere, therefore it must be distinguished from, and can only be thought of as being of lesser mitigation value to, leaving geologically stored carbon (fossil fuels and limestone) unextracted. Therefore, climate action must prioritise cutting fossil fuel usages as fast as possible. As outlined by the Intergovernmental Panel on Climate Change (IPCC) [49], Page 546:

> "***In this assessment, we use "permanence" to refer to time scales larger than tens of thousands of years****. CDR [Carbon Dioxide Removal] methods associated with either permanent or non-permanent carbon sequestration (see Table 6.14) have very different climate implications (Kirschbaum, 2003). Permanent sequestration methods have the potential to reduce the radiative forcing of CO_2 over*

[48] https://www.agriland.ie/farming-news/could-an-extra-terrestrial-manage-the-planet-better-than-we-can/; https://www.agriland.ie/farming-news/should-landowners-who-promote-carbon-sequestration-be-rewarded/

[49] IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [https://www.ipcc.ch/report/ar5/wg1/].

> *time. By contrast,* ***non-permanent sequestration methods will release back the temporarily sequestered carbon as CO_2 to the atmosphere, after some delayed time interval (Herzog et al., 2003). As a consequence, elevated levels of atmospheric CO_2 and climate warming will only be delayed and not avoided by the implementation of non-permanent CDR methods*** *(Figure 6.39). Nevertheless, CDR methods that could create a temporary CO_2 removal (Table 6.14) may still have value (Dornburg and Marland, 2008) by reducing the cumulative impact of higher temperature*."

Land carbon is best characterised as "slow in, fast out", in other words sequestration of CO_2 from atmosphere into soils, wetlands and forests is slow but the carbon stocks thus accumulated are very easily lost by ploughing, harvest, extraction, fire, management change etc. This means that "*the mitigation value of the ecosystem resides in maintenance of the stored carbon stock*" (Mackey et al. 2013[50]). Therefore, the overriding priority for land in climate mitigation is for the protection of existing land carbon stocks eg. no or low plough agriculture (including limiting pasture reseeding, limit forestry harvest and thinning, stop peat extraction, block drains on organic pasture soils). Years of carbon sequestration through increased verified soil sequestration can be quickly lost by ploughing disturbance or agriculture which depletes soils over time. Therefore, in policy and climate action, land carbon sequestration is of lower, slower climate mitigation value than land carbon stock protection. However, land carbon stock protection can have significant costs, hence economically its value needs to be substantially discounted relative to fossil carbon.

Soils can store large amounts of carbon but relative changes in soil carbon are therefore very difficult to measure for any specific field or area. C-CO_2 fluxes are also enormously variable from year to year, depending on weather, nutrient availability, etc. This means there is very large uncertainty in land carbon measurement meaning, whereas fossil carbon flows are known with high certainty. Therefore, in addition to the permanence issue noted above, involving land carbon can undermine the certainty of carbon accounting for climate action.

Proving additionality (increased sequestration), discounting for impermanence and stopping carbon leakage create enormous problems for any claim of land carbon value in climate action particularly in soils that are harder to measure than standing timber. Thamo and Pannell (2015)[51] put it simply:

> "*Designing effective policy for sequestration will be challenging politically, and will involve substantial transaction costs. Compromises in policy design intended to make sequestration attractive and reduce transaction costs can render it highly inefficient as a policy."*

[50] Mackey, B. et. al. (2013) Untangling the confusion around land carbon science and climate change mitigation policy, Nature Climate Change, 3. https://www.nature.com/articles/nclimate1804?page=1

[51] Thamo, T. & Pannell, D.J. (2015) Challenges in developing effective policy for soil carbon sequestration: perspectives on additionality, leakage, and permanence, *Climate Policy* 16(8). https://doi.org/10.1080/14693062.2015.1075372

Policymakers essentially have three options. Firstly, they can implement stringent systems to ensure the veracity of sequestration. The high transaction costs associated with this option will make sequestration less competitive, and sequestration's overall contribution to international action on climate change may be minor. Secondly, they can simplify the process, reducing its stringency. This would no doubt be popular with farmer groups and polluters, both of whom would stand to benefit. Although it will boost participation, it will also be inefficient and the amount of genuinely additional mitigation from carbon sequestration in the long run may only be small. The third alternative is to exclude sequestration options that suffer from the challenges identified here. In considering these options, sequestration should be seen as a means to an environmental end and not an end in itself. It should also be remembered that, once implemented, poor policy can be difficult to remove as it creates a group of beneficiaries with an incentive to lobby for its continuation.

Overall, the third option of excluding soil carbon sequestration activities from carbon abatement policy should be carefully considered. Although there undoubtedly are benefits to increasing the carbon content of soils, given the challenges, risks and potential for perverse outcomes and high transaction costs, soil carbon sequestration may not be an efficient approach to mitigating climate change, especially if the sequestration is used as a direct substitute for preventing or reducing emissions. Where sequestration practices are associated with significant leakage, or where they are anticipated to have the potential to become very widely adopted even without policy support, their inclusion in abatement policy seems particularly ill-advised.

Ireland is unusual in Europe in having net land use emissions (most nations have net removals). Although forestry and harvested wood products achieve removals of about 4.5 $MtCO_2$/yr, grassland pasture soils emit about 6 $MtCO_2$/yr (drained organic soil emissions greatly exceed mineral soil sequestration) and wetland peat extraction results in about 2$MtCO_2$/yr losses. Cumulatively since 1990 Irish land use has lost about 150 $MtCO_2$. Initially any increase in net removals will only reduce overall land use emissions. An urgent climate mitigation effort could ensure that land carbon protection measures greatly reduce grassland and wetland carbon losses, and stop/reverse the projected reduction in forest sequestration. However, if net removals are achieved then these would only be refilling the land carbon stock over previous decades. The charts below are from EPA inventory data.

As stated above, any "offsetting" due to increased land carbon sequestration (if verifiable at low enough cost) can only scientifically be meaningfully equated with cancelling prior land carbon losses by refilling land carbon stocks. As per point 1 the permanence issue means that land carbon cannot be equated with fossil carbon, nor with long-lived nitrous oxide (half-life in atmosphere of about 120 years). Most importantly in the Irish case, it makes no scientific sense to suggest land carbon can be set against ruminant methane emissions in terms of the standard CO_2-eq values used in UNFCCC reporting via the GWP100 metric. The most important point for methane in climate action is that methane emissions must trend downward continuously if Paris targets are to be met and a net zero by 2050 target also requires fast CH_4 reductions to 2030, with slower reductions afterward (unlike CO_2 emissions which need to go to zero and then go negative).

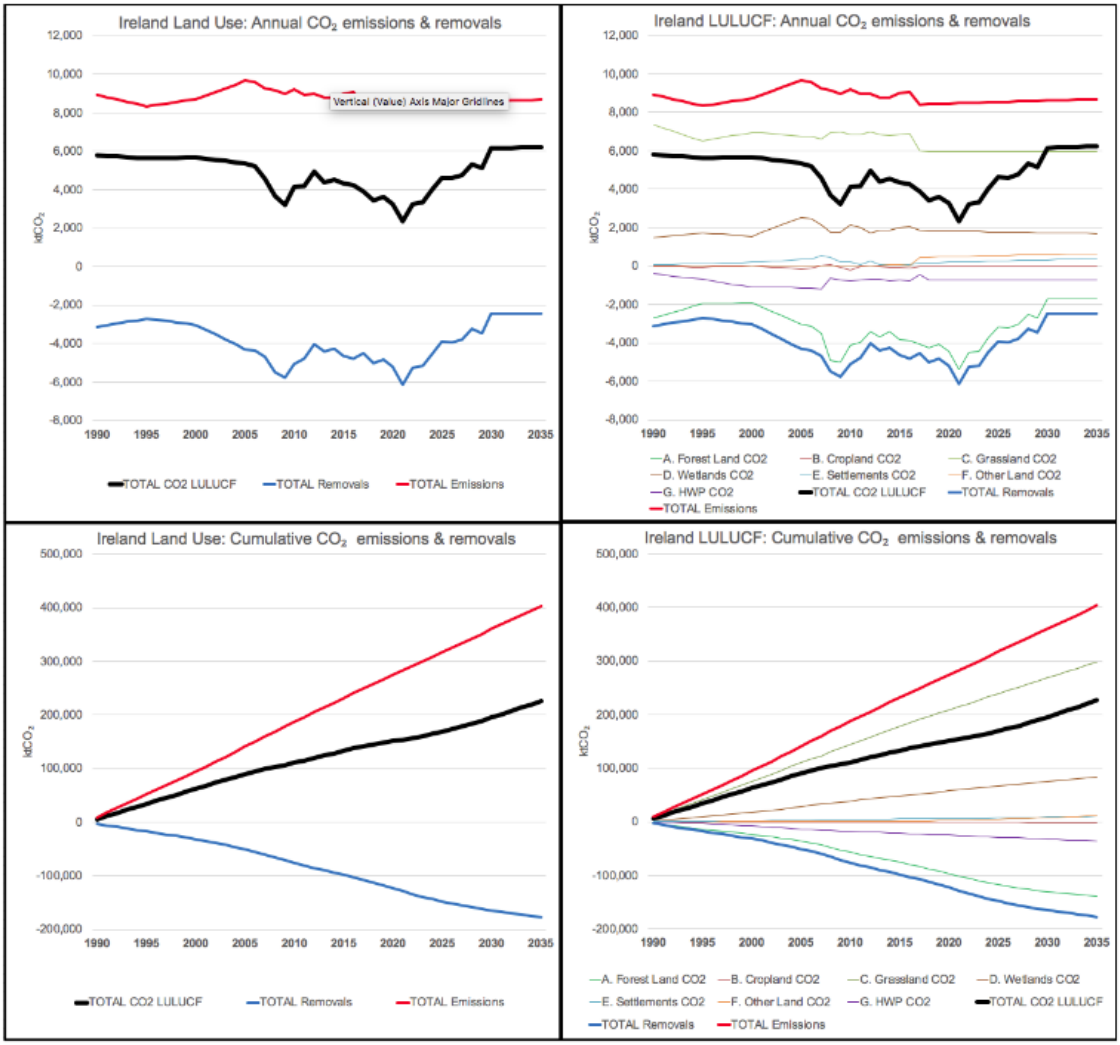


***Figure 8**: From EPA emissions inventory data*

Pointing to "jam tomorrow" such as highly uncertain carbon sequestration or methane reduction (eg. seaweed feed additives) is no substitute for action now. Intensive dairy and beef has by far the highest per hectare nitrogen pollution (N_2O, NH_3 to air, and nitrates to water). From 1998 to 2011, EU policies of a national milk quota and subsidy reduction favouring extensification decreased N usage and cattle numbers, decreasing emissions on track to meet EU 2030 targets.

Since 2010, two agrifood industry designed beef and dairy industry driven growth strategies endorsed by the Government have reversed the prior achievements. Nitrogen usage rose 38% from 2011 to 2018 and methane emissions have risen steadily. Contrary to recent misinterpretations of climate science (and the GWP* metric approximating climate science) using any metric shows that the prior mitigation success has been intentionally undone by intensification policy especially targeting dairy expansion. In terms of IPCC illustrative

pathways, only rapid early cuts in methane emissions can limit overshoot of Ireland's Paris-aligned CO_2 budget and limit the need for negative emissions using bioenergy with carbon capture and storage, which would need very large investment starting now in highly speculative technology.

In summary, the critical climate near-term actions for Irish agriculture are reduction in total reactive nitrogen inputs (to limit soil N_2O and CH_4 from ruminant digestion and manure of grass quantities boosted by these inputs), cutting CH_4 steadily and protecting organic soil carbon by urgent blocking of drains on such pasture. By comparison, carbon sequestration in soils is of extremely limited value and distracts from what is most important in Irish climate action: substantial and sustained reductions in GHG emissions from fossil fuel use, cement production, and ruminant agriculture.

Intensive tillage land can have higher carbon losses due to ploughing but if providing direct-to-human food crops then it is hugely more nutrient efficient and far less polluting than managed pasture. Intensively managed ryegrass requires high nitrogen inputs that may aid carbon uptake but the ryegrass roots are uniform shallow depth, and ryegrass pasture is often ploughed and reseeded every ten years losing the carbon gained in the previous years. By comparison traditional meadows are biodiverse with grasses that have different root depths for carbon storage and legumes such as clovers for natural nitrogen fixation. Ryegrass pasture is productive but leads to GHG, water and air pollution, and any carbon stored is often lost as part of the management plan in reseeding.

2.2 Forestry: Reduced Carbon Removals Imply More Agricultural Mitigation

Kenny et al. (2018)[52] find that Irish agricultural strategy and policy development emphasises a 'business as usual' approach based on "*economic priorities of specialisation, intensification and concentration*" and "*reducing GHG emissions was framed as being reliant on a possible expansion of forestry, a technical fix or a simple change of measurement*." FoodWise continued to place a heavy emphasis on increasing annual forest carbon sequestration to reduce the climate mitigation requirement from agriculture: *Increased contribution of forest based biomass, carbon sequestration and wood products use to reduce climate change mitigation (DAFM, 2015, p. 97)*[53] and:

> *After wind energy, wood fuels are the largest contributor to renewable energy generation in Ireland, while forests' contribution to climate change mitigation through carbon sequestration and the use of wood products form an important element of the national climate change strategy. Latest estimates show that, after taking harvest and wood use into account, forests established since 1990 will remove from the atmosphere a net 3.4*

[52] Kenny, T., Cronin, M., Sage, C., 2018. A retrospective public health analysis of the Republic of Ireland's Food Harvest 2020 strategy: absence, avoidance and business as usual. Critical Public Health 28, 94–105. https://doi.org/10.1080/09581596.2017.1293234

[53] DAFM, 2015. Food Wise 2025 High Level Implementation Committee (HLIC) Meeting 25th November 2015.

million tonnes in 2015; by 2025 the rate of removal is projected to be in the region of 4.7 million tonnes. (DAFM, 2015, p. 98)[54]

In fact, the EPA state higher forest land removals in 2015 of 4.9 $MtCO_2$ but the EPA project the rate of forest CO_2 removals will fall rapidly to only 1.2 MtCO2 in 2025. Managed forest land is already a net emitter, and the forest land use sector is projected to become a net emitter from 2030 onward with an average emissions for 2030–2040 projected to be 0.9 $MtCO_2$ in emissions (rather than removals).

For removals, it is more meaningful to combine the removals from forest land and Harvested Wood Products (HWP), as the EPA modelling increases HWP if forest land removals are reduced by harvesting forest. Figure 6 below shows annual and cumulative charts comparing EPA sequestration projections with a scenario of stable sequestration of 5.5 MtCO2eq/year based on the 2015–2020 averages for forest land and HWP. EPA projections show a steady reduction in removals from 5.5 $MtCO_2$/yr to about 1 $MtCO_2$/yr by 2033, due to non-achievement of afforestation targets and excess harvest relative to historic planting rates.

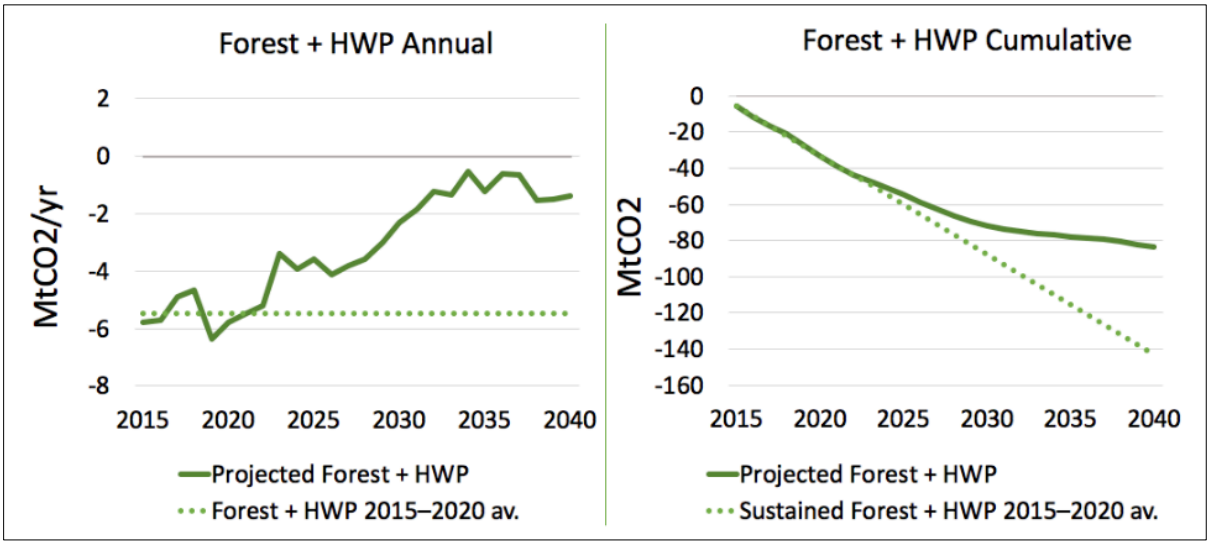


Figure 7. *Annual and cumulative charts showing Forestland and Harvested Wood Product removals as projected by EPA (solid line) and as per a scenario of constant removals at the average 2015–2021 rate (dotted line). Chart by An Taisce using EPA data*[55]*.*

Most importantly for climate action, what matters is minimising cumulative total future emissions and maximising cumulative removals (within biodiversity and ecological limits). Compared to stable Forest and HWP removals, the current projections indicate a shortfall of 58 $MtCO_2$. Following the logic given by FoodWise the *reduced* contribution of forest-based

[54] Ibid.
[55] EPA, 2020b. Ireland 2020 GHG projections submitted under Article 14 of the EU Monitoring Mechanism Regulation: Table 1. Environmental Protection Agency (Ireland).

biomass, carbon sequestration and wood products, implies a need to *increase* climate change mitigation from agriculture and other land use to compensate for it.

2.3 Hedgerows and Afforestation

Ireland's extensive hedgerow network, with its wide mix of trees and other species, is of major biodiversity significance both as a habitat and in providing wildlife corridors. Much is made by the agricultural sector of the role of hedgerows in sequestering carbon. Meanwhile the loss and overly-heavy cutting of hedgerows continues with agricultural intensification, European Court judgment Case C/66-06 against Ireland on the incremental removal of field boundaries and hedgerows. Environmental Impact Assessment (Agriculture) Regulations (SI 456 of 2011) are administered by the Department of Agriculture, Food and the Marine. An Taisce is a consultation body under Article 2 of the Regulations and has not been notified by DAFM on any of the over 500 screening applications processed since the Regulations were introduced in September 2011.

Ireland has a low level of surviving native woodland or other woodland areas of ecological value since afforestation over the last century has been dominated by non-native, short rotation and clear fell conifer plantations of poor biodiversity value and creating soil carbon loss in clear felling. This cannot be the model for any new forestry aiming to provide carbon sequestration.

The EU Biodiversity Strategy 2030 sets out overarching policies for sustainable and ecologically appropriate afforestation.

2.4 Biomethane

In 2019 the Gas Networks Ireland's GRAZE (Green Renewable Agricultural and Zero Emissions) gas project was launched with €8.5 million in grant funding support from the Department of Communications, Climate Action and Environment's Climate Action Fund. This was for a Dairygold facility at Mitchelstown with the capacity to support up to 20 farm-based, agri-anaerobic digestion biomethane plants within a 50km radius. This is part of the international rebranding of agriculturally-sourced biomethane as "green gas" or "renewable gas" for injection into the fossil pipeline network. Gas Networks Ireland has proposed a target of 20% of agricultural biomethane to dilute into the fossil gas grid by 2030.

In order for biomethane to be deemed renewable and to contribute to overall emissions reduction, the feedstock sources and the supply chain of these feedstocks must be assessed to be sustainable. For example, while the burning of biogas generated from biomass, slurry, etc. might be deemed "carbon neutral", the emissions that contribute to the growth, harvesting and transport of the feedstock must also be accounted for. The fertiliser used to accelerate the growth of energy crops and feed cattle, which eventually produce slurry, not only produce emissions but also contribute to water quality deterioration. In the worst cases, the emissions mitigation potential of biogas may be negligible. We would also

highlight that anaerobic digestion leads to methane leakage. The effect of the leakage of this potent greenhouse gas may greatly reduce or cancel out the claimed climate benefits of using biogas in place of fossil fuels. Digesters also do not remove ammonia from the digestate produced.

