



**AgriSearch Response to the
DAERA Consultation on:**

**Setting of Northern Ireland's
Fourth Carbon Budget
2038-2042**

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Executive Summary

AgriSearch welcomes the opportunity to contribute to the Department of Agriculture, Environment and Rural Affairs (DAERA) consultation on the Fourth Carbon Budget. The response focuses on areas aligned with AgriSearch's charitable objectives and highlights the critical role of agriculture in both climate mitigation and food security.

Key Points:

- **Agriculture's Role in Climate Action:** Agriculture is uniquely positioned to capture carbon dioxide and convert it into food, fibre, and fuel. However, climate change poses significant challenges to farming, including extreme weather and emerging pests and diseases.
- **Carbon Budget Target Concerns:** AgriSearch neither agrees nor disagrees with the proposed 77% reduction target, citing concerns over its achievability and proportionality. The organisation calls for an urgent review of the Climate Change Act (Northern Ireland) 2022, noting that the targets exceed those recommended by the UK Climate Change Committee (CCC) and may lead to unrealistic expectations and reduced stakeholder engagement.
- **Metrics and Measurement:** The response critiques the continued use of the GWP100 metric for greenhouse gas emissions, particularly methane, and advocates for a split-gas approach using GWP* to better reflect methane's short-lived nature. It also recommends integrating animal health-adjusted emissions factors into future inventories.
- **Considerations for Budget Setting:** AgriSearch stresses the importance of equity among sectors, technological readiness, economic and environmental impacts, and scientific advice. It also urges inclusion of food security and carbon leakage concerns in policy deliberations.
- **Potential Impacts:** The organisation warns of widespread negative impacts—financial, economic, social, rural, and equality-related—if unrealistic targets are pursued without proper impact assessments. It criticises the lack of such assessments in the current consultation process.
- **Additional Comments:** AgriSearch reiterates the need for coordinated policy responses that avoid unintended consequences and support the viability of the agri-food sector and rural communities.

Introduction

AgriSearch (The Northern Ireland Agricultural Research and Development Council) welcomes the opportunity to respond to the Consultation on the setting of Northern Ireland's Fourth Carbon Budget 2038 - 2042.

AgriSearch was formed in 1997 to provide a mechanism through which beef, dairy and sheep farmers could have direct involvement in agricultural focused research. Funds contributed to AgriSearch are used to commission research into the improvement and development of beef, dairy and sheep farming. Our vision is to drive farm profitability and sustainability through science, research and innovation and our strategy is applying our knowledge, network and capabilities and working with others to turn scientific possibilities into sound farm practice.

AgriSearch will be limiting its response to areas related to its charitable objectives.

AgriSearch notes the substantial volume of consultations issued by DAERA in recent months. Since the launch of the Nutrients Action Programme consultation in early May, we have responded to five separate consultations; two of which address highly significant policy matters. For smaller organisations with limited administrative capacity, this clustering of consultations presents a considerable challenge, particularly during peak seasonal periods. Each consultation addresses complex and critical issues that warrant thoughtful and informed responses. We therefore urge DAERA to consider the cumulative impact of concurrent consultations on stakeholder capacity and engagement. A more coordinated and spaced approach would enhance the quality of responses and foster more meaningful participation across the sector.

The importance of the farming industry to Northern Ireland cannot be over-stated and is widely recognised as the backbone of the NI economy. The total gross turnover of the food and drink processing sector in NI was £6.52 billion in 2022 with provisional estimates for 2023 projecting a 9.4 increase to £7.13 billion¹. The Northern Ireland agri-food sector supports 113,000 workforce jobs².

Agriculture, and the land-based economy, will play a key role in tackling climate change. It is uniquely placed to capture the major GHG, carbon dioxide, from the air and turn it into a wide range of food, fibres and fuels.

¹ https://www.daera-ni.gov.uk/sites/default/files/2025-04/Northern%20Ireland%20Food%20and%20Drinks%20Processing%20Report%202022_0.pdf

² <https://nifda.co.uk/wp-content/uploads/2021/05/Food-for-Thought-EIA-of-the-Food-and-Drink-sector-in-NI.pdf>

Climate Change is the most significant environmental threat facing society. It is impacting all farmers across the world with every country facing weather events that are increasingly extreme and frequent. NI agriculture will have to adapt to a changing climate. This will include dealing with more frequent severe weather events, adapting to changing weather patterns and addressing the challenge of new pests and diseases. This must be recognised and may influence NI's ability to meet targets particularly in the LULUCF sector. Data gathered from AgriSearch's GrassCheck programme has clearly shown the extent to which more extreme weather patterns are affecting forage production and utilisation.