2.5 Carbon Loss of Horticultural and Animal Bedding Peat

There is a particular issue in Ireland with the continued mechanised extraction of peat for horticulture including mushroom substrate and animal bedding. It is part of the agricultural sector and has impacts on the loss of carbon in peat high organic soils including agricultural and land drainage. Peat extraction for horticulture is a land use change under LULUCF with significant carbon releases, which will need to be accounted for in the national inventory by 2026. While the two River Shannon peat power stations have ceased operation and the use of the Edenderry Power plant for peat is to be phased out, large scale horticultural extraction by Bord na Mona and other companies needs to be addressed.

The sustainability of the Irish horticultural sector is undermined by the continuation of peat extraction and the inappropriateness of Bord Bia putting an "Origin Green" label on any product using peat. In particular, this applies to the Origin Green certification of mushrooms where there is use of peat substrate. The 2018 drought saw a straw shortage and increased promotion of and use of peat for animal bedding by commercial peat extraction companies, an issue on which advocates for carbon offsetting in grasslands remained silent.

While Teagasc has carried out research on peat alternatives, progress has been slow because of the action of the peat compost supply industry in continuing its damaging activity without regulation and not funding any serious research or resources in developing alternatives.

Legal action in 2019 has now resulted in peat extraction over 30 hectares being required to cease until planning, Environmental Impact Assessment and Habitats Directive assessment processes are resolved. Sites below this threshold have not been subject to Appropriate Assessment screening under the Habitats Directive. The effect of this is that there is no current authorised horticultural peat supply source. The advancing of sustainable compost alternatives is an overarching priority for Irish horticulture.

3. The Investment Risk Facing Irish Agriculture

3.1 Environmental Protection Agency Warning on AgriFood 2030

In a submission to the Committee responsible for the formulation of the proposed Government-endorsed AgriFood 2030 strategy for the decade ahead, EPA head Laura Burke stated that Irish farming's “green” reputation as not “supported by evidence”:

> *"Taking the sector as a whole, the economic growth in recent years is happening at the expense of the environment as witnessed by the trends in water quality, emissions and biodiversity all going in the wrong direction… Business as usual will not reverse these trends."*

The EPA Director added:

> *"In our view, this is a serious reputational risk for the agri-food sector in Ireland. Pending evidence and implementation of effective solutions to ongoing unsustainable air and water emissions, any plans for further intensification/expansion of the dairy herd would be difficult to sustain*."

3.2 EU Agricultural Commissioner Phil Hogan 2018 Warning to Ireland on Dutch Situation

The situation that has arisen in the Netherlands where cattle herd contraction has been required because of nitrates excess should be warning to Ireland. In 2018, *The Farming Independent* reported that the then EU Agriculture Commissioner Phil Hogan raised concern on Dutch water pollution action forcing cattle herd reduction as a "cautionary example" if Ireland is to avoid "potentially negative consequences" (SEE APPENDIX 2).

3.3 Averting Stranded Investment in Meat and Dairy Production

Investing in the wrong computer system becomes a wasted or stranded asset if it does not meet current and future operational needs and has to be scrapped for a new system. This applies to larger industrial or production systems as well.

The past history of Irish agriculture shows high levels of tillage and other crop production particularly flax, which changed with international production and trade. Ireland was a major grain exporter in the early 19th Century. The scaling up of wheat imports from North America left a legacy of redundant water mills and fine stone grain stores which still dot the countryside in various states of abandonment or ruin. Another pertinent Irish example was the collapse of the linen industry in the 19th Century with the import of cotton. More recent was the EU withdrawal of support for sugar beet production and accommodation of cane produced sugar from South America.

As the most recent warning, Irish agriculture investment needs to address the ill-advised building of the two high carbon emitting ESB/Bord Na Mona peat supplied power stations built in County Offaly and County Longford only in 2004. These are now redundant after 15 years of highly subsidised polluting impact and have no new use capacity.

This redundant investment risk applies globally and equally to coal, oil and gas extraction, fossil fuel transport vehicle production, and transmission infrastructure as much as high

resource-consuming and greenhouse gas-generating ruminant animal meat and dairy production and processing.

4. The European Green Deal

Since the CAP plan review process was initiated in 2019 there has been a significant change of circumstances. In May 2020, in furtherance to the European Green Deal, the European Union adopted two overlapping Strategies:

- Farm to Fork Strategy – for a fair, healthy and environmentally-friendly food system
- EU Biodiversity Strategy for 2030 - Bringing nature back into our lives

The Biodiversity Strategy sets out a 14-point EU Nature Restoration Plan, the majority of the provisions being either directly or generally applicable to agriculture:

1. *Legally-binding EU nature restoration targets to be proposed in 2021, subject to an environmental impact assessment. By 2030, significant areas of degraded and carbon-rich ecosystems are restored; habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend.*
2. *The decline in pollinators is reversed.*
3. *The risk and use of chemical pesticides is reduced by 50% and the use of more hazardous pesticides is reduced by 50%.*
4. *At least 10% of agricultural area is under high-diversity landscape features.*
5. *At least 25% of agricultural land is under organic farming management, and the uptake of agro-ecological practices is significantly increased.*
6. *Three billion new trees are planted in the EU, in full respect of ecological principles.*
7. *Significant progress has been made in the remediation of contaminated soil sites.*
8. *At least 25,000 km of free-flowing rivers are restored.*
9. *There is a 50% reduction in the number of Red List species threatened by invasive alien species.*
10. *The losses of nutrients from fertilisers are reduced by 50%, resulting in the reduction of the use of fertilisers by at least 20%.*
11. *Cities with at least 20,000 inhabitants have an ambitious Urban Greening Plan.*
12. *No chemical pesticides are used in sensitive areas such as EU urban green areas.*
13. *The negative impacts on sensitive species and habitats, including on the seabed through fishing and extraction activities, are substantially reduced to achieve good environmental status.*
14. *The by-catch of species is eliminated or reduced to a level that allows species recovery and conservation.*

Current and continuing nitrate fertiliser grass based bovine agriculture levels in Ireland are incompatible with these objectives.

These EU-wide strategies signpost a new pathway to lower agri-chemical dependence, ensure better diets, increase food security and look to a better future for farmers and rural Ireland. These Farm to Fork goals must guide any future Irish agri-food strategy. We urge the Government to stop the current agri-strategy process and start anew. To date, a narrow focus on intensification is increasing risks for farmers and the environment. A new vision with far wider societal support and greater acceptance of expert input from scientists and environmental organisations is needed to change the direction of Irish agricultural strategy to align with Farm to Fork and ecological recovery.

Farm to Fork advances climate actions and dietary health as overarching considerations, including referencing excessive red meat consumption: The introduction, "NEED FOR ACTION" states:

> *Overall, European diets are not in line with national dietary recommendations, and the 'food environment' does not ensure that the healthy option is always the easiest one. If European diets were in line with dietary recommendations, the environmental footprint of food systems would be significantly reduced*"

And on the promotion of sustainable food consumption and facilitating the shift to healthy, sustainable diets:

> "*Current food consumption patterns are unsustainable from both health and environmental points of view. While in the EU, average intakes of energy, red meat, sugars, salt and fats continue to exceed recommendations, consumption of whole grain cereals fruit and vegetables legumes and nuts is insufficient"*

and

> *"Moving to a plant based diet with less red and processed meat and with more fruits and vegetables will educe not only risks of life threatening diseases, but also the environmental impact to of the food system".*

The argument commonly made by the Irish beef and dairy industry lobby sector that Ireland should continue to expand because of claimed "efficacy" or "green" credentials and that "someone else would produce it" is rebutted in Page 4 of *A Farm to Fork* which emphasised that climate and sustainability action must be global:

> "*It is also clear that we cannot make a change unless we take the rest of the world with us. The EU is the biggest importer and exporter of agri-food products and the largest seafood market in the world. The production of commodities can have negative environmental and social impacts in the countries where they are produced. Therefore, efforts to tighten sustainability requirements in the EU food system should be accompanied by policies that help raise standards globally, in order to avoid the externalisation and export of unsustainable practices."*

Arguments are being put forward by the industry rather than independent science based sources that ruminant methane should be given a "different" accounting "offsetting" to justify continuing impact. Ireland, in adopting the UNFCCC Paris Agreement in 2015, is required to follow the IPCC accounting system for all categories of emissions including ruminant methane. Lobbyists for animal nutrition supplement companies are advancing unsubstantiated claims about the potential use of seaweed-based and other feed supplements to reduce ruminant methane. Major claims are being made that current bovine production levels can continue and even increase with "carbon offsetting" through biomethane production and carbon offsetting through sequestration in grasslands, forestry and hedgerows. This offsetting does not address the continuing loss of carbon from agricultural and other activities in high organic soils as well as through horticultural peat compost extraction.

5. High Level Recommendations from "Towards a New Agricultural and Food Policy for Ireland" April 2021

On 27 April 2021, three civil society coalitions, the Environmental Pillar, Stop Climate Chaos and the Sustainable Water Action Network, released a joint report "Towards a New Agricultural and Food Policy for Ireland" setting out policy recommendations for changes in the agriculture sector. The joint coalition represents 72 different groups, including environmental NGOs, development NGOs such as Trócaire, faith-based groups, community groups, etc.

The report's high-level recommendations are presented below, and the report in its entirety is attached as an appendix (3) to this submission.

Recommendations:

Develop a Policy Framework Aligned with Ecological Limits and Environmental Commitments
The Government must ensure that Ireland's food production is in line with commitments to the Agenda 2030 Sustainable Development Goals, the Paris Agreement, the EU Green Deal and current legal obligations to protect biodiversity and water quality. It must phase out all environmentally harmful subsidies in the agricultural and food sector. This means re-orienting subsidies so that public money is channelled into the delivery of public goods. Public funding should deliver permanent cuts in greenhouse gas emissions and protect and restore water quality and biodiversity. It should also support rural livelihoods and communities. The following sections detail policy recommendations that are crucial to this framework.

Protect and Restore Biodiversity on Farmland

The Government must commit to ambitious restoration of biodiversity on farmland and at landscape scale. They must also implement the EU target of protecting (at least) 30% of land area for biodiversity by ensuring that, at the very minimum, 10% of agricultural area is under high diversity landscape features by 2030. The State should reward farmers for the

public goods HNV farmland provides and ensure the socio-economic viability of rural communities. Scaling up locally adapted and financially attractive results-based agri-environment payment schemes will be important for restoring biodiversity on all farm types. As part of the proposed land use review, the Government should assess the potential for ecological rewilding at farm, catchment and landscape level.

Protect and Restore Peatlands and Woodlands on Farms

We call on the Government to cease the drainage of wetlands and peaty soils, and end all peat extraction. We recommend that targeted, customised supports for the management and rejuvenation of existing carbon stocks be put in place. We also call for the introduction of a suite of agroforestry measures to promote natural regeneration and ecological corridors for nature connectivity

Ensure that Agriculture Delivers its Fair Contribution of the 51% Reductions in Greenhouse Gas Emissions by 2030 Committed to in the Programme for Government

We call for a revised roadmap for agri-related emissions reductions and a declining cap on total national reactive nitrogen usage. To rapidly bring down sectoral methane and nitrous oxide emissions, we recommend that regulatory, voluntary and combined measures be implemented to limit and reverse recent dairy expansion. Compensatory measures for farmers should be put in place to incentivise herd reductions.

Urgently Improve Air Quality

We call for a roadmap that brings Ireland into compliance with binding commitments on ammonia. The roadmap should include implementation and enforcement measures, and funding for farm abatement measures. We also call for efforts by the Government to address barriers to compliance with the NECD, including improved mapping and monitoring.

Halt and Reverse Water Quality Decline

We call on the Government to conduct risk assessments of all intensive farms (greater than 130 kg livestock manure nitrogen/ha) in sensitive catchment areas. Nitrates derogations should only be granted where it can be demonstrated that no deterioration in the aquatic environment will result. If necessary, sub-catchment areas must be zoned ineligible for certain stocking rates. A national plan to co-ordinate and support on-farm measures to intercept pollution pathways must be implemented.

Support Sustainable Livelihoods and Incentivise Farm Diversification

We call on the Government to develop a farmer and community-centred Just Transition action plan for the sector that includes diversification options with environmental co-benefits. We recommend support for the scaling up of local and indigenous nature-friendly food production, especially in cereals and pulses for human consumption, fruit and

vegetables – a large proportion of which are currently imported at the expense of the indigenous tillage and horticultural sector.

Contribute to Public Health and Sustainable Consumption

Ireland must ensure that its food production policy promotes global health and environmental protection. National food policy should incentivise and support a greater dietary intake of organic produce and plant-based foods that are sustainably produced.

Contribute Meaningfully to Food Security and Nutrition

We call for the implementation of clear principles and oversight mechanisms, including mandatory Human Rights and Environmental Due Diligence legislation, to ensure that the commercial links to the global food economy do not undermine Ireland's international development commitments.

Appendix 1

FARM IRELAND
Farming Independent
Tuesday 2 April 2019
www.independent.ie

PROPERTY
Prime Tipperary farm on the market for €3.6m P28



CUTTING COSTS



How farmers can cut their silage bills this year P22-23

Beef in a bind



Martin O'Sullivan on why the figures don't add up on beef production P6-7

ANALYSIS
It's time to take the bull by the horns on dairy calves issue
Darragh McCullough
PAGE14



'Greenwashing' will backfire warns Teagasc

Bord Bia's Origin Green campaign needs to be backed up by 'credible evidence'

CLAIRE FOX

IRISH agriculture needs to back up its 'green' image with credible evidence rather than "glamour stories", Teagasc has warned.

"We've seen problems in other countries where they resort to glamour stories and greenwashing on biodiversity performance – that has major repercussions and backfires very quickly," Teagasc researcher and ecologist John Finn told the *Farming Independent*.

"In (Bord Bia's) Origin Green we are making very strong claims about sustainable performance and environmental performance that is creating a need for credible demonstration of sustainability – the industry needs credible evidence rather than glamour stories.

"If we are to continue with the sustainability claims that we are a clean, green food producing nation, we need

Bord Bia defended the Origin Green programme, saying its ambition was to drive sustainability in food production at every point on the supply chain.

"Since the introduction of carbon footprint assessments on farms in 2013, over 212,000 individual carbon footprint calculations have taken place on over 37,000 dairy farms and 175,000 beef farms," stated Bord Bia.

"The carbon footprint calculations to date show a continued decline in the carbon footprint intensity related to the production of beef and dairy."

A new report on farm sustainability published by Teagasc last week has found that dairy farms are producing up to three times more greenhouse gas and ammonia emissions than other farming sectors.

Teagasc researcher Trevor Donnellan said that while Irish farms have been improving their carbon efficiency, "emissions have been increasing, the dogs on the street know that".

in activity or until growth in activity comes down to reach the efficiency improvement," he said.

Dairy Industry Ireland spokesman Conor Mulvihill said the dairy model was not only sustainable but "absolutely vital" in delivering proper livelihoods and strong farming enterprises.

He pointed out that the report showed the emissions intensity for the production of a litre of dairy has dropped.

Mr Mulvihill said the dairy industry was committed to improving its carbon efficiency and adhering to water and soil quality targets to ensure the standards and reputation of the industry is maintained.

Support

However, he added that dairy processors were aware that if they could not "deliver measurable improvements", the "regulatory system hammer will drop" and they will also "lose public support

Association (ICSA) said the Teagasc sustainability report has blown apart the narrative that suckler and beef farmers are the problem on climate change.

"The suckler herd is clearly not the problem when cattle farming systems produce less than half the emissions of intensive dairy systems per hectare," said ICSA president Patrick Kent.

"Where a hectare of land is switched from sucklers to intensive dairy, GHG emissions double. ICSA has been arguing for a long time that cattle and sheep farmers should not be the scapegoats for our climate change challenges.

"While there is no doubt that all sectors have to do their bit in being more efficient in terms of emissions, it is time for all to recognise that cattle, sheep and tillage systems give rise to between 2 and 4.2 tonnes CO2/ha compared with 8.5 tonnes for intensive dairy.

"This has serious implications for policy. It calls into question the long-standing advice to cattle and sheep farmers

Calf prices up €20/hd as shippers push for stock

CALF prices have increased by €20/hd over the last week, on the back of stronger exporter buying.

A fall-off in the number of Friesian bulls sold through the marts, and an increased availability of beef crosses, has also helped the trade.

Shippers continue to dominate sales, with the bulk of the calves sold through the marts going for export.

The base price for shipping-type Friesian bulls was up €20/hd last week, with the majority making between €40 and €80/hd.

Sean Leahy of Corrin Mart in Fermoy said the majority of Friesians for the Dutch market sold for €50-80/hd last week, with shippers very keen for stock.

Calves for the Spanish trade made €80-120/hd, with farmers paying €120 to €200/hd for stronger types.

Appendix 2

From the Farming Independent

Look what happened in the Netherlands – Hogan warns Irish dairy sector on environment



1 EU Agriculture and Rural Development Commissioner Phil Hogan

Ciaran Moran
September 11 2018 3:04 PM

Agriculture and Rural Development Commissioner, Phil Hogan has warned the Irish dairy sector that it must maintain its reputation for producing products of the highest standards of safety and sustainability.

Speaking INTL FCStone dairy conference recently, he said that broadly speaking, the European dairy sector has a good story to tell, and good prospects for the future.

But went on to say that "we have to be honest about the potential pitfalls that lie ahead".

Hogan said the appealing image of dairy cows eating grass in wide open fields is a very successful selling point for Irish products.

However, he said if that reputation for quality and sustainability is compromised in any way, there is a clear and present danger of a negative market impact.

"I have used the Netherlands as a cautionary example in Ireland before, and for good reason.

“The Dutch dairy industry has been dealing with an ongoing phosphate problem which has resulted in the reduction of the Dutch dairy herd by around 122,000 cows over nine months, with a consequent reduction in phosphate and nitrates production.

“Currently, Dutch milk supply has fallen by 1.5pc,” he said.

Hogan warned that building a more sustainable foundation in relation to inputs “is not a choice: it is a must”.

Ireland and all other EU MS need to get the balance right under the Nitrates Directive and the Water Framework Directive, he said and added that failure to act now will lead to negative consequences in the near future – “potentially very negative consequences,” he warned.

Read also: The Dutch dairy dilemma - How dairy farmers in the Netherlands are coping with new phosphates regulations

CAP payments

Hogan also spoke on reform of the Common Agricultural Policy (CAP) and said that despite the difficult budgetary context of Brexit and other new EU challenges such as security and migration, the Commission has proposed a strong budget for agriculture.

“Direct payments to farmers are cut moderately by no more than 4%.

“This reduction is complemented with a proposal to achieve greater equity in direct payments per hectare, by means of continued convergence, degressivity and capping,” he said.

Hogan highlighted that the direct payments envelope for Ireland in the next budget is €8.15 billion, a reduction of 3.9pc compared to the 2020 baseline allocation.

For rural development, he said the Commission proposes to rebalance EU and national support, so that public support to European rural areas remains largely unchanged.

Towards a New Agricultural and Food Policy for Ireland

Recommendations for Government

A Position Paper from the Environmental Pillar, the Stop Climate Chaos Coalition and the Sustainable Water Network



Towards a New Agricultural and Food Policy for Ireland

Recommendations for Government

April 2021

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Environmental Pillar
Working for a sustainable future

stop climate chaos.

Sustainable Water Network
SWAN

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Executive Summary

Agriculture is by far the most significant pressure on Ireland's nature, water and air, and greenhouse gas emissions. There has been a long-standing failure to align the sector with Ireland's obligations under environmental law. Current policies that prioritise a productivist model of agriculture (i.e. focused on specialisation and intensification) lock farmers into an unsustainable commodity-driven food production system which leaves them economically vulnerable. These policies have also undermined Ireland's international reputation on food security.

In this paper, we – the Environmental Pillar, the Stop Climate Chaos Coalition, and the Sustainable Water Network – set out our policy recommendations for the Government that would deliver much needed change in Irish agriculture policy. This paper provides a foundation for a deeper discussion on what a new model of agriculture for Ireland could look like – a model that works within the ecological parameters essential to a healthy society, economy and planet.

01

Develop a Policy Framework Aligned with Ecological Limits and Environmental Commitments

The Government must ensure that Ireland's food production is in line with commitments to the Agenda 2030 Sustainable Development Goals, the Paris Agreement, the EU Green Deal and current legal obligations to protect biodiversity and water quality. It must phase out all environmentally harmful subsidies in the agricultural and food sector. This means re-orienting subsidies so that public money is channelled into the delivery of public goods. Public funding should deliver permanent cuts in greenhouse gas emissions and protect and restore water quality and biodiversity. It should also support rural livelihoods and communities. The following sections detail policy recommendations that are crucial to this framework.

02

Protect and Restore Biodiversity on Farmland

The viability of food production in Ireland depends on functioning ecosystems. Yet, agriculture is the main pressure and threat to Ireland's habitats and species. Biodiversity protection on farmland is undermined by incoherence between agriculture and biodiversity policies, and the failure by Government to enforce existing nature laws.

Approximately 33% of the agricultural area in Ireland has High Nature Value (HNV) characteristics. On HNV farmland, grazing is important for the healthy grasslands that create favourable habitat for many species. Maintaining the viability of these farming practices must be a priority for Ireland's rural development policy. Whilst intensive farms should be required to do more for biodiversity, we believe that incremental changes at farm-level will not restore ecosystem services, species and habitats as long as intensification remains the core goal of agri-policy.

Farmers should be subsidised for farm and landscape-scale ecological restoration and rewilding initiatives, where appropriate. In carrying out their proposed national land use review, the Government should examine how best to protect existing HNV systems, how best to improve biodiversity values on more intensive farms, and where and how best land use could be transformed from food production to restoration and rewilding to enhance the provision of ecosystem services.

Recommendations **The Government must commit to ambitious restoration of biodiversity on farmland and at landscape scale. They must also implement the EU target of protecting (at least) 30% of land area for biodiversity by ensuring that, at the very minimum, 10% of agricultural area is under high diversity landscape features by 2030. The State should reward farmers for the public goods HNV farmland provides and ensure the socio-economic viability of rural communities. Scaling up locally adapted and financially attractive results-based agri-environment payment schemes will be important for restoring biodiversity on all farm types. As part of the proposed land use review, the Government should assess the potential for ecological rewilding at farm, catchment and landscape level.**

03

Protect and Restore Peatlands and Woodlands on Farms
Land use in Ireland is currently a net emitter of greenhouse gases. This is due to on-going unregulated drainage of peatlands and organic soils because of agricultural activity, afforestation and the harvesting of peat. This can be tackled by reducing livestock grazing on organic soils. Rewetting degraded peatlands (through ditch blocking, for example) has demonstrable benefits for carbon sequestration, flood attenuation and biodiversity. The elimination of further GHG emissions from degraded peatlands must be a priority.

Agroforestry involves deliberately integrating woody vegetation (trees or shrubs) with crops. Examples include animals grazing the understory of trees and the use of trees for animal shelter, timber and/or food production. Agroforestry has multiple benefits – for example, soil biodiversity, carbon sequestration, flood mitigation, and human and animal wellbeing are all enhanced when tree cover is stable and long term.

Recommendations **We call on the Government to cease the drainage of wetlands and peaty soils, and end all peat extraction. We recommend that targeted, customised supports for the management and rejuvenation of existing carbon stocks be put in place. We also call for the introduction of a suite of agroforestry measures to promote natural regeneration and ecological corridors for nature connectivity.**

04

Ensure that Agriculture Delivers its Fair Contribution of the 51% Reductions in Greenhouse Gas Emissions by 2030 Committed to in the Programme for Government
Agriculture is the single largest contributor to Ireland's overall climate impact. Greenhouse gas emissions from the sector are increasing. The average dairy farm emits three and a half times more emissions than the average for beef farms, and four times more than the average for tillage farms. Current policies rely on the uptake of voluntary on-farm efficiency measures. However, these fail to adequately address the underlying drivers of emissions: rising cattle numbers and associated nitrogen inputs (fertiliser and animal feed). Further growth in the dairy sector is envisaged by Teagasc, a goal that is incompatible with climate policy. The current Government emissions reduction roadmap for the sector (AgClimatise) is not consistent with the 2020 Programme for Government commitment to reduce emissions by on average 7% per annum or 51% by 2030, as it assumes a stabilisation as opposed to an absolute reduction of methane emissions by 2030. Total emissions of greenhouse gases and nitrate/ammonia impacts must be reduced.

Recommendations **We call for a revised roadmap for agri-related emissions reductions and a declining cap on total national reactive nitrogen usage. To rapidly bring down sectoral methane and nitrous oxide emissions, we recommend that regulatory, voluntary and combined measures be implemented to limit and reverse recent dairy expansion. Compensatory measures for farmers should be put in place to incentivise herd reductions.**

05

Urgently Improve Air Quality

Rising cattle numbers and excessive use of nitrogen from fertiliser and animal feeds have also contributed to Ireland breaching the National Emission Ceilings Directive (NECD) limits on ammonia. A high concentration of ammonia in the air can damage ecosystems, as well as being linked to a range of pulmonary and cardiac issues in humans.

Recommendations **We call for a roadmap that brings Ireland into compliance with binding commitments on ammonia. The roadmap should include implementation and enforcement measures, and funding for farm abatement measures. We also call for efforts by the Government to address barriers to compliance with the NECD, including improved mapping and monitoring.**

06

Halt and Reverse Water Quality Decline

Agriculture is specifically linked with recent marked increases in water pollution, particularly in the south and southeast of Ireland. An association has been found between cattle density (i.e., as pathogen sources) and human Verotoxigenic Escherichia coli (VTEC) infection in Ireland, because of the contamination of private well drinking water supplies. Current regulations are ineffective in controlling nutrient pollution, and on-farm best practice measures to protect water quality are of limited efficacy, especially if more animals and more nitrogen inputs are permitted.

Recommendations **We call on the Government to conduct risk assessments of all intensive farms (greater than 130 kg livestock manure nitrogen/ha) in sensitive catchment areas. Nitrates derogations should only be granted where it can be demonstrated that no deterioration in the aquatic environment will result. If necessary, sub-catchment areas must be zoned ineligible for certain stocking rates. A national plan to co-ordinate and support on-farm measures to intercept pollution pathways must be implemented.**

07

Support Sustainable Livelihoods and Incentivise Farm Diversification

The current commodity-driven model contributes to spatial and sectoral inequalities within the farming population. Solutions include building sustainable and viable rural communities and rewarding farmers for the ecosystem services they provide. Just transition principles will help ensure that farm diversification alternatives and payments for ecosystem services adequately compensate farmers for any radical or abrupt changes.

Recommendations **We call on the Government to develop a farmer and community-centred Just Transition action plan for the sector that includes diversification options with environmental co-benefits. We recommend support for the scaling up of local and indigenous nature-friendly food production, especially in cereals and pulses for human consumption, fruit and vegetables – a large proportion of which are currently imported at the expense of the indigenous tillage and horticultural sector.**

08

Contribute to Public Health and Sustainable Consumption
A reduction in the intake of meat and dairy products is essential to reversing environmental decline and enabling a shift towards more sustainable agriculture. The high rates of consumption of livestock products in nearly all wealthy countries, including Ireland, and increasing global demand for livestock-based foods, threatens to undermine the United Nations Sustainable Development Goals and the Paris Agreement.

Recommendation **Ireland must ensure that its food production policy promotes global health and environmental protection. National food policy should incentivise and support a greater dietary intake of organic produce and plant-based foods that are sustainably produced.**

09

Contribute Meaningfully to Food Security and Nutrition
If Ireland is to be an international leader in creating a fairer, healthier and more sustainable global food system, the environmental, social and economic bases for food security and nutrition for future generations must not be compromised by Irish domestic policies.

Recommendation **We call for the implementation of clear principles and oversight mechanisms, including mandatory Human Rights and Environmental Due Diligence legislation, to ensure that the commercial links to the global food economy do not undermine Ireland's international development commitments.**

10

Facilitate Inclusive Dialogue and Participation for an Alternative Model for Agriculture in Ireland
A transition to a sustainable agricultural system will not be possible without ongoing multi-stakeholder dialogue. Drawing on the recommendations presented in this report, the Environmental Pillar, Stop Climate Chaos Coalition, and SWAN are committed to engaging in dialogue and discussion, with all relevant stakeholder groups, where there is genuine commitment to deliver an alternative, fairer model for Irish agriculture.

Context

The world's food and agricultural systems feed more people than ever before, supplying large volumes of key commodities to domestic and international markets. Yet, the intensification of agricultural practices across the world is causing potentially irreversible damage to the planet's living systems – its soils, air, biodiversity and water.[1] Exceeding planetary limits threatens to weaken the very support systems that are crucial to food production and ecosystem health.[2, 3]

The COVID-19 pandemic has highlighted the potentially dangerous interactions between infectious diseases, the environment, and public health. Intensive livestock farming and land-use change are widely recognised as increasing the risk of zoonotic diseases emerging in humans.[4, 5] COVID-19 revealed many hitherto invisible concerns associated with livestock production.[6, 7] The global pandemic has also highlighted the risks associated with unhealthy diets (such as obesity, cardiovascular disease, some forms of cancer), poor environmental conditions, the vulnerabilities of the global food system to supply chain issues, poor animal and human welfare standards, and biosecurity risks.[8]

Preventing future pandemics calls for a planetary health perspective across the entire spectrum of public policy, including agricultural policy. Central to this response must be the preservation of ecosystems and public health, higher standards of animal health and welfare in line with legislation and best practice, and reductions of climate pollution consistent with Ireland's fair share commitment under the Paris Agreement.



Image Eoin Campbell

Here in Ireland, a productivist model of food production – characterised by intensification, concentration, and specialisation – has come to dominate farming. There has been a continued failure to align food production with environmental protection and legal obligations.[9, 10] The EU's Common Agricultural Policy (CAP) has supported this model by subsidising food production over the other services that farmland can provide (such as regulation of soil and water quality, carbon sequestration, support for biodiversity and cultural services). Despite numerous and on-going reforms, the current CAP policy framework has failed to drive sustainability and environmental protection. Since its establishment in 1962, the CAP has driven the intensification of agriculture and has promoted the simplification and specialisation of agricultural ecosystems. This, in turn, has led to profound biodiversity loss land degradation, including over-grazing, and climate change. Limited funding goes to support climate-friendly and biodiverse farming regions.[11]

It is also well recognised that CAP spending exacerbates income inequality within agriculture. CAP has not benefited the majority of farmers, with larger farms (that are more prone to intensification) receiving the bulk of CAP funds through direct payments linked to how much land is farmed, with minimal environmental requirements.[12] The analysis of proposals for a revised CAP post-2020 indicates that it generally retains the structure and weaknesses of the current CAP. (This paper does not address CAP in detail. It is expected that the individual coalitions behind this paper will provide a more detailed assessment of Ireland's National CAP Strategic Plans in due course).[13]

Current policies lock Irish farmers into farming practices that may be unsustainable and uneconomical in the long term, linked as they are to the vagaries of global commodity markets. These policies have also undermined Ireland's international reputation as a credible voice on food security, climate change, and environmental protection. Yet, to date, the Department for Agriculture, Food and the Marine has so far failed to offer credible alternatives that prioritise environmental sustainability.[14]

Irish agriculture is now at a critical juncture, and significant decisions are being made regarding the direction and priorities of the sector. This paper is published by the Environmental Pillar, the Sustainable Water Network (SWAN), and the Stop Climate Chaos Coalition – Ireland's largest environmental coalitions. It comes against the backdrop of the publication, in April 2021, by the Department of Agriculture, Food and the Marine, of the Agri-Food Strategy for 2030.[15]

We present our policy recommendations for the Government that, if implemented, would bring agriculture into line with Ireland's national and international obligations on climate, nature, and air and water quality.[16] These recommendations are based on an integrated approach to agriculture. They recognise the synergies between climate, water and air quality, and healthy ecosystems and provide multiple benefits across climate change mitigation, biodiversity conservation and restoration, and the protection of water and air quality. For example, aligning intensive land use with ecological parameters at catchment level will mitigate climate change and deliver benefits for ecosystems, water and air quality.

The recommendations presented in this report reflect the priorities of Ireland's largest environmental coalitions for a new vision for agriculture and food production that works with and protects nature from further destruction. Our combined membership spans local and regional grassroots-based groups to faith-based, youth, development, and environmental NGOs with a nationwide and global reach. We propose, therefore, that these recommendations are used to inform a national dialogue for an alternative model for Irish agriculture and how this might best be implemented and supported by Government. We propose that, if based on an inclusive, committed process, the Government's 'Farming for Future in Ireland Dialogue' (put forward in the 2020 AgClimatise - A Roadmap towards Climate Neutrality) could provide an important space in which to progress these recommendations to chart a more sustainable pathway for Irish agriculture.

"The recommendations presented in this report reflect the priorities of Ireland's largest environmental coalitions for a new vision for agriculture and food production."

Priorities and Recommendations for a New Agricultural and Food Policy in Ireland

01 Develop a Policy Framework Aligned with Ecological Limits and Environmental Commitments

Significantly greater ambition is now required in domestic policy to meet the objectives of the EU Green Deal,[17] the EU 2030 Biodiversity Strategy, and the Farm to Fork Strategy.[18] The European Green Deal comprises a set of policy initiatives by the European Commission with the aim of making Europe climate neutral by 2050 and reducing greenhouse gas emissions by 50%-55% by 2030 compared with 1990 levels. In addition to other areas, the plan also introduces new policies:

- **On restoration of biodiversity through a Biodiversity Strategy for 2030. The Strategy aims to protect nature, reverse the degradation of ecosystems and halt biodiversity loss:**

- **On agriculture through the Farm to Fork strategy. The Strategy aims to "guarantee a fair, healthy and environmentally friendly food system, whilst ensuring farmers' livelihoods. It covers the entire food supply chain, from cutting the use of pesticides and sales of antimicrobials by half and reducing the use of fertilisers to increasing the use of organic farming":[19]**

These Strategies set targets that seek to transform the EU's food system. EU member states, including Ireland, must set national values, through agri-food policy and national CAP strategic plans, for the relevant targets set out in these Strategies. This will require a detailed, target-driven roadmap that shifts Irish agriculture away from the commodity-driven, export-focused production of meat and dairy produce, and brings it in line with these EU strategies and with national obligations on climate, water and biodiversity.

The Government must ensure that Ireland's food production is in line with commitments to the Agenda 2030 Sustainable Development Goals, the Paris Agreement and current legal obligations to protect biodiversity.[20]

This requires early, continual and permanent cuts in greenhouse gas emissions and air pollution, the protection and restoration of

water quality and biodiversity, and support for rural livelihoods and communities (Fig. 1). Achieving these goals will require that semi-state agencies, such as Teagasc, perform their functions in a manner consistent with Ireland's environmental obligations.[21]

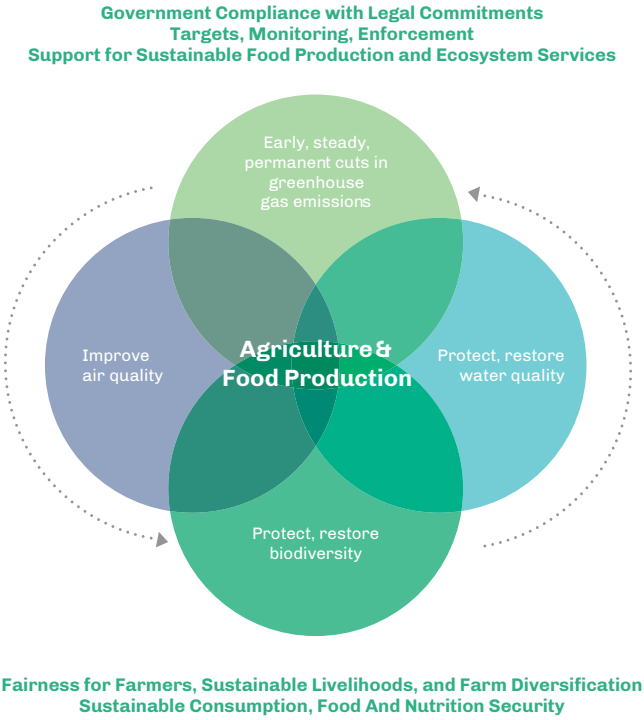


Figure 1 A broad outline of approaches & supports required to align agriculture with ecological limits.

We call on the Government to

- **Provide a detailed strategy for the agricultural sector, setting out how environmental targets and commitments as they relate to biodiversity, climate, soil, air, and water quality will be met and enforced, and how primary producers will be supported in achieving these targets. The roadmap for the sector must address the EU Farm to Fork and Biodiversity strategies.**
- **Task an independent body, ideally Ireland's Environmental Protection Agency, to establish and implement a robust monitoring framework to assess the full environmental impacts of food production at farm, catchment and national level.**
- **Discontinue Bord Bia's Origin Green Programme because of the conflict of interest between the marketing aims of the programme and the role of Bord Bia in producing their own sustainability assessments and metrics.**
- **Review the legal mandate of Teagasc (Ireland's Agriculture and Food Development Authority) with a view to reorienting its research and advisory activities towards a sustainable agro-ecological model, ensuring that environmental expertise is immediately represented on its board and management.**
- **Phase out all environmentally harmful subsidies in the agricultural and food sector.**

02 Protect and Restore Biodiversity on Farmland

The viability of food production in Ireland depends on well-functioning ecosystems. Yet, agriculture is the main pressure and threat to Ireland's habitats and species. Biodiversity and ecosystem function has deteriorated in recent decades to the point where agriculture is now responsible for an erosion of the important public goods and services that these ecosystems provide. Habitat fragmentation, land clearance, afforestation, widespread drainage of wetlands and damp pastures, severe declines in mixed farming, land abandonment, hedgerow removal and reduction, and increase in intensive management of grasslands have all contributed to this deterioration.[22, 23, 24] Of Ireland's designated sites (i.e., areas have been designated specifically to protect core areas for a subset of species or habitat types listed in the Habitats and Birds Directives), many of which are farmed, 85% have 'unfavourable status' with 70% of those impacted negatively by agriculture (see Fig. 2 and Fig. 3).[25] Ireland's water-dependent habitats, birds and other species are declining.[26, 27] The population of bird species such as the Curlew, Corncrake, and Lapwing have plummeted in recent decades, and one third of Ireland's wild bee species are threatened with extinction.[28, 29, 30]

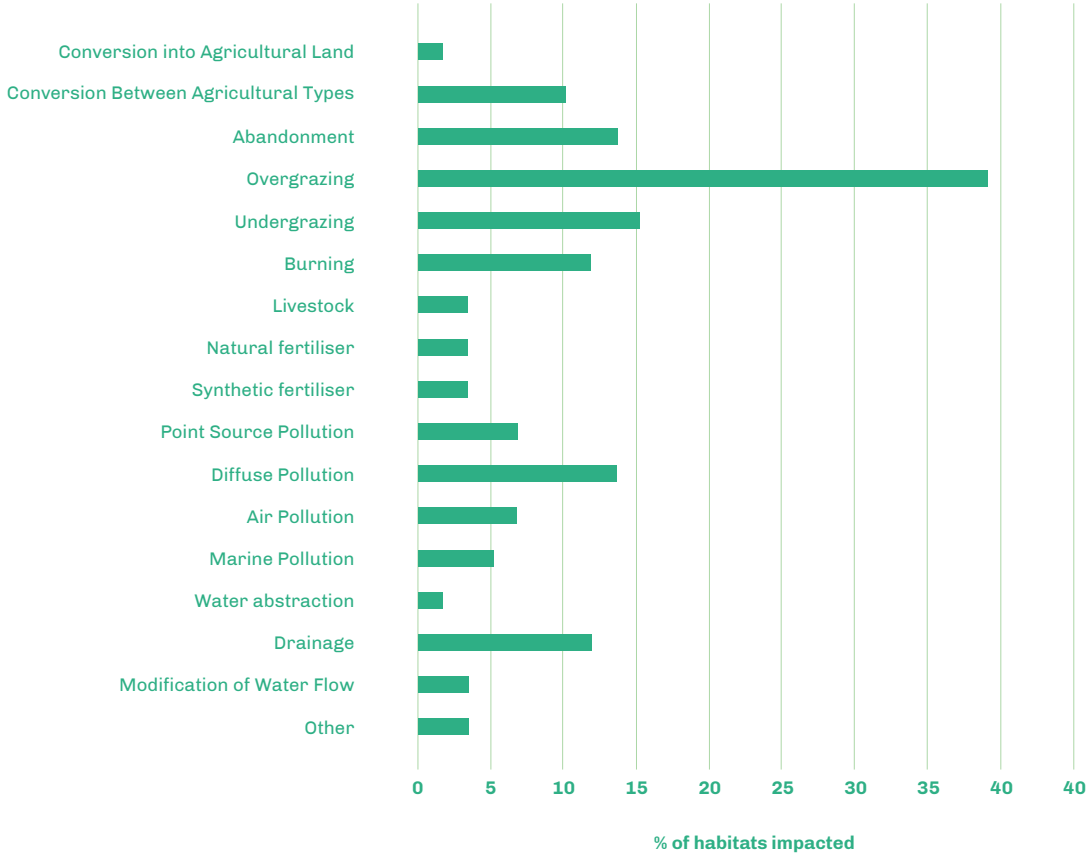


Figure 2 Percentage of habitats impacts by agricultural pressures (Medium and High-importance pressures combined). (Source: NPWS, 2019

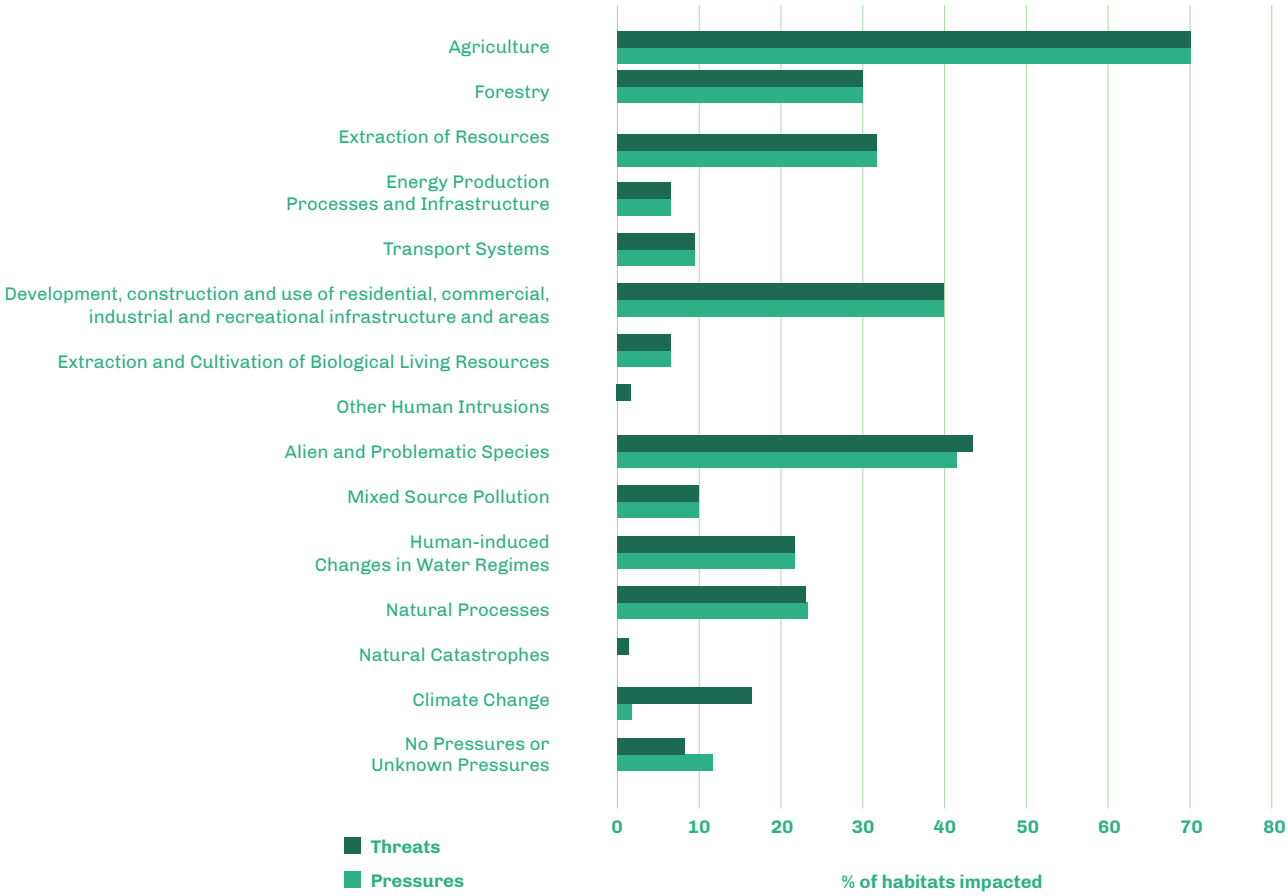


Figure 3 Percentage of habitats impacts by pressure/threat category (combined Medium and High-importance pressures/threats).

Source NPWS (National Parks and Wildlife Service) (2019). The Status of Protected EU Habitats and Species in Ireland. Volume 1: Summary Overview. NPWS, Dublin. **https://www.npws.ie/publications/article-17-reports/article-17-reports-2019**

The protection and enhancement of biodiversity on farmland, and more broadly at regional and national scale, is impeded by an incoherence between agriculture policy and biodiversity policy, disincentives to make space for nature on farms, and the consistent failure by Government to enforce existing national and EU nature laws. In addition, because of serious design flaws in national agri-environment schemes, current monitoring and evaluation systems for farm biodiversity actions do not capture the true impact of these schemes on biodiversity.

Complex EU land eligibility rules for Pillar 1 payments under the CAP have had perverse effects on the ground, causing farmers to destroy habitats simply to retain eligibility for payments, often on farms with the most ecologically sensitive systems. Farmers can find themselves penalised for keeping certain biodiverse landscape features on their land (such as ponds, hedges, shrub patches, for example) as a result of poorly conceived rules and their interpretation by national and EU authorities.[31]

Ireland as a whole has a mixture of semi-natural vegetation and more intensive food production areas. The range of intensities of farming in Ireland and the spatial diversity of land types mean that measures to protect biodiversity on farmland need to be locally adapted within a broader framework of integrated catchment/landscape management initiatives. The following subsections present scenarios for biodiversity on farmland under different management regimes.

Protecting High Nature Value Farming

Ireland's grassland and hedgerow biodiversity has assembled over time in conjunction with diverse, low-intensity mixed farming with minimal to zero fertiliser inputs. Because of their landscape and socio-cultural value, and high levels of biodiversity, these systems are known as High Nature Value farmland ((HNVf) (Fig. 4).[32, 33] It is estimated that approximately 33% of the agricultural area in Ireland has HNV characteristics, approximately half of this is within the Natura 2000 protected areas network.[34]

Many HNV landscapes across the EU are at risk of ecological degradation.[35, 36, 37] Past and current agricultural subsidies and conservation measures have mainly failed to safeguard HNV farmland and the respective farming systems, and a combination of social, economic and environmental pressures has led to either farmland abandonment or agricultural intensification.

Many HNV farms are economically vulnerable. Farmers are highly dependent on direct payments and off-farm employment for income, but they are not recognised or rewarded for the ecosystem services they provide. This is both a policy failure and an example of market failure.[38]

Once lost, it can be difficult to reinstate HNV management, especially in areas of rural depopulation, and because of global environmental change, there may be a limited timescale in which it is possible to achieve restoration goals to a former ecological state. Supporting and maintaining the viability of HNV farming must be a priority for Ireland's rural development policy. Vibrant rural communities are needed to help protect and ensure the socio-ecological viability of this type of farming. Ensuring this requires: improving basic services and infrastructure in rural communities, providing new economic opportunities for HNV related goods and services, and

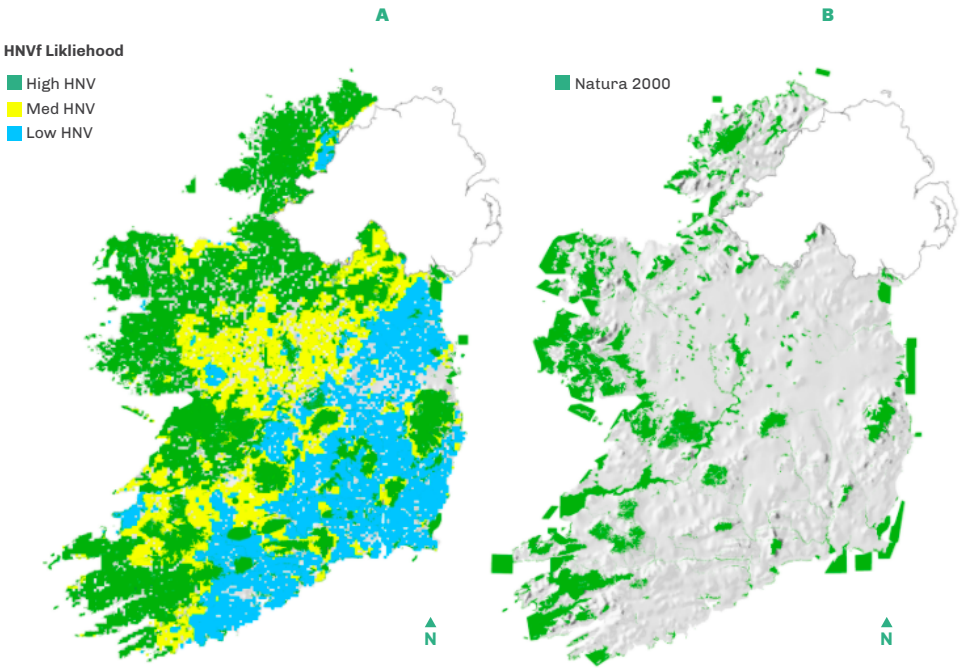


Figure 4 (a) Extent and distribution of high nature value farmland in the Republic of Ireland. (b) Natura 2000 network in the Republic of Ireland.

Source Moran, J., D. Byrne, J. Carlier, B. Dunford, J. A. Finn, D. Ó hUallacháin, and C. A. Sullivan. 2021. Management of high nature value farmland in the Republic of Ireland: 25 years evolving toward locally adapted results-orientated solutions and payments. Ecology and Society 26(1): 20. **https://doi.org/10.5751/ES-12180-260120**

empowering farmers and rural communities through capacity building and innovation, and rewarding farmers for the delivery of ecosystem services. Restrictions on certain land use change may be necessary to deter intensification. A mix of conditionality rules along with environmental funding schemes such as CAP eco-schemes, and incentives to bring stocking densities in line with the specific ecological parameters of the system may be required.

Recently established targeted, results-based agri-environment schemes have shown much-needed promise in the fight to save species from extinction and improve habitats. With adequate investments, Ireland should be significantly expanding results-based schemes across all farm types (i.e., HNV and more intensive systems) including where there exists a clear relationship between biodiversity protection and other environmental targets, e.g., related to water and soil quality, carbon storage and sequestration. The protection and reintroduction of structural elements (such as ecological corridors, ponds and wetlands, hedgerows, for example) to increase habitat heterogeneity should be part of these schemes.

Increasing Biodiversity Potential on Intensive Farms

Farms with a higher level of input and output per unit of agricultural land area have considerable impact on biodiversity and ecosystem health directly (through local land use changes on-farm and at landscape scale) and indirectly (through feed production processes and associated land conversion off-farm).[39] The reliance on monoculture pasture and high fertilizer input, as well high levels of nitrogen pollution means that intensive systems present risks to biodiversity and ecosystem stability. This is especially in traditionally biodiverse grasslands and wetland areas. Across Europe, intensification has resulted in a decline of structurally diverse landscape elements, such as ecological corridors and hedgerow networks, where natural habitats have become increasingly fragmented.[40] As a result, this pressure undermines the capacity of the land to support other functions and ecosystem services.

Studies from across Europe show that if a minimum of 10-14% of agricultural land were left to nature, then birds, and thus other wildlife, would recover. Targets within the EU Biodiversity Strategy aim for at least 30% of EU land area to be protected and connected through ecological corridors, and at least 10% of agricultural area to have high-diversity landscape features, such as hedges and ponds. As highlighted earlier in this report, these targets need to work in tandem with the Farm to Fork Strategy and the CAP post 2020. If Ireland preserved all farmland landscape features, either through targeted incentives and schemes, or via legal designation, to achieve this 10% high diversity target, it would help progress the overall EU target of 30% protected lands. Climate mitigation measures such as multi-species swards, hedgerows or agroforestry are clearly good for biodiversity at a field or farm scale. At a landscape and catchment scale, ecological diversity and connectivity should be encouraged through the conservation of ponds and wetlands, mixed species woodlands and other natural and semi-natural habitats.



Image Richard T. Mills—
Courtesy BirdWatch Ireland

Although important ecological features at farmland and landscape level should be protected from intensive agriculture, incremental changes at farm-level will not deliver for biodiversity if intensification remains the core goal of agri-policy. Recommendations – on regulating nitrogen inputs and reducing herd size and stocking density, on-farm diversification, and reducing the demand for meat and dairy consumption – presented in subsequent sections of this report will also deliver biodiversity gains on Irish farmland.

Ecological Restoration and Rewilding

Ecological restoration aims to return severely degraded ecosystems to a former ecological state, restoring its ecosystem function. Rewilding gives wildlife and natural processes the space and time to recover to increase ecological resilience, with the focus on process rather than a desired outcome.[41] Both approaches represent a managed withdrawal of direct human management of nature (depending on the scale of the area, i.e., small farmland areas, for example, may require much more intervention to replace the ecological processes that require large areas of land to operate naturally). There is now a growing discussion among conservationists about the need to restore and rewild degraded ecosystems by leaving land free from livestock. In future, the implementation and enforcement of existing legislation will need to take place alongside additional efforts (e.g., outside of protected areas) to halt wide-scale biodiversity loss.

Restoration and rewilding could be used where land has been abandoned or severely degraded due to agricultural practices[42] (for example, overgrazed upland regions), or where the ecological, economic and societal value outweigh the benefits of keeping land under food production (supported by subsidies).[43, 44, 45] Land owners could be subsidised – by channelling public money into the delivery of public goods – for keeping land not for the primary focus of food production and agricultural activity, but for farm and landscape-scale ecological restoration and recovery.[46] The local implementation of rewilding initiatives, however, must be based on a scientifically robust rationale, and an assessment of the potential ecological and social costs and benefits.[47]

In undertaking their proposed national land use review (committed to in the 2020 Programme for Government), the Government should examine how best to protect existing HNV systems, how best to improve biodiversity values on non-HNV farmland, and where and how land use could be transformed from food production to restoration and rewilding. An important part of this review will be the need to consider how best to operationalise land management regimes in policy and practice in cooperation with farmers and local communities.

We call on the Government to

- **Urgently develop new, and fully implement all existing conservation and restoration plans for habitats, threatened species and protected areas at landscape/catchment scale in line with EU Biodiversity Strategy targets.**
- **Progress the EU target of protecting (at least) 30% of land area for biodiversity by ensuring that, at the very minimum, 10% of agricultural area is under high diversity landscape features by 2030. This can be achieved by working collaboratively with farmers and ecologists to identify areas that can support natural regeneration, ecosystem connectivity and functioning at scale. Given the poor condition of Ireland's biodiversity, the Government must commit to a much higher restoration target.[48]**
- **Reward farmers for the public goods HNV farmland provides and improve its viability by promoting recognition and demand for these goods and services.**
- **Scale up locally adapted results-based agri-environment payment schemes on all farm types. Scheme payments must be financially attractive[49] and supported by improved monitoring and evaluation systems for biodiversity actions and outcomes. Schemes should support biodiversity, carbon sequestration and water quality including active rewetting and maintenance of bogs, riparian planting, agroforestry, continuous cover forestry and hedgerow conservation.**

- Use the national CAP Strategic Plan to select instruments and measures that best support the delivery of public goods. Review land eligibility criteria under CAP with a guarantee of payments for space for nature and high quality, connected ecosystems on all farms. The primary eligibility criterion should be that land is subject to positive environmental management in a way that ensures maintenance of public goods.

- Significantly tighten and enforce the regulations on land restructuring, habitat removal and drainage of wetlands. Introduce bespoke legislation to protect hedgerows, including a requirement for consent from the relevant agencies for all proposed hedgerow removal.

- Significantly bolster farm advisory services with appropriately skilled ecologists to work with farmers to ensure that desired outcomes are achieved for biodiversity and water quality. More specifically, expand expertise and peer-to-peer learning opportunities on the management of hedgerows, with specialised training provided in best practice hedgerow management techniques.

- Assess the policy constraints and opportunities for ecological restoration and rewilding at farm, catchment and landscape level. This assessment should include an analysis of the trade-offs between food production and provision of ecosystem services, and where there are win-win opportunities for the environment and rural communities. Identify funding mechanisms to reward farmers for farm-scale rewilding initiatives, and support the piloting of well-monitored and evaluated rewilding initiatives at multiple scales.

“Introduce bespoke legislation to protect hedgerows, including a requirement for consent from the relevant agencies for all proposed hedgerow removal.”

03 Protect and Restore Peatlands and Woodlands on Farms

Ireland needs to take a holistic approach to agricultural land use to meet the need for food and fibre, and to protect and restore ecosystems and to provide public goods.

The Restoration of Peatlands and Soils

Wetlands in Ireland are a significant source of carbon emissions due to ongoing and unregulated drainage of peatlands and organic soils for agriculture and forestry, and peat harvesting. Peatlands contain up to 75% of Ireland's soil carbon, with carbon dioxide emissions associated with changes in soil temperature, vegetative cover and water table level. Wetlands (such as turloughs, fens and swamps, callows, ponds, and wet grasslands, for example) are important habitats on farms, providing habitat diversity and ecosystem services.

Agricultural soils are one of the largest peatland categories. Many peatlands, including those protected under national and European legislation, are in poor condition at present. Just 18% of peatlands are classified as 'near-natural' and of conservation value, whilst 82% are classified under other land uses that involve some form of drainage. Agricultural activity is attributed to 28% of this area of peatland.[50] Annual drainage emissions from histic and humic soils related to agriculture equate to over half of Ireland's agricultural emissions.[51, 52] This contrasts with the widespread misreporting of the carbon sequestration potential of farming practices in Ireland.

Managing soils to minimise GHG emissions and depletion must be a priority in agricultural policy. A decline in soil organic matter is one of the major factors in declining soil biodiversity.[53] Given that biodiversity is positively linked with soil functioning and land productivity, farming practices that increase soil organic matter should be encouraged to aid carbon sequestration. Such practices would result in an increase in the quality and productivity of agricultural soil, residing the need for nitrogen fertilisation.[54] Rewetting of nutrient poor organic soils, coupled with grazing reduction, has proven benefits for carbon sequestration. Increasing soil organic matter also improves water retention, which in turn helps agricultural land to become more resilient to flooding and drought.

Although the implementation of the 2019 Climate Action Plan and the 2020 AgClimatise strategy will help to reduce carbon losses from peatlands and grasslands, both land-use categories will remain significant sources of emissions unless more ambitious action is taken.

The elimination of GHG emissions from degraded peatlands should be a priority for the Government. Improved management and protection of existing carbon stocks, such as peatlands, could generate income under agri-climate environmental measures in national CAP strategic plans.[55]

It is important to emphasise however, that due to the lack of verifiable and permanent carbon storage, offsetting is not a reliable policy for managing agricultural emissions. For example, trees may eventually be harvested or burned, and climate-induced drought may affect rewetted soils or bogs. Restoration for the purpose of generating carbon credits for the voluntary carbon market or for trading under the provisions of Article 6 of the Paris Agreement is not a reliable policy that supports Ireland's domestic emission reduction obligations under the international climate law.[56, 57] While carbon sequestration must play an important role in agriculture and land use policy, it cannot be a substitute for absolute emission reductions from the sector.[58] The State should not support, develop or encourage any carbon market or offsetting project that uses land-based credits until we have as a country contributed our fair share of mitigation effort under the Paris accord.



Image Dick Coombes

Woodlands & Agroforestry

Only 2% of Ireland's land mass consists of semi-natural and native woodland cover. Most of this is recently planted or naturally regenerated, much of it is isolated, fragmented and in far from satisfactory condition. Healthy woodlands provide multiple environmental and social benefits – for example, carbon sequestration, natural organic soil improvement, flood mitigation, potential benefits of related farm diversification; local employment, and enhancement of human and animal well-being from shade, shelter, and aesthetic value.

Recent evidence points to a high level of deforestation in privately owned broadleaf dominated forest, with 52 deforestation events (between 2000 and 2012) taking place in long-established or ancient woodlands.[59] Raising awareness among landowners of the

regulatory framework around tree felling and the penalties for the illegal felling of trees should be a priority.[60, 61]

Forestry and farming are not mutually exclusive activities. They can work together to support ecosystems, people and the rural economy. Agroforestry is the practice of deliberately integrating woody vegetation (trees or shrubs) with crops with a view to, for example, reducing soil erosion. Agroforestry also describes the practice of letting animals graze at the understory of trees and where the trees are used for animal shelter, timber and/or food production.[62] There is evidence to show greater floral, faunal and soil microbial diversity on agricultural land that includes agroforestry, in comparison to monocropping and some forest systems.[63]

Agroforestry can also open up opportunities for diversification (farm-woodland guided walks, for example). These benefits are enhanced when agroforestry is stable and long term and managed manually with selective felling. Current agroforestry measures are limited in scope and have the production of timber as the main objective. Stringent timber production criteria and a replanting obligation present obstacles to farmers adopting agroforestry measures.

We call on the Government to

- **Cease the drainage of wetlands and peaty soils,[64] and cease all peat extraction. Identify areas of agricultural land that require better management of existing carbon stocks and where immediate rewetting is possible. Put in place targeted, customized support for the management and rejuvenation of existing carbon stocks.[65]**
- **Ensure that measures to promote soil carbon sequestration, rewetting of grasslands and afforestation are done for sound environmental reasons and not with a view to generating unreliable and impermanent carbon offsets.**
- **Introduce a full suite of agroforestry measures focused on a variety of species and a continuous cover management model to promote natural regeneration and ecological corridors for nature connectivity.[66] Prioritise the protection and restoration of ecological corridors of linear native woodlands and hedgerows that connect existing fragments of semi-natural, native, and ancient woodlands.**
- **Prioritise the development of a new sustainable forestry model that is in line with EU law, and increases the area of woodland and continuous tree cover. This model must be based on appropriate afforestation in the appropriate place and the implementation of environmental safeguards to protect water sources and biodiversity. It is critical that physical ecological survey and assessment is undertaken prior to afforestation of sites.**

04

Ensure that Agriculture Delivers its Fair Contribution of the 51% Reductions in Greenhouse Gas Emissions by 2030 Committed to in the Programme for Government

Agriculture is responsible for 35% of Ireland's annual greenhouse gas emissions and is the single largest sectoral contributor to Ireland's overall climate impact (Fig. 5).

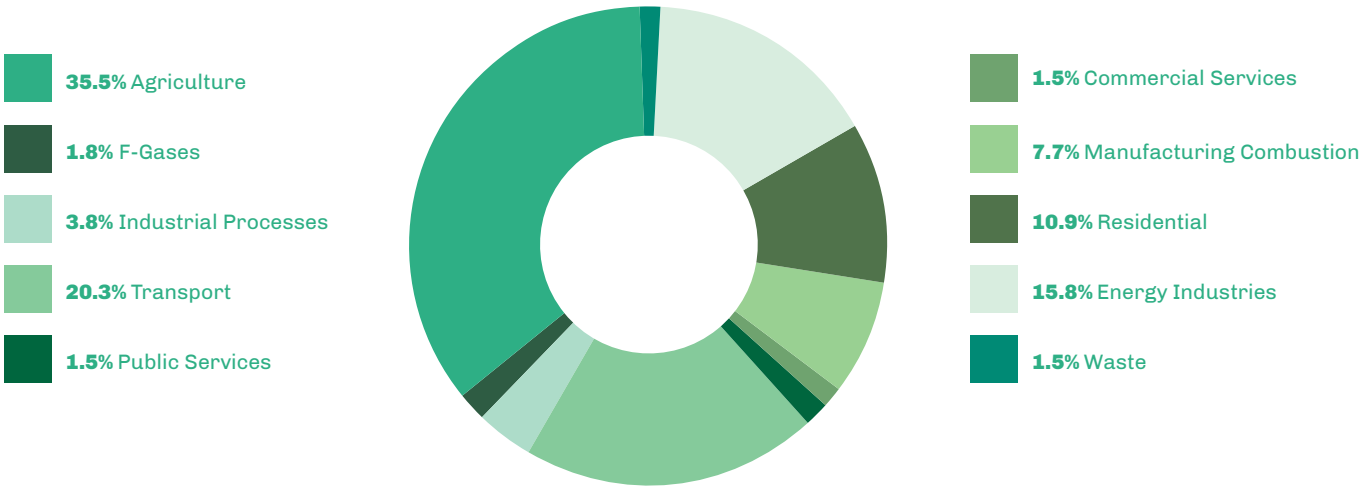
The EPA states in its most recent emission projection reports that emissions from the sector are increasing, and that they are driven by rising dairy cattle numbers and associated nitrogen inputs.[67]

The dairy sector currently contributes half of all of Ireland's agricultural greenhouse gas emissions and has been driving the increase in agricultural emissions in recent years. Recent CSO data shows that there was a 41% increase in dairy cows from 2010 to 2019, making Ireland an outlier in comparison to other EU member states.[68]

It is worrying to note that the Teagasc dairy strategy to 2027 envisages yet further growth in herd numbers, a goal that is totally incompatible with climate policy.[69] If current projections for the sector are realised in terms of animal numbers and milk and

Figure 5 Sectoral contribution to overall GHG emissions in 2019

Source EPA (Environmental Protection Agency). (2020b). Ireland's Provisional Greenhouse Gas Emissions 1990-2019. EPA, Wexford, Ireland.



beef output, there will be an inevitable increase in absolute greenhouse gas emissions, regardless of whether on-farm efficiencies are implemented.

Total emissions of greenhouse gases and nitrate/ammonia impacts must be reduced. However, reliance on the uptake of voluntary efficiency measures drawn up by Teagasc and the more recent AgClimatise Roadmap (published in late 2020), fail to adequately address the underlying drivers of emissions: cattle numbers and nitrogen inputs (fertiliser and animal feed). Nor is the AgClimatise roadmap consistent with the Programme for Government commitment to reduce emissions by on average 7% per annum or 51% by 2030, as it assumes a stabilisation rather than an absolute reduction of methane emissions by 2030.[70]

Climate action policies for the agricultural sector have to date been based on assumptions about farmers' responses to theoretical cost savings from voluntary mitigation and efficiency measures. However, even if fully implemented, these measures will not address the multiple environmental impacts of the sector, nor can they be scaled up quickly enough to deliver the required emission reductions in a timely fashion.[71, 72] Moreover, the focus on cost efficiency falsely assumes that if farms are 'efficient' in the sense of maximising outputs per unit of input (feed and fertiliser), they are environmentally sustainable. This approach ignores greenhouse gas impacts and other land-use changes that, taken together, would show much higher environmental impacts per unit of output than are currently reported.

In fact, the only important measure of climate and air pollution action is absolute, instead of relative, annual emissions as reported in the National Inventory of GHGs published annually by the EPA, therefore efficiency measures are a distraction. Agricultural emissions of methane, nitrous oxide and ammonia have been increasing steadily since 2011 due to dairy expansion and greatly increased nitrogen inputs, with only a minimal reduction in beef cattle numbers.

Requiring herd reductions from beef farmers will not by itself address the water and biodiversity impacts from the dairy sector, and may even lead to rebound effects as more land becomes available for silage production for dairy cows.

The Climate Change Advisory Council undertook a special review of agriculture, forestry and land-use in 2019 but assumed in its scenarios that no herd reductions would take place in the dairy sector, thus ignoring the growing ecological burden of intensive dairy farming in many areas of the country. Getting cattle numbers down simply by sacrificing the beef sector is not a just transition for Irish agriculture: no farmer should be left behind, and no one part of the country should be turned into a 'sacrifice zone' to keep profitable dairy farmers in business. Farmers must be supported with policies that provide both stable incomes through diversification, and also facilitate reduced stocking rates with decreased inputs.[73]



Image iStock.com/Wendy Love

Without substantial and sustained reductions in agricultural methane over the next decade, it will not be possible to meet current national and EU climate targets. It is not expected that agricultural emissions will fall as fast as emissions in other sectors of the economy over the next decade. It is expected, however, that there must be substantial year-on-year reductions in absolute emissions from agriculture. For the Government to allow one economic sector in society — a sector which represents one-third of Ireland's emissions — to simply continue business-as-usual, and insist that the rest of the economy reduce its emissions by three-quarters to achieve the overall 51% target for 2030 is highly unfair and impractical. Steadily and permanently reducing agricultural methane in the near-term with annual reductions in the order of 3-5% from 2022 to 2030 will be necessary to limit overshoot of Ireland's national 'fair share' of the remaining global carbon budget aligned with meeting the Paris Agreement commitments.[74]

Policies that support carbon sequestration, though highly important for carbon storage in trees, soils, hedgerows and wetlands, are neither reliable nor permanent methods to offset greenhouse gas emissions from agriculture or fossil fuel combustion. Relying on carbon storage or anaerobic digestion technologies carries risks, uncertainties and high costs.

Changing the types and quantities of foods we consume could also have a significant impact on emission reductions. Shifting diets in

line with health recommendations would have the positive benefit of reducing GHG emissions and freeing up land for other uses.[75] However, it needs to be acknowledged that while there is potential for emissions reductions from a shift towards plant-based diets among Irish consumers, a reduction in the consumption of animal-sourced food in Ireland is unlikely to have a significant impact on Ireland's total agricultural greenhouse emissions. This is due to the fact that most agricultural commodities are produced for export markets. For this reason, the Government, in its approach to agriculture and food production, must address the total impacts of all food production in Ireland on a territorial basis regardless of where the food is eventually consumed.

We call on the Government to

- **Publish a revised roadmap for agri-related greenhouse gas emissions reductions that sets out a time scale to achieve, as a minimum, compliance with EU and national law, including the forthcoming Climate Amendment Bill, by 2030, and an implementation and enforcement schedule that can be monitored on an annual basis.[76]**
- **Put in place a declining cap on total national reactive nitrogen (and phosphorus) usage based on an assessment of the total amount and rate of nitrogen inputs from fertiliser and animal feed that is appropriate and sustainable for climate action, air and water quality to bring usage down to 2011 nitrogen inputs levels (296 ktN) within three years, followed by a more gradual, steady reduction thereafter.[77]**
- **Consult with stakeholders and devise regulatory, voluntary and combined measures based on international best practice to limit and reverse recent expansion in the dairy sector by rapidly bringing sectoral greenhouse gas emissions back to 2011 levels by 2025 or as soon as feasible thereafter. Such measures should include a requirement for dairy farmers to reduce their herds and stocking rates to the level consistent with local environmental, and national ammonia and climate constraints, with immediate priority given to farms in sensitive catchment areas.**
- **Put in place compensatory measures to facilitate and incentivise herd reductions and diversification in the beef suckler and finishing sectors. Farmers relying on CAP payments for the bulk of their farm incomes should not be financially worse off by implementing herd reductions on a gradual basis.[78]**

05 Urgently Improve Air Quality

Ireland is in breach of the National Emission Ceilings Directive (NECD) on ammonia, with agriculture dominating emissions of ammonia (99%) because of animal manures and nitrogen fertiliser (Fig. 6).[79] The EPA has identified this breach as being largely due to increasing cattle numbers under Food Wise 2025. Beef and dairy farming represent 51% of these emissions, and 4% and 3% are from the rearing of pigs and poultry, respectively.[80] These figures exclude emissions from the spreading of animal manure from cattle, pig and poultry (30% of national total). Due to the intensive nature of pig and poultry production, their ammonia contributions may have a higher impact locally, especially with unlicensed intensive pig and poultry farms acting as ammonia hotspots in some parts of Ireland.[81]

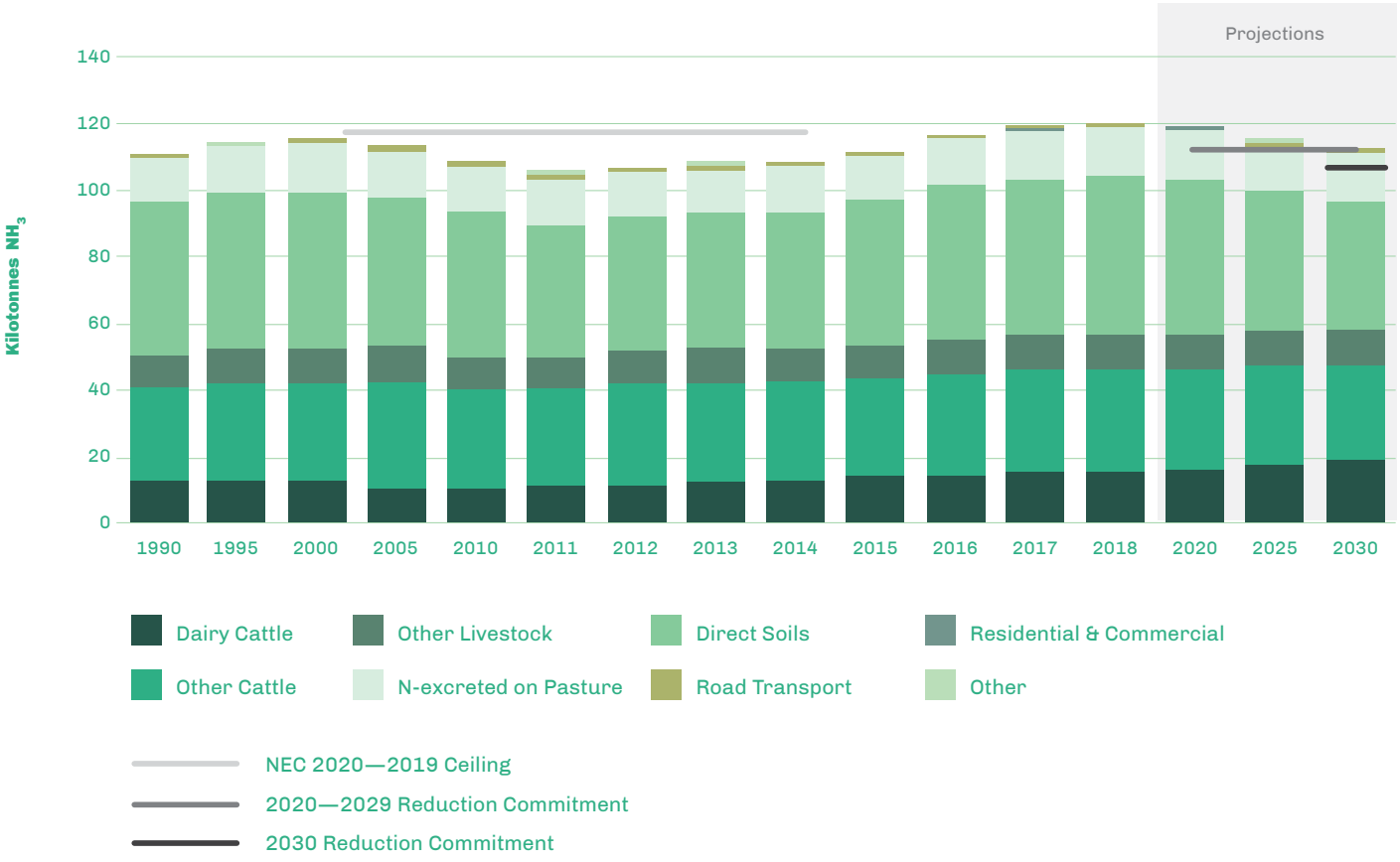


Figure 6 Total ammonia emissions and projected emission figures (Source: EPA, 2020).



Image iStock.com/Jef Folkerts

A high concentration of ammonia in the air can also cause negative changes in ecosystems, especially nitrogen-sensitive habitats, such as semi-natural grasslands and peatlands.[82] Particulate matter resulting from the reaction of ammonia with other pollutants has been linked to a range of pulmonary and cardiac issues in humans. Research specific to Ireland is required to assess the impacts of ammonia on human health, especially on the prevalence of asthma in children.

The Government's Code of Good Agricultural Practice (which is a range of voluntary yet cost-prohibitive measures that farmers can implement) is insufficient for achieving reductions in ammonia emissions.[83, 84] The Government currently relies on AgClimatise, which adopts this Code, as the instrument to reduce ammonia emissions.

The most recent analysis (at the time of writing) of the costs of ammonia abatement in Irish agriculture expects that compliance with NECD obligations can be achieved, conditional upon the full uptake of all abatement measures. Notably, the Baseline Scenario adopted in this analysis assumes a decrease by 2% in the overall cattle population between 2018-2030. This projection differs from an earlier analysis, which assumed an increase of 6% in cattle numbers up to 2030, to reflect the most likely trajectory of Irish agricultural activity. Overall, considering the voluntary and unfunded nature of abatement measures, full implementation is highly unlikely, and Ireland will continue to breach binding ammonia limits for both 2020 and 2030.[85, 86, 87]

We call on the Government to

- Prioritise the establishment of a credible, integrated roadmap that delivers compliance with the NECD. Include in this pathway mandatory implementation and enforcement measures, and substantial funding streams for specific farm abatement measures and monitoring of impacts.
- Address the current barriers to compliance with the NECD, including the need for extensive mapping and monitoring of ammonia concentrations and the ecological impacts.
- Implement an immediate ban on splash plate slurry spreading within the impact zone of sensitive Natura sites (such as bogs, heaths and species rich grasslands), and within 5.2 km of those sites.[88]
- Task the EPA to thoroughly critique, via the integrated pollution control licencing process, and undertake a cumulative assessment of projected ammonia emissions from intensive pig and poultry production, with a view to determining the impact on Ireland's efforts to achieve its NECD obligations.

"Implement an immediate ban on splash plate slurry spreading within the impact zone of sensitive Natura sites (such as bogs, heaths and species rich grasslands), and within 5.2 km of those sites."

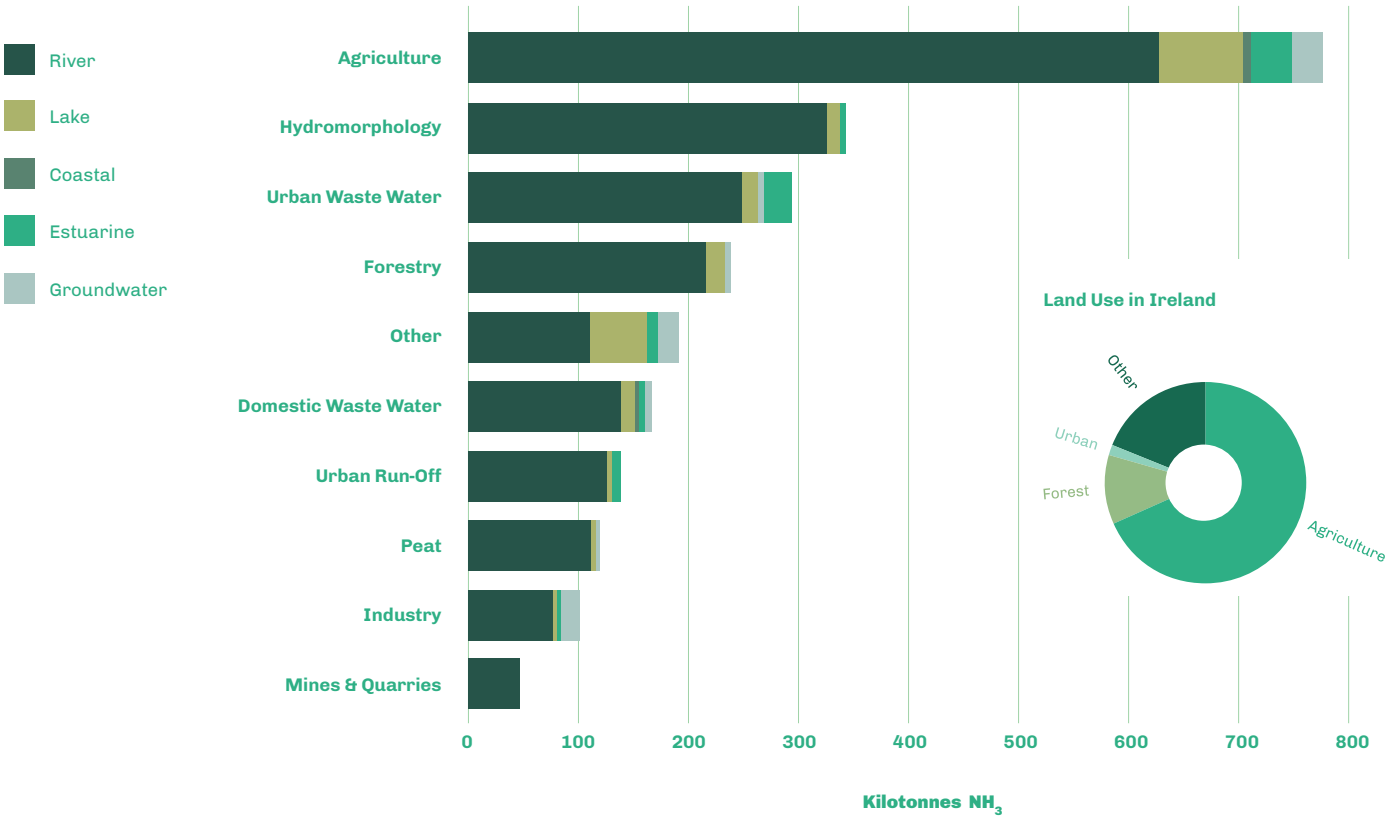
06 Halt and Reverse Water Quality Decline

Agriculture is by far the most significant pressure on the Irish water environment,[89, 90, 91] and the sector is responsible for a large proportion of water bodies failing to achieve good status as required by the Water Framework Directive (WFD) (Fig. 7 and 8).[92]

Agriculture is specifically linked with recent marked increases in water pollution from nutrients, particularly in the south and southeast of Ireland (Fig. 8)[93, 94] elevated pesticide levels,[95] declining species richness and abundance,[96] physical alterations to water bodies, and widespread unregulated wetland and riparian drainage causing sedimentation impacts.[97]

In addition, Ireland reports one of the highest crude incidence rates of Vero toxigenic Escherichia coli (VTEC) infection in the European Union, with evidence showing a link between infection risk, private well use and cattle density.[98]

Figure 7 Significant pressures on Ireland's aquatic environment (Source: EPA, 2020)



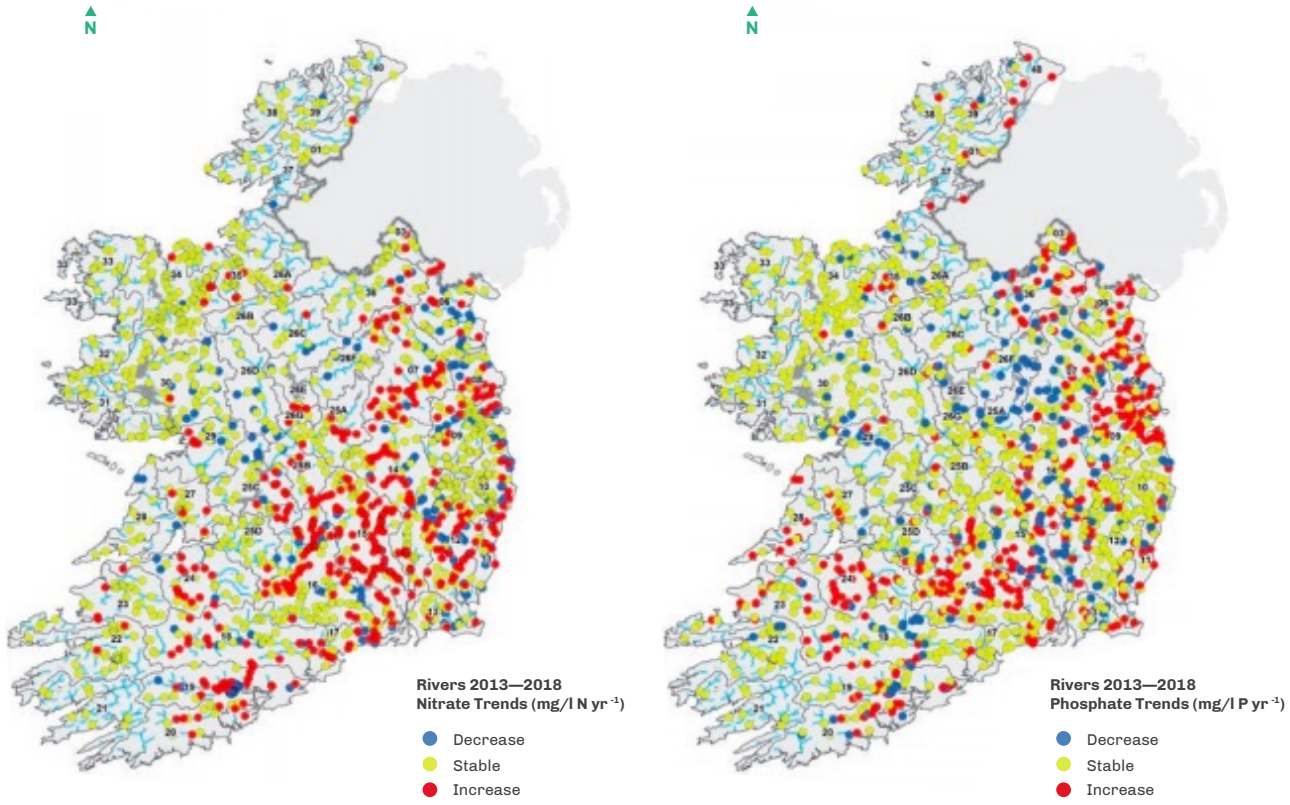


Figure 8 Nitrate (left) and phosphorus (right) concentrations in rivers, 2013-2018, showing trends increasing (red dots), stable (yellow dots) and decreasing (blue dots) (Source: EPA, 2020)

Low-input extensive farming can have local impacts, depending on biophysical conditions. The sensitive nature of some catchment areas means that very low-level on-farm changes can impact negatively on sensitive high-status waters.[99] The link between agricultural intensification and declining water status has long been proven,[100] and recent intensification has been clearly linked to increased localised water pollution.[101] Given that additional measures may be required in sensitive catchments, there is a clear need to differentiate between the potential impacts of different types of farming and their spatial distribution within catchment areas.

The resilience of Ireland's waters (i.e., the rivers' capacity to recover from the impact of further pollution) is greatly reduced by the general degradation of their environmental integrity. This problem will be amplified by climate change, as extreme weather events exacerbate land vulnerabilities and the damage caused by underlying water pollution.[102, 103]

There has been a recent shift in policy recognising the importance of 'the right measure in the right place', with this principle supported through initiatives such as the Agricultural Sustainability Support and Advisory Programme (ASSAP). However, the Good Agricultural Practices (GAP) regulations, which are the main policy and regulatory tools to control agricultural water pollution, do not reflect this principle. For this and other reasons, including inadequate enforcement, the GAP regulations are widely recognised to be ineffective in controlling nutrient pollution. [104, 105, 106, 107,] They

fail to account for site-specific conditions, and do not provide for targeted farm-specific measures. Furthermore, the ASSAP is a limited scheme targeting a small percentage of farms, and no assessment has been done to ascertain the effectiveness of the scheme in reversing water quality trends.[108]

Continued agricultural intensification, in particular intensive dairy expansion, cannot be reconciled with Ireland's commitments to protecting its water environment.[109] On-farm best practice measures to protect water quality are of limited efficacy within a policy framework that facilitates more animals and more nitrogen inputs that have, in turn, been linked to declines in water quality.[110] Any such policy is at odds with the WFD.[111]

Effective, substantial and robust mitigation measures to tackle agricultural impacts are urgently required if the necessary water quality improvements are to be achieved,[112] and ecological resilience restored. These measures need to immediately address water pollution linked to the intensification of agriculture,[113] and also focus on the localised impacts of intensive and extensive farming systems. The restoration of degraded river systems, as part of broader efforts to restore functioning habitats on agricultural land, should also be incentivised where appropriate. For example, reconnecting rivers to their natural floodplains could form an integral part of a catchment-based integrated land-use plan, that would deliver benefits for biodiversity, water quality and flood attenuation.

We have serious concerns about the prevalence and prospect of continued growth of zero-grazing/feedlot systems on beef and dairy farms. Unlike pig and poultry intensively housed systems, these feedlots do not fall within the licensing requirements of the Industrial Emissions Directive. This is despite the potential environmental consequences. Due to the higher application of inorganic fertiliser and manure used for the production of concentrate feed ingredients, as well as the extra slurry storage requirements, there is the potential for eutrophication of surface waters and nitrate contamination of ground waters in systems where cattle are confined.[114, 115] Furthermore, ammonia emitted from dairy and beef feedlots is a human health hazard. Studies on existing farms have shown that keeping cows indoors is, unsurprisingly, detrimental to their health and welfare.[116]

The EPA's Pollution Impact Potential (PIP) maps show the potential critical source areas for agricultural diffuse nutrients in Ireland's water bodies and sub-catchments. These maps will provide a useful management tool for assessing the suitability of certain catchment areas for intensive systems, especially intensive dairy farming. (i.e., 130 livestock manure nitrogen/ha and above).[117]

We call on the Government to

- Acknowledge the failings of current policy to address agricultural impacts on the water and wetland environment, in light of escalating water pollution and aquatic/wetland habitat degradation. Clearly outline and make publicly available, the relative, catchment-specific impacts of all the main farming types on water status; the incidence & impacts of agricultural wetland drainage; data on agricultural pesticide use & impacts; and impact to date of the application of nitration derogations on water quality in the catchments of derogation farms. Where this information/analysis is not available, it must be prioritised and the precautionary approach applied in its absence.

- As part of national regulation aimed at aligning the dairy sector with ecological parameters and environmental commitments:

  — Radically overhaul the Nitrates Action Plan so that nitrate derogations are no longer granted unless it can be demonstrated that a given catchment area can absorb the totality of nitrates being applied without negative impacts on water status as per the WFD. Informed by the EPA PIP maps, risk assessments must be carried out on farms applying for derogation, taking into account catchment-scale cumulative impacts.[118]

  — Require a WFD-specific assessment on all intensive farms (greater than 130 kg livestock manure nitrogen/ha) in areas identified by the EPA as Critical Source Areas (CSAs) for nitrate pollution. If necessary, certain sub-catchment areas may need to be zoned ineligible for certain stocking rates and for the granting of derogation status.[119]

- Introduce comprehensive measures based on site-specific on-farm assessments in all sub-catchments designated as at-risk[120] to intercept nutrient transport pathways between critical source areas and watercourses. This is required irrespective of stocking rates, particularly in relation to controlling pollution from phosphorus. Examples include attenuation zones, riparian zones, and appropriately distanced buffer strips.

- Introduce results-based dedicated water-protection schemes as part of wider supports for HNV farming, e.g. wetland protection; flood attenuation; fenced riparian buffers; and low and zero inputs near watercourses.

- Prohibit drainage of all wetlands. Ensure these regulations are enforced, and accompanied by targeted awareness-raising campaigns.

07 Support Sustainable Livelihoods and Incentivise Farm Diversification

Agriculture is at the forefront of the fight against climate change. Simultaneously, farmers are directly exposed to the impacts of extreme weather events, rising input costs and workloads, and related stresses on animal health and welfare.

In comparison to other sectors of the Irish economy, the farming population experiences serious income inequality, with over a third of farms economically vulnerable and at risk of severe poverty.[121] Yet, discussions on reducing agricultural emissions have been broadly perceived by the sector as a threat to farmers' income and livelihoods.

The current livestock and production-focused model also contributes to spatial and sectoral inequalities within the sector.[122, 123] Average farm income is highest on dairy farms and in the south-east region. The north-west (mainly beef and sheep farmers) is the most disadvantaged region, with the lowest farm income and highest reliance on direct payments and off-farm income.[124] Agri-environmental schemes, as a source of income, are more important on dry stock farms than on dairy and tillage farms. Improvements in average income have been made since 2018, however these improvements are largely confined to the dairy sector.

Dairy farms account for only 17% of the total farm population; yet, in 2019 these farms represented 48% of the total farm income (€1,074m) generated by the farm population represented.

Farmers face intense pressure from market forces and powerful actors, such as supermarket chains and agribusiness, to produce more and more outputs for a fraction of the price that their produce is sold for. The expansion of the dairy sector has resulted in farmers taking on intergenerational levels of debt to finance this expansion. In 2013, Irish dairy farmers were warned by Teagasc of the risks of price volatility and external cost exposures, and farmers were advised to adapt their farming systems to deal with these risks.[125]

The 2019 National Farm Survey revealed that two-thirds of Irish dairy farmers had an average debt of over €110,000, with levels increasing over the past five years.[126] This level of on-farm debt, in addition to the risk of low milk prices, rising production costs and the costs associated with extreme weather events, places dairy farmers in a potentially very vulnerable position. Long-term gains to the farm must be weighed against the potential that increased pressure due to farm debt, higher workloads, and extreme weather events have for farmer well-being.[127]

Solutions to the income inequalities experienced by Irish farmers require a shift in our food production model and policies that focus on building sustainable and viable rural communities. This requires linking subsidies to the provision of public goods, building local food supply systems that are based on new forms of cooperation among farmers and consumers, and adding value to farm produce. Just transition principles that seek to address the current inequities within the sector must also underpin this shift to an alternative agricultural model. This will help ensure that farm diversification alternatives and payments for ecosystem services adequately compensate farmers for any radical or abrupt changes that are required.

On Farm Diversification

On-farm diversification (such as agroforestry, horticulture, mixed organic farming, agri- and eco-tourism, and social farming) can improve farmers' livelihoods by opening up new economic opportunities, and reduce the environmental impacts associated with single modes of food production. The absence of economic incentives for on-farm diversification and a route out of damaging agricultural activities has the potential to jeopardise farm incomes even further as Ireland's climate and environmental targets become increasingly onerous.

However, farm diversification should not be narrowly defined by a switch to another single form of land use type or farm activity that compromises local and global environmental quality (e.g., mono-culture forestry, or a shift to anaerobic digestion based on grass inputs). It is also important to understand the barriers to diversification. Some farmers can be averse to risk, they can have limited access to agronomic and market information, and a loss of local and traditional knowledge may undermine the capacity of some farmers to consider alternatives. These barriers warrant the need for tailored communication on how to diversify farm systems.[128]

The Government needs to prioritise and reward diverse land use activities that are necessary for a multifunctional agricultural system. This will require broader policy reforms that recognise the multiple services and benefits provided by the land, including the broad range of ecosystem services. Aiming for added-value, shorter supply chains and local markets (such as organic, locally branded or artisan production) as opposed to higher volumes of commodity-based produce would help reduce stocking pressure on farms and allow for mixed farms, increased agroforestry and other biodiversity-friendly measures. Changing consumer preferences to



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include more locally produced, plant-based products will help open up new market opportunities for farm produce.

Diversification and Ireland's Tillage Sector

Ireland currently imports a high proportion of the cereals, vegetables and fruit consumed nationally. This is despite the fact that a very wide range of vegetable and fruit crops can be grown here, the production of which could be introduced or increased at commercial scale. Ireland's import dependence has been increasing across all main outputs of the tillage sector (i.e., cereals, oilseed rape, pulses, potatoes, and arable fodder crops).[129] This reflects an increase in demand that has outpaced domestic supplies, and highlights the notable economic opportunities that exist for the Irish tillage sector.

In recent years, calls have been made by representatives in the tillage sector for the economic and environmental contribution of tillage to be recognised as part of a balanced agri-food strategy. Nevertheless, tillage expansion in recent years has been curtailed by a sharp increase in the rental cost of land due to competition from the dairy sector.[130] Over the past decade, there has been a substantial reduction in tillage acreage especially in areas of the southeast and southwest, where former tillage land is now used by the dairy sector.

Tillage farming in Ireland has a lower emissions footprint than dairy and meat production, and is more calorie, protein and nitrogen efficient than dairy and beef production. However, current systems

are heavily reliant on the routine use of pesticides to minimise the impact of pests and disease, with implications for water quality and biodiversity.[131] Regular tillage is also destructive to soil diversity and function, and can reduce levels of soil organic matter and soil carbon.

The livestock feed sector comprised 93%, 83%, and 65% of the domestic uses of wheat, barley, and oats, respectively, diverting arable land from direct food production. Specifically, 15% of barley (malting/distilling), 32% of oats (milling), and less than 1% of wheat supply were used in human food and drink products. The vast majority of Irish output of pulses is used in the animal feed industry.[132]

A move towards greater uptake of tillage farming in Ireland would need to focus on substantially increasing the share of output of food ingredients direct for human consumption, and using nature-friendly management techniques to reduce the need for pesticides. Sustaining diverse agricultural land use with 'pockets' of tillage may be of particular value in agri-environmental planning, alongside a shift towards organic tillage production.

We call on the Government to

- **Develop, fund and implement a Just Transition action plan for the agricultural sector to identify and address the specific needs of farmers and communities in rural areas. In developing this plan, assess the emissions reductions and environmental benefit of diversification options. Identify the grants, training and advisory supports required, and the potential economic viability and employment opportunities of diversification strategies. Involve those affected by policy changes to identify sustainable alternatives, with support and input from the wider community and civil society working collectively toward rapid and fair solutions.[133, 134]**

- **Base diversification strategies on the merits of delivering public goods that deliver landscape and catchment-scale environmental and socio-ecological benefits. These strategies should take into account the local agro- and socio-ecological context, including soil type and the socioeconomic needs of farmers.**

- **Establish networks of agricultural innovation that provide an enabling environment for on-farm diversification. Facilitate peer-to-peer learning and knowledge transfer between farmers, government agencies, civil society, and research institutes.**

- Expand small scale, local food production. In particular, scale up local and innovative initiatives that shorten, amplify and democratise local food supply chains linking producers to consumers (such as Community Supported Agriculture schemes, farmers markets etc.). Open up marketing and new business opportunities for a range of HNV food produce (such as the development of farm shops, niche products, and ecotourism), and increase the value of HNV produce by linking food with environmental ethics.

- Increase the uptake in organic farming in line with the EU Biodiversity Strategy 2030 target of having at least 25% of agricultural land under organic farming management.

- As a national policy priority, substitute imported horticulture food items with cereals, fruit and vegetables grown in Ireland. This would improve rural economic resilience and national food security, help promote a healthier diet nationally, and reduce GHG emissions.

- Incentivise a shift in the tillage sector away from producing feed grains for the livestock sector, to producing outputs such as cereals and pulses directly for food consumption to reduce Ireland's reliance on imported food. Strengthen supply chains and the domestic market opportunities for Irish tillage farmers by supporting the production of organic certified cereals and pulses that offer price premiums for the tillage sector.

- Promote nature-friendly farming methods in the tillage and horticultural sector, including the use of Integrated Pest Management, reduced or no-till farming, crop rotation and cover crops, as well as leaving fallow plots and allowing for arable reversion next to existing natural habitats.

- Review the curricula of all agricultural training colleges to ensure that the next generation of farmers has up-to-date skills and knowledge in ecology and climate change.

"Expand small scale, local food production. In particular, scale up local and innovative initiatives that shorten, amplify and democratise local food supply chains linking producers to consumers..."

08 Contribute to Public Health and Sustainable Consumption

The global growth in animal food demand comes at a significant environmental cost and is inherently resource inefficient.[135] Plants that could be used for human consumption and directly for nutrition are instead used for the (indirect) process of meat production. The subsequent competition for scarce land between "food and fodder" drives land uses that are incompatible with the Paris Agreement and that undermine global nutrition.[136] Intensive agriculture can also present direct risks to human health through acute and chronic soil, air, and water pollution as well as by increasing exposure to zoonotic diseases, pathogens, and exacerbating the risk of antimicrobial resistance. Continuing high consumption of livestock products in wealthy countries, including Ireland, and increasing demand for livestock-based foods in large transition economies, severely limits the ability to achieve all of the UN SDGs and the objectives of the Paris Agreement.[137, 138]

Western diets are characterised by a high intake of meat and dairy products that exceed dietary recommendations.[139] Tackling poor dietary habits therefore is now a public health emergency that requires a whole-of-government response. Kilocalorie, protein and nutritional recommendations can easily be met with a variety of different diets, including low-carbon diets. Simply adhering to nutritional guidelines, and moving to a healthier diet with less

Image Eoin Campbell



dairy and meat intake will deliver some reductions to greenhouse gas emissions from food production and associated land use. The greatest reductions in emissions can be achieved, however, by eliminating all animal produce from one's diet.[140, 141]

The contribution of agriculture to food and public health should not only consider the role of livestock in food and nutrition security or in terms of the market value of promoting animal-based produce. The Government must acknowledge the fact that a reduction in meat and dairy consumption is essential to supporting One Health, One Welfare principles, and to reversing global environmental decline.[142, 143, 144]

Claims that Ireland is efficient at producing food also need to be reassessed.[145] Ireland's efficiency measures rely on out-of-date evidence which may not capture the full life cycle impacts of livestock production and which often do not confront the ethical imperative of reducing absolute emissions from food production regardless of how 'efficient' a particular country may appear to be in comparison to others.[146]

Simultaneously, the ethics of high consumption and aggressive marketing, both here and abroad, of high carbon foodstuffs (the production of which has serious environmental impacts) needs a balanced and fair discussion.[147] A sustainable food system must include policies that promote sustainable consumption practices and public health.[148, 149] Rather than seeing these as a threat to Irish agriculture, marketing and promotional measures should be tailored to accommodate changing consumer preferences and market opportunities.

We call on the Government to

- **Ensure that all stages of food production and consumption — from farm to fork and beyond to post-consumption — are in line with an agenda that promotes global health and environmental conservation. This requires a food and agricultural strategy that incentivises a greater dietary intake of organic produce and plant-based foods that are sustainably produced, facilitates a shift away from ultra-processed foods, and supports a drastic reduction in food waste.**
- **Draw up new Healthy Eating Guidelines and resources that are compatible with the latest science on reducing consumption of meat and dairy-rich produce in line with human and planetary health.**
- **Implement public health campaigns to promote nutritious, high quality plant-based diets utilising locally and nationally grown food where possible in line with environmental and climate policies, and ensure that any promotion of meat and dairy foods is consistent with up-to-date dietary and environmental considerations.[150]**

09 Contribute Meaningfully to Food and Nutrition Security

A truly sustainable food system delivers food security and nutrition for all in such a way that the environmental, social and economic bases for food security and nutrition for future generations are not compromised. It must integrate all food-related activities beyond actual agricultural production. This includes food availability, how food is used, how far food travels, whether the food in question requires energy-intensive transportation or not, and access to food, in addition to the consequences for the environment and social equity.[151]

The One Health, One Welfare principles to agriculture and food production, promoted by the World Organisation for Animal Health, recognise the synergies between human health and animal health for food security, and how these interconnections are interdependent and bound to the health of ecosystems.[152, 153] Implementing these principles however, requires a shift away from intensive, high-throughput livestock production systems. It must involve situating food production within the context of planetary health, fostering resilience and, where possible, shortening supply chains so as to reduce 'food miles', encouraging community involvement in food growing, maximising access to fresh, locally-produced food, and ensuring fairness across the chain of activities that comprise the food system.

Positioning Ireland as an international leader in creating a fairer, healthier and more sustainable global food system requires a transparent assessment of the relationship between food production, land use impacts and environmental deterioration, and how these variables combine to cause food insecurity and societal instability globally. It also means supporting small-scale food producers globally through appropriate accreditation schemes, such as Fairtrade and the Rainforest Alliance, that enhance farmer agency in global food value chains (especially in food items such as coffee, cocoa, etc., where they are dominant suppliers).

As threat multipliers, biodiversity collapse, climate change and resource depletion are the biggest risks to food security and nutrition, with the potential to aggravate existing social, economic and security problems, especially in vulnerable regions of the world.



Image Eoin Campbell

To avoid future breakdowns in food and sustainable livelihoods, it is essential that Ireland ensures its agri-food policy and approach to food systems do not contribute further to climate change.

Policies that purport to contribute to global food security must consider and address land use and transportation impacts, the principle of equal access to food, the right to food production and sustainable livelihoods, and the need to mitigate ecological and climate impacts due to production.[154, 155]

We call on the Government to

- **Implement clear principles and oversight mechanisms, including mandatory Human Rights and Environmental Due Diligence legislation, to ensure that the commercial links to the global food economy do not undermine Ireland's international development commitments on climate mitigation and sustainable development. Include appropriate assessment tools to evaluate the implications for delivery of the full set of Sustainable Development Goals (SDGs).**

- **Recognise the importance of deforestation-free value chains for agricultural imports. This should involve supporting small-scale farmers globally through appropriate accreditation schemes (Fairtrade, Rainforest Alliance, organic certification, etc.) that enhance their agency in global food value chains (especially in food items such as coffee, cocoa, etc. where they are dominant suppliers). These schemes enable small producers to transition to more sustainable agricultural systems and gain a greater share of the value of their production.**

10 Facilitate Inclusive Dialogue and Participation to Envision an Alternative Model for Agriculture in t

The planetary boundaries and global carbon budget consistent with 1.5°C of global warming are now the context within which all policy choices and strategic decisions must be made. Transitioning to a more sustainable future presents opportunities but will also require difficult political and societal decisions to be made. As a result, it will be necessary to make potential trade-offs explicit, in a way that recognises regional impacts, the strengths and weaknesses of different approaches to food production, and costs and benefits to society as a whole.

We believe that a successful transition to a sustainable food system requires an ongoing dialogue and cooperation between farmers, civil society, and experts across climate, water and biodiversity, and policy-makers an approach that has been lacking to date in the

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formulation of Irish agri-policy.[157] The policy making process should reflect the diversity of perspectives now needed from a range of stakeholder voices, including farmers from all sectors, agri-extension workers, rural sociologists, political economics, environmental, animal welfare, and public health experts, and consumers to address the complex socio-environmental challenges faced by the sector, and broader public health, food security and sustainable food system challenges. We need a dialogue that is based on creative engagement, including awareness raising and participation in decision-making, via citizens assemblies and/or dialogue fora and regional exchanges, as reflected in the final action of AgClimatise.

The recommendations presented in this report reflect the key positions and priorities of Ireland's largest environmental coalitions. These recommendations provide a strong mandate for an end to a business-as-usual approach to agricultural policy. The Environmental Pillar, Stop Climate Chaos Coalition, and SWAN are committed to engaging in dialogue and discussion with all relevant stakeholder groups, where there is genuine commitment to define and deliver an alternative, more sustainable model for Irish agriculture that is in line with Ireland's climate and environmental obligations.

We call on the Government to

- **Ensure that environmental and climate civil society NGOs are recognised as partner stakeholders by agricultural bodies and the Department of Agriculture, Food and the Marine.**
- **Develop and implement a plan for comprehensive, effective and inclusive public engagement and debate, with adequate time and engagement mechanisms for incorporating public input into the policy making process.**

"The recommendations presented in this report reflect the key positions and priorities of Ireland's largest environmental coalitions. These recommendations provide a strong mandate for an end to a business-as-usual approach to agricultural policy."

About the Environmental Pillar, SWAN and Stop Climate Chaos

Stop Climate Chaos is a coalition of over thirty civil society organisations campaigning to ensure Ireland plays its part in preventing runaway climate change. It was launched in 2007 and is the largest network of organisations campaigning for action on climate change in Ireland. Its membership includes development, environmental, youth and faith-based organisations.

It's members are: Afri, BirdWatch Ireland, Christian Aid Ireland, Comhlámh, Community Work Ireland, Concern Worldwide, Cultivate, Cyclist.ie, Dublin Friends of the Earth, Eco Congregation Ireland, ECO UNESCO, Feasta, Fossil Free TCD, Friends of the Earth, Friends of the Irish Environment, Goal, Good Energies Alliance Ireland, Self Help Africa, Jesuit Centre for Faith and Justice, Just Forests, Latin America Solidarity Centre (LASC), Liberia Solidarity Group, Methodist Church of Ireland – Council of Social Responsibility, Mountmellick Environmental Group, National Youth Council of Ireland, Oxfam Ireland, Peoples' Climate Ireland, Presentation Ireland, Tearfund Ireland, Trócaire, An Taisce, Union of Students in Ireland, VITA, VOICE., and Young Friends of the Earth.

www.stopclimatechaos.ie

The Environmental Pillar is made up of thirty-two national environmental non-governmental organisations that work together to represent the views of the Irish environmental sector. The Environmental Pillar creates and promotes policies that advance sustainable development and acts as an advocacy coalition promoting sustainable solutions in areas such as climate change, biodiversity, tree-cover, resource efficiency, transport, planning and water.

It's members are: An Taisce, Bat Conservation Ireland, BirdWatch Ireland, CELT (Centre for Environmental Living and Training), Coastwatch, Coomhola Salmon Trust, ECO-UNESCO, FEASTA, Forest Friends, Friends of the Earth, Global Action Plan Ireland, Gluaiseacht, Good Energies Alliance Ireland, Green Economy Foundation, Green Foundation Ireland, Hedge Laying Association of Ireland, Irish Peatland Conservation Council, Irish Seed Savers Association, Irish Whale & Dolphin Group, Irish Wildlife Trust, Leave No Trace Ireland, Native Woodland Trust, The Organic Centre, The Rediscovery Centre Ireland, Sonairte, Sustainable Ireland Cooperative (Cultivate), Sustainable Projects Ireland (The Village), Vincent Wildlife Trust, VOICE, Wildlife Rehabilitation Ireland, and Zero Waste Alliance Ireland.

www.environmentalpillar.ie

The Sustainable Water Network (SWAN) is an umbrella network of twenty five of Ireland's leading environmental NGOs, national and regional, working together to protect and enhance Ireland's aquatic resources through coordinated participation in the implementation of the Water Framework Directive, the Marine Strategy Framework Directive and other water-related policy in Ireland. SWAN Members: An Taisce, Bat Conservation Ireland, BirdWatch Ireland, Carra/ Mask/Corrib Water Protection Group, Cavan Leitrim Environmental Awareness Network, Celebrate Water, Coastwatch, Coastal Concern Alliance,Coomhola Salmon Trust, Cork Environmental Forum, Cork Nature Network, Dodder Action, ECO-UNESCO, Friends of the Earth, Friends of the Irish Environment, Irish Peatland Conservation Council, Irish Seal Sanctuary, Irish Whale and Dolphin Group, Irish Wildlife Trust, Longford Environmental Alliance, Macroom District Environmental Group, River Shannon Protection Alliance, Save the Swilly, Slaney River Trust, Voice of Irish Concern for the Environment.

www.swanireland.ie

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12 Feehan and O Connor (2009) refer to the competitive dualism within Irish agriculture characterised by the co-existence of a sector with sufficient capacity to withstand and adapt to radically changing market conditions, alongside a less competitive sector which has limited response capacity but which is potentially viable if its supply of public goods is remunerated. See: Feehan, J., O Connor, D. (2009). 55 Agriculture and Multifunctionality in Ireland, in McDonagh, J., Varley, T., Shorthall, S., Eds. 2009. A Living Countryside? The Politics of Sustainable Development in Rural Ireland, Ashgate.

13 A number of position papers that include recommendations on CAP as it relates to water, climate, and biodiversity are available. See: Larkin, C. (2020). Optimising Water Quality Returns from the Reform of the Common Agricultural Policy (CAP): A Rapid Evidence Assessment Report. The Water Forum. **https://thewaterforum.ie/app/uploads/2020/11/CAP-Reform-Report-to-An-Foram-Uisce_FINAL-3.pdf**; Birdlife International (2020). Reform the CAP: 3 Solutions to Beat the Biodiversity and Climate Crisis. **https://www.birdlife.org/sites/default/files/attachments/birdlife_europe_reform_the_cap_policy_briefing.pdf**; CAN Europe (2020). How can the new Common Agricultural Policy (CAP) support the fight against climate change? **https://caneurope.org/content/uploads/2021/01/Final-CAP-briefing.pdf**

14 Industry and farm lobby representation continue to exert a powerful influence over almost all aspects of Irish agricultural policy. There is also a growing sense that the Department of Agriculture, Food and the Marine has been captured by the agrifood industry, and that the diplomatic resources of the State are focused on promoting exports of cheap animal food commodities abroad at the expense of the environment. See: Kenny, Cronin & Sage (2017). A retrospective public health analysis of the Republic of Ireland's Food Harvest 2020 strategy: absence, avoidance and business as usual. doi.org/10.1080/09581596.2017.1293234.

15 This Strategy succeeds Food Harvest 2020 and Food Wise 2025, ten year strategic plans for the direction of the agri-food sector. In February 2021, the Environmental Pillar, which was the only environmental civil society representative on the Agri-Food 2030 Strategy Committee, formally withdrew from the Committee because of the inadequacy of the (draft) Strategy in addressing urgent social and environmental challenges. See: **https://environmentalpillar.ie/the-environmental-pillar-withdraws-from-the-problematic-2030-agri-food-strategy-committee/**

16 Whilst there are common issues between agriculture, aquaculture and fisheries, this paper deals specifically with land-based food production.

17 Communication from the Commission to the European Parliament, the European Council, The Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. COM/2019/640 final. **https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640**

18 European Commission. (2020) Biodiversity strategy for 2030 - concrete actions. **https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en**

19 Ibid.

20 Agricultural production has particular relevance for many of the Sustainable Development Goals (SDGs), and delivery of the full suite of the Goals must form an intrinsic part to any agricultural strategy. Because of a failure to mainstream across relevant policy areas, Ireland's implementation of the SDGs has been slow. In particular, significant and major challenges are faced in relation to achieving environment-focused Goals. See: Sustainable Development Solutions Network and Institute for European Environmental Policy (2020). The 2020 Europe Sustainable Development Report: Meeting the Sustainable Development Goals in the face of the COVID-19 pandemic. Sustainable Development Solutions Network and Institute for European Environmental Policy: Paris and Brussels.

21 For Teagasc, this would also involve a revised agriculture research programme where the requirements for a new vision for agriculture can be delivered.

22 Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

23 Martin, J., O Neill, F. and Daly, O. (2018). The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals 102, National Parks and Wildlife Service, Ireland

24 Lewis, L. J., Coombes, D., Burke, B., O Halloran, J., Walsh, A., Tierney, T. D. & Cummins, S. (2019). Countryside Bird Survey: Status and trends of common and widespread breeding birds 1998-2016. Irish Wildlife Manuals, No. 115. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland

25 NPWS (2019). The Status of EU Protected Habitats and Species in Ireland, pg. 84

26 National Park and Wildlife Service (2019). The Status of EU Protected Habitats and Species in Ireland.

27 Kelly-Quinn, M., Feeley, H., & Bradley, C. (2020). Status of freshwater invertebrate biodiversity in Ireland's rivers time to take stock. Biology and Environment: Proceedings of the Royal Irish Academy, 2020, Vol. 120B, No. 2. 10.3318/BIOE.2020.09

28 Balmer, D. et al. (2013). Bird Atlas 2007 11: The Breeding and Wintering Birds of Britain and Ireland, Thetford: British Trust for Ornithology Books.

29 FitzPatrick, Ú., Murray T.E., Byrne A., Paxton R.J., Brown M.J.F. (2006). Regional Red List of Irish Bees, Publ. Rep. to National Parks and Wildlife Service (Ireland) and Environment and Heritage Service. **https://www.npws.ie/sites/default/files/publications/pdf/Fitzpatrick_et_al_2006_Bee_Red_List.pdf**

30 As important indicators for the health of our environment, bird populations provide a warning system for the degradation or loss of ecosystems, and the services these ecosystems provide. See: Gregory, R. D., A. van Strien, P. Vorisek, A. W. Gmelig Meyling, D. G. Noble, R. P. B. Foppen and D. W. Gibbons. (2005). Developing indicators for European birds. Philosophical Transactions of the Royal Society B 360. **https://doi.org/10.1098/rstb.2004.1602**

31 Other barriers to ensuring the protection of biodiversity include the absence of targeted incentives and support for farmers to continue low intensity farming methods and to make space for nature on their farms. In addition, a decline of local management skills and knowledge specific to the needs of HNV farms is compounded by a lack of suitable farm advisory services with sufficient ecological knowledge.

32 In these systems, grazing is important for healthy grasslands that create favourable habitat for many species (e.g. species such as the starling, Hen Harrier, and Red Grouse which rely on open areas, others such as curlew and lapwing require tussocky swards). The value of HNV farmland is not just for biodiversity. The public good value spans clean water and clean air, carbon sequestration, landscape aesthetics. These socio-ecological systems also form an important part of rural life, however because of soil, climate and topographic characteristics, there are biophysical constraints to food production on these farms. HNV farmland in Ireland falls into three categories: whole (i.e., the whole farm is low intensity), partial (where low-intensity exists alongside intensive practices), or remnant (where HNV farmland is no longer present, although there may still exist features of high nature value). Examples of whole HNV farmland can be found in the Burren, Connemara, the Wicklow Uplands, the Inishowen peninsula, and the Commeragh region. Partial HNV farmland can be found in areas of Leitrim, east Mayo and east Galway. Across these types exist a range of landscapes including peatland, semi-natural, species-rich wet or dry grassland habitats, commonage, and arable land with a range of landscape features such as hedgerows and ditches, treelines, stone walls, ponds, scrub and patches of woodland, for example. See: Moran, J., and Sullivan, C. (2017). The Co-Benefits for Water and Biodiversity from the Sustainable Management of High Nature Value Farmland. Environmental Protection Agency, Ireland.

33 Sullivan, C. (2020). High Nature Value Farmland: Getting Results from Farming for Biodiversity. Working Notes 86: Integral Ecology: Five Years On? Dublin, Jesuit Centre for Faith and Justice. **https://www.jcfj.ie/article/high-nature-value-farmland-getting-results-from-farming-for-biodiversity**

34 Moran, J., D. Byrne, J. Carlier, B. Dunford, J. A. Finn, D. Ó hUallacháin, and C. A. Sullivan. (2021). Management of high nature value farmland in the Republic of Ireland: 25 years evolving toward locally adapted results-orientated solutions and payments. Ecology and Society 26, **https://doi.org/10.5751/ES-12180-260120.**

35 Strohbach, M., Kohler, M., Dauber, J., and Klimek, S. (2015). High Nature Value farming: From indication to conservation. Ecological Indicators 57, **https://doi.org/10.1016/j.ecolind.2015.05.021**

36 Plieninger, T., and C. Bieling. (2013). Resilience-based perspectives to guiding high-nature-value farmland through socioeconomic change. Ecology and Society 18, **http://dx.doi.org/10.5751/ES-05877-180420**

37 Lomba, A. et al. (2020). Back to the future: rethinking socioecological systems underlying high nature value farmlands. Frontiers in Ecology and the Environment 18, doi:10.1002/fee.2116

38 Fabrice Gouriveau, Guy Beaufoy, James M. Moran, Xavier Poux, Irina Herzon, et al. (2019). What EU policy framework do we need to sustain High Nature Value (HNV) farming and biodiversity? **http://www.hnvlink.eu/download/D4.3.HNV-Link_Policy-Brief_v2019-3-25.pdf**

39 Tscharntke, T. et al. (2005). Landscape perspectives on agricultural intensification and biodiversity ecosystem service management. Ecology Letters 8, **doi.org/10.1111/j.1461-0248.2005.00782.x** for a useful table outlining the local and landscape scale impacts of intensification.

40 Frey-Ehrenbold, A. et al. (2013). Landscape connectivity, habitat structure and activity of bat guilds in farmland-dominated matrices. Journal of Applied Ecology 50(1), DOI: 10.1111/1365-2664.12034

41 As a developing concept, there are different definitions of what rewilding is. Pettorelli et al. (2017) identified four types of rewilding categorised according to the associated vision and aims, and the associated management interventions. These types are: Pleistocene rewilding (involving the restoration of ecological interactions lost during the Pleistocene megafauna extinction); trophic rewilding (involving introductions to restore top-down trophic interactions); ecological rewilding (allowing natural processes to regain dominance); and passive rewilding (primarily involving land abandonment and the removal of human interference). See: Pettorelli, N. et al. (2017). Making Rewilding fit for Policy. Journal of Applied Ecology, DOI: 10.1111/1365-2664.13082

42 Navarro & Pereira, (2012) and Merckx, T. and Pereira, H. (2015)

43 Navarro, L.M., Pereira, H.M. (2012). Rewilding Abandoned Landscapes in Europe. Ecosystems 15, **https://doi.org/10.1007/s10021-012-9558-7**

44 Merckx, T. and Pereira, H. (2015). Reshaping agri-environmental subsidies: From marginal farming to large-scale rewilding. Basic and Applied Ecology 16, **https://doi.org/10.1016/j.baae.2014.12.003**

45 Lomba, A. et al. (2020).

46 Current biodiversity legislative requirements (i.e., set by the Birds Directive and Habitats Directive), as well as land management conditions set by the CAP may limit rewilding opportunities. Many HNV farmlands, for example, are subject to non-agriculture related commitments that require active low intensity agricultural management to preserve favourable conservation outcomes as legally required (such as Natura 2000 sites). Pettorelli et al. (2017) argue that a better understanding of current policy opportunities and constraints is needed in order to progress the rewilding agenda.

47 Lomba, A. et al. (2020).

48 Several European studies conclude that if, at least, 10-14% of agricultural land were kept free from food production, then birds, and other wildlife, would recover. At landscape level, 26-33% may be required for landscape-level recovery. See: Birdlife International. Reform the CAP: 3 Solutions to beat the biodiversity and climate crisis. **https://www.birdlife.org/sites/default/files/attachments/birdlife_europe_reform_the_cap_policy_briefing.pdf**

49 Scheme payments must be at the same rate or higher than forestry premia or other competing agriculture schemes.

50 Pschenyckyj, C. et al (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce. **https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Synthesis-Report_Final_April2021.pdf**

51 Carsten, P., Fealy, R., Fenton, O., Lanigan, G., O Sullivan, L., and Schulte, R. (2018). Assessing the role of artificially drained agricultural land for climate change mitigation in Ireland. Environmental Science & Policy 80, doi.org/10.1016/j.envsci.2017.11.004

52 Donlan, J., O Dwyer, J., and Byrne, K. (2019). Assessment of Agricultural Activity on Drained Organic Soils. Environmental Protection Agency, Ireland. **https://www.epa.ie/pubs/reports/research/climate/Research_Report_299.pdf**

53 Gardi, C., Jeffrey, S., & Saltelli, A. (2013), An estimate of potential threats levels to soil biodiversity in the EU. Global Change Biology 19, **https://doi.org/10.1111/gcb.12159**

54 Barrios, E. (2007). Soil biota, ecosystem services and land productivity. Ecological Economics 64, **https://doi.org/10.1016/j.ecolecon.2007.03.004**

55 Wichmann, S. (2018). Economic incentives for climate smart agriculture on peatlands in the EU. **http://paludiculture.uni-greifswald.de/doc/paludikultur/projekte/cinderella/Wichmann_2018_Economic%20incentives%20for%20climate%20smart%20agriculture%20on%20peatlands_Report.pdf**

56 Carbon Market Watch (2020) Carbon markets and agriculture why offsetting is putting us on the wrong track. **https://carbonmarketwatch.org/publications/carbon-markets-and-agriculture-why-offsetting-is-putting-us-on-the-wrong-track/**

57 It is not possible to accurately measure the soil carbon content of a given area of land, and land use and soil type vary even at the farm-level. There are also potentially high costs and adverse impacts on wildlife and biodiversity from projects that seek to address the wastes of industrial agriculture (using anaerobic digestion for example) instead of preventing them.

58 Mackey, B., Prentice, I., Steffen, W. et al. (2013). Untangling the confusion around land carbon science and climate change mitigation policy. Nature Climate Change 3, **https://doi.org/10.1038/nclimate1804**

59 These are extremely rare features of the Irish landscape, and are among the most threatened and vulnerable Annex 1 Habitats. See: Devaney, J., Redmond, J., Barrett, B., Cott, G., & O Halloran, J., (2017). 21st Century Deforestation in Ireland. Environmental Protection Agency, Ireland. **https://www.epa.ie/pubs/reports/research/land/EPA%20RR%20221%20essentra_web.pdf**

60 Corkery, I., Keating, U., Lusby, J., Irwin, S., Quinn, J., O Halloran, J., (2015) Overlap of afforestation and birds of conservation concern on farmland habitat. In Ó hUallacháin, D. and Finn, J.A. (eds.) 2015, Farmland Conservation with 2020 Vision. Wexford: Teagasc, 74-75. ISBN 978-1-84170-620-7

61 Afforestation and related activities such as clear-felling and building of forest access roads have had, and continue to have, a detrimental impact on biodiversity and water quality and may only make a marginal contribution to carbon sequestration. Managed forests are already net emitters due to excess harvest compared to past planting, and annual carbon sequestration into forests and harvested wood products is projected to decrease through 2030, thereby further increasing land carbon emissions.

62 Agroforestry systems include open parkland assemblages, planted mixtures of a small number of tree species, to hedgerow planting and tree cover on field boundaries.

63 Udawatta, P., Rankoth, L., Jose, S. (2019). Agroforestry and Biodiversity. Sustainability 11, **https://doi.org/10.3390/su11102879**

64 Article 1 of the Ramsar Convention on Wetlands states that wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. Ramsar Handbook 5th Edition. An Introduction to the Ramsar Convention on Wetlands. **https://www.ramsar.org/sites/default/files/documents/library/handbook1_5ed_introductiontoconvention_e.pdf**

65 For example, by reducing grassland and wetland carbon losses, properly managing hedgerows, ending drainage of wetlands, limiting forest harvesting, moving away from intensive agricultural production and drainage on nutrient poor soils, rewetting nutrient rich soils, and managing organic soils for carbon sequestration. Proper protection may require a bespoke law to protect important features. For example, the EIA regulations for hedgerow removal need to be revised; the thresholds must be eliminated and consent for all proposed hedgerow removal should be required.

66 Species could include: Aspen, Birch, Oak, Cherry, Holly; valuable high end broadleaves including Maple, Walnut and Spanish Chestnut; native conifer, Scots Pine; and non-native conifers including Cedar, Douglas Fir, European Larch

67 Environmental Protection Agency (2020). Ireland's Greenhouse Gas Emissions Projections 2019-2040. Environmental Protection Agency, Ireland. **https://www.epa.ie/pubs/reports/air/airemissions/ghgprojections2019-2040/2020-EPA-Greenhouse-Gas-Emissions-Projections_final.pdf**

68 Eurostat (2020) **https://ec.europa.eu/eurostat/web/products-datasets/product?code=tag00014**

69 Launched in late 2020, the Teagasc dairy strategy for 2027 envisages an increase in the dairy herd to 1.65 million dairy cows, which, in conjunction with increases in milk output, will lead to additional methane and nitrous oxide emissions. The N20 emissions are also likely to increase further if the dairy sector remains reliant upon imported feed and additional grazing land, and this dependency could increase further if climate change attributes to more droughts. See: Teagasc (2020). 2027 Sectoral road map: Dairy. **https://www.teagasc.ie/publications/2020/2027-sectoral-road-map-dairy.php**

70 The AgClimatise roadmap was developed in the context of the Climate Action Plan 2019, and meeting national targets under the 2030 Effort Sharing Decision and LULUCF decision.

71 Bowles, N., Alexander, S., Hadjikakoub, M. (2019). The livestock sector and planetary boundaries: A 58 limits to growth perspective with dietary implications. Ecological Economics 160. **https://doi.org/10.1016/j.ecolecon.2019.01.033**

72 Agriculture is the single largest sectoral emitter in Ireland. Nitrous oxide and methane emissions have been increasing steadily since the ending of milk quotas in 2015, and are projected to grow over the next decade in line with an increase in animal numbers and fertilizer usage. See: Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

73 Rather than waiting until the need to impose top-down strict regulations to meet environmental commitments, with a shift in policy direction now, decision makers can enable a smoother, farmer-led transition to a more sustainable sector. To illustrate the challenges from introducing regulation, it is worth looking at the Netherlands, where farmers held protests dissatisfied with regulation introduced to curb nitrogen emissions. See: Nitrogen crisis from jam-packed livestock operations has 58 paralyzed Dutch economy. Science

Magazine. doi:10.1126/science.aba4504

74 McMullin, B. and Price, P. (2020). Synthesis of Literature and Preliminary Modelling Relevant to Society-wide Scenarios for Effective Climate Change Mitigation in Ireland. Environmental Protection Agency, Ireland. **https://www.epa.ie/researchandeducation/research/researchpublications/researchreports/Research_Report_352.pdf**

75 Centre for Alternative Technology (2018) People, Plate and Planet report **https://www.cat.org.uk/app/uploads/dlm_uploads/2018/11/People-Plate-and-Planet.pdf**

76 The latter is required as part of the two five-year carbon budget periods committed to by the present Government, incorporating an overall 7% per annum national reduction in greenhouse gas emissions up to 2030.

77 For a detailed account of the policy drivers of agricultural emissions in Ireland, and possible interventions to reduce emissions, see: Stop Climate Chaos Coalition (2020). Agricultural emissions in Irish climate change mitigation policy: Science and Solutions. **http://www.stopclimatechaos.ie/assets/files/pdf/agricultural_emissions_science_and_solutions.pdf**

78 Beef Industry. Dáil Éireann Debate, Thursday - 11 February 2021. **https://www.oireachtas.ie/en/debates/question/2021-02-11/344/#pq_344c;** and Dairy Sector. Dáil Éireann Debate, Thursday - 11 February 2021. **https://www.oireachtas.ie/en/debates/question/2021-02-11/345/#pq_345**

79 Environmental Protection Agency (2020) Ireland's Air Pollutant Emissions 1990-2030. The EPA's 2019-updated recalculation of nitrogen inputs (not yet published at the time of writing) is expected to show a large increase in reported ammonia emissions.

80 Kelleghan, D., Hayes, E. Everard, M. & Curran. T. (2020). Assessment of the Impact of Ammonia Emissions from Intensive Agriculture Installations on Special Areas of Conservation and Special Protection Areas. Environmental Protection Agency, Ireland. **http://www.epa.ie/pubs/reports/research/health/Research_Report_347.pdf**

81 Ibid.

82 Ibid.

83 Kelleghan, D., Hayes, E. Everard, M. & Curran. T. (2019). Mapping ammonia risk on sensitive habitats in Ireland. Science of the Total Environment 649. DOI: 10.1016/j.scitotenv.2018.08.424

84 European Commission (2020). Report from the Commission to the European Parliament and the Council on the progress made on the implementation of Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants. COM(2020) 266 final. **https://ec.europa.eu/environment/air/pdf/reduction_napcp/1_EN_ACT_part1_v7.pdf**

85 European Commission - DG Environment (2020). Review of the National Air Pollution Control Programme Ireland Final Report for European Commission DG Environment Specific contract 070201/2018/791186/SER/ENV.C.3. **https://ec.europa.eu/environment/air/pdf/reduction_napcp/NAPCP%20review%20report%20IE%20-%20Final%20updated%2008Jun20.pdf**

86 Buckley, C. and Krol, D. (2020). An Analysis of the Cost of the Abatement of Ammonia Emissions in Irish Agriculture to 2030. Teagasc, Ireland. **https://www.teagasc.ie/media/website/publications/2020/NH3-Ammonia-MACC.pdf**

87 Buckley, C., et al. (2020) An Analysis of the Cost of the Abatement of Ammonia Emissions in Irish Agriculture to 2030. Teagasc, Carlow. **https://www.teagasc.ie/publications/2020/an-analysis-of-the-cost-of-the-abatement-of-ammonia-emissions-in-irish-agriculture-to-2030.php**

88 Kelleghan, D., Hayes, E., Everard, M., & Curran, T. (2019).

89 Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

90 Department of Housing, Planning and Local Government (2018). River Basin Management Plan for Ireland 2018 - 2021. **https://www.gov.ie/en/publication/429a79-river-basin-management-plan-2018-2021/?referrer=http://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021**

91 Environmental Protection Agency (2020) Water Quality in 2019. An Indicators Report. Wexford, Ireland. **https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%202019%20-%20an%20indicators%20report.pdf**

92 The EPA s catchment characterisation has identified agriculture a significant issue in 67% of 59 At Risk river and lake waterbodies and 53% of 59 At Risk waterbodies overall (incl. coastal waters and groundwater).

93 Ibid., and Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

94 The upward trend of nitrate concentrations is a particular concern in the south and southeast of Ireland where nitrate losses are closely correlated with increasing farm intensity. This coincides with areas of marked increase in dairy intensification. Such declines are in contravention of the WFD. See: Environmental Protection Agency (2019) Water Quality in Ireland. 2013-2018. Also: Environmental Protection Agency (2020) Water Quality in 2019. An Indicators Report.

95 Environmental Protection Agency (2020). Drinking

Water Quality in Public Supplies 2019. Wexford, Ireland. Available at: **https://www.epa.ie/pubs/reports/water/drinking/DW%20Quality%20in%20Public%20Supplies%202019_web.pdf**

96 Kelly-Quinn, M., Feeley, H., & Bradley, C. (2020). Status of freshwater invertebrate biodiversity in Ireland's rivers time to take stock. Biology and Environment: Proceedings of the Royal Irish Academy, 120B(2), doi:10.3318/bioe.2020.09

97 McCarthy, C. (June 17th, 2020) 60 Two years on the ground: identifying problems and fixing them , EPA, National Water Event. Available online: **https://www.catchments.ie/2020-epa-water-conference-watch-online-now/**

98 Óhaiseadha, C., Hynds, P., Fallon, U. and O'Dwyer, J. (2017). A geostatistical investigation of agricultural and infrastructural risk factors associated with primary verotoxigenic E. coli (VTEC) infection in the Republic of Ireland, 2008-2013. Epidemiology and Infection145(1), Doi:10.1017/S095026881600193X

99 Moran, J., and Sullivan, C. (2017).

100 Donohue et al. (2006) found significant inverse relationships between a range of land-use pressures, including agricultural intensity and cattle densities, and ecological status in 797 river catchments in Ireland. See: Donohue, I., McGarrigle, M.L. and Mills, P., (2006). Linking catchment characteristics and water chemistry with the ecological status of Irish rivers. Water Research 40, pp. 91 98

101 EPA Water Environmental Protection Agency (2019). Water Quality in Ireland 2013-2018. EPA, Wexford, Ireland. **https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%20Ireland%202013-2018%20(web).pdf**

102 Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

103 Environmental Protection Agency (2019) The impacts of climate change on Irish groundwater resources. Wexford, Ireland. Available at: **https://www.catchments.ie/the-impacts-of-climate-change-on-irish-groundwater-resources**

104 The GAP regulations do not include interception measures tailored to on-farm physical and hydrological conditions. Whilst the right measure in the right place is appropriate where the pollution pathway is the most critical factor (in the case of phosphorus), it is the source that is the most significant factor in terms of nitrogen.

105 Teagasc (2017). Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford **https://www.teagasc.ie/media/website/publications/2018/ACP_Phase_2_Report.pdf**

106 Deakin, J., Flynn, R., Archbold, M., Daly, D., O'Brien, R., Orr, A., and Misstear, B. (2016). Biology and Environment: Proceedings of the Royal Irish Academy, Vol. 116B, No.3 pp. 233-243

107 Government of Ireland (2018) River Basin Management Plan for Ireland 2018 - 2021. Prepared by the Department of Housing, Planning and Local Government

108 The ASSAP scheme is being implemented in 190 60 Priority Areas for Action.

109 Environmental Protection Agency (2020) Ireland's Environment An Integrated Assessment 2020.

110 Environmental Protection Agency (2020) Water Quality in 2019. An Indicators Report.

111 In New Zealand, where dairy has expanded at the expense of sheep and beef farming, conflicts have been greatest where intensive farming occurs or was expected to expand in catchments with nutrient sensitive water bodies. In the case of some iconic catchments, this has resulted in a cap and trade scheme for nitrogen discharge from pastoral farming. See: Quin et al. (2009). Grassland farming and water quality in New Zealand. Tearmann: Irish Journal of Agri-Environmental Research 7, 69-88

112 This can help achieve multiple benefits for Ireland's commitments under the National Emissions Ceiling Directive, the WFD, and its climate commitments. See: Kanter, D.R. (2018) Nitrogen pollution: a key building block for addressing climate change. Climatic Change 147. **https://doi.org/10.1007/s10584-017-2126-6**

113 EPA Water Environmental Protection Agency (2019). Water Quality in Ireland 2013-2018. EPA, Wexford, Ireland. Available at: **https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%20Ireland%202013-2018%20(web).pdf**

114 Meul, M. Et al. (2012). Higher sustainability performance of intensive grazing versus zero-grazing dairy systems. Agronomy for Sustainable Development 32(3), DOI: 10.1007/s13593-011-0074-5

115 Hristov, A., et al. (2011). Review: Ammonia emissions from dairy farms and beef feedlots. Canadian Journal of Animal Science 91, **https://doi.org/10.4141/CJAS10034**

116 Arnott, G., Ferris, C., O Connell, N. (2017). Review: welfare of dairy cows in continuously housed and pasture-based production systems. Animal 11, **https://doi.org/10.1017/S1751731116001336**

117 At the time of writing, these maps were due for imminent publication by the EPA.

118 This must also apply to farms over 170kg/Ha that are exempt from derogation through slurry export.

119 Environmental Protection Agency (2019). EPA - Nitrates Directive Derogation Consultation Submission Final. **https://www.epa.ie/pubs/epasub/EPA%20-%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf**

120 At-risks areas are identified in the EPA PIP maps.

121 Teagasc (2020). Teagasc National Farm Survey 2019 Results. **https://www.teagasc.ie/media/**

website/publications/2020/Teagasc-National-Farm-Survey-2019.pdf

122 Sage, C. (2017). Connecting agri-export productivism, sustainability and domestic food security via the metabolic rift: The case of the Republic of Ireland," in Advances in Food Security and Sustainability, vol.2, Oxford, Elsevier, pp. 41-67.

123 Analysis by Birdwatch Ireland revealed clear disparities between northwest, southeast regions across the average total CAP payment received by individual beneficiaries in each county. The scale of this divide is also substantial, with farmers in counties Kilkenny and Waterford (south-east region) receiving almost twice the average CAP payment compared to farmers in Mayo, Sligo and Leitrim (north-west), yet perhaps only half the proportion of farmers in these areas undertake environmental management measures in comparison to the north-west. See: https://birdwatchireland.ie/app/uploads/2020/08/BirdWatch-Ireland-submission-on-CAP-post-2020-final.pdf

124 The average family farm income in 2019 was ¬ 23,934. 44% of farmers earned less than ¬ 10,000, 4% of farms earned in excess of ¬ 100,000, and there are major differences across Farming Systems. Income figures for 2019 were: Dairy farms: ¬ 66,570 (+9% since 2018); Cattle rearing: ¬ 9,188 (+11%); Cattle (Other): ¬ 13,893 (-6%); Sheep: ¬ 14,604 (+9%); Tillage: ¬ 34,437 (-15%). See: Teagasc (2020). Teagasc National Farm Survey 2019 Results.

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145 The next agri-food strategy must confront the reality that the vast majority of Ireland's beef and dairy products (¬ 7.3bn in 2019) are exported. At the same time, Ireland imported ¬ 10bn in agri-food products in 2020.

146 According to the special report on agriculture and land-use in the Climate Change Advisory Council s 2019 Annual Review, Life Cycle Analysis studies indicate that Ireland has the fifth lowest carbon footprint within the EU-27: 19 kg carbon dioxide equivalent per kg of beef compared to an EU average of 22. Using a different methodology, Ireland was found to have the ninth highest carbon footprint within the EU-27 at approximately 28 kg CO2eq kg beef compared to an average of 22.6. A separate review explored the carbon footprint for global beef production regions (Canada, USA, EU, Australia, Brazil). This study suggests Ireland is closer to the average footprint. The study also highlighted the importance of accounting for land-use change, which may not always be considered in life cycle analysis, where Ireland may have a considerably lower footprint than some non-EU countries. The Origin Green Sustainability Report of 2016 indicates that participating beef enterprises have an average carbon footprint of 11.6 kg carbon dioxide equivalent per kg of beef liveweight. The report notes a large variation in performance, from 5 to 18 kg carbon dioxide equivalent per kg. Similarly, Teagasc has indicated variation according to economic performance of enterprises and type of beef cattle i.e. suckler or dairy breeds. See: Climate Change Advisory Council (2019) Annual Review 2019. P.107. **https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/Climate%20Change%20Advisory%20Council%20Annual%20Review%202019.pdf**

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156 Greater representation of the environmental sector was sought on the committee behind the development of Ireland's Agri-food strategy to 2030. This representation included experts in climate science, biodiversity and water quality to ensure that pressing and complex environmental concerns and priorities were reflected in the strategy document. This request was denied.

Notes

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