Farmers can and must be part of the climate change solution within the correct policy framework and support.

AgriSearch has been working on several initiatives to benchmark and improve the carbon footprint of local farms. This includes carbon benchmarking of 48 farms involved in the Beacon Farm project, conducting in depth case studies on seven of these farms and working with farmers to reduce their carbon footprint through the use of clovers and other legumes. AgriSearch was also a partner in the pioneering ARCZero³ European Innovation Partnership project which carried out a net carbon balance on seven farms across Northern Ireland.

The International Paris Agreement on climate change aims to limit greenhouse gas (GHG) emissions and keep temperature increases below 2°C, it also recognized the importance of "safeguarding food security and ending hunger". While it is recognised that NI needs to reduce its impact on the climate, this should not reduce our capacity to produce high quality, affordable food produced to high environmental, animal health and welfare standards, as reductions in local food production risks displacement of this production to countries with much higher emissions and poorer animal health and welfare standards. The Paris Agreement recognised the importance of "safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impact of climate change".

Goal 2 within the United Nations Sustainable Development strategy⁴ is to 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture'. Global demand for food is increasing and, according to UN forecasts, the number of mouths to feed will rise to nearly 10 billion by 2050. Agricultural production will need to increase by an estimated 60%, according to the UN Food and Agriculture Organisation, with strong demand projected for commodities such as milk and meat. The UK is currently only around 60-70% self-sufficient on a calorific basis with regard to meat, milk

³ <https://www.arczeroni.org/>

⁴ <https://sdgs.un.org/goals>

and eggs from domestic livestock production. There continues to be increased global demand for meat and dairy products, therefore it makes no sense for the UK and NI to achieve its climate change ambitions by exporting food production to other countries where emissions per unit of food production are much higher (carbon leakage).

The CCC's own evidence has indicated that NI and UK farmers are efficient meat and dairy producers. Ruminant livestock farming in the UK and Northern Ireland produces much lower emissions per unit of milk and meat output than other countries. In addition, NI and UK agriculture can utilise readily available "green" water (i.e. directly from rainfall and not immediately available for human consumption), instead of "blue" water where chemical/mechanical intervention is required and which within farming is inefficient and has a significantly higher CO₂ equivalent. Thus, Northern Ireland also has a low water footprint. Climate change is likely to lead to further desertification and increased water stress across a growing proportion of the world. It therefore makes sense for NI to produce red meat and dairy from sustainable livestock farming here as the contribution to global emissions will be much lower than producing this elsewhere. The CCC have recognised carbon leakage as an issue that must be prevented.

It is also recognised that beef production in Western Europe is currently 2.5 times more efficient in managing carbon emissions than the global average. Dairy farming in Northern Ireland has reduced its carbon intensity by 34% between 1990 and 2017 and greenhouse gas emissions from beef in the UK are 52% lower than the global average.

In addition, while there is some scope to increase arable and horticulture farming, most of Northern Ireland is unsuitable for crop and vegetable production. In addition, these enterprises have seen their margins drop considerably in recent years raising serious concerns about the impact on profitability of switching from grass-based livestock to arable and horticulture. In addition, the ploughing of permanent pasture to establish arable and horticultural crops raises the prospect of the loss of a significant amount of carbon from the soil to the atmosphere. The ability of local ruminant livestock to turn grass and other by-products into high quality nutrient dense protein for human consumption must be recognised. In addition to food provision, ruminant livestock also provide wider benefits such as producing wool and leather as alternatives to manufactured plastics, help to manage landscapes and promote biodiversity and provide nutrients through organic manures which contribute to improved soil health.

The Climate Change Act (Northern Ireland) 2022 recognises the principles of just transition and a Just Transition Commission should be established as soon as possible to ensure climate change targets are fair and just. Any just transition should recognise the essential role of farming in underpinning the rural economy and safeguarding the

viability of rural communities and delivering food security for the nation and alleviate the cost of its transition.

It is important that a co-ordinated policy response is pursued. DAERA needs to consider its intended policy actions in a wider context and guard against unintended consequences / perverse outcomes. This includes ensuring the economic and social sustainability of farmers and the wider agri-food sector and Northern Ireland's rural economy, in addition to consideration of other environmental issues (such as water and air quality and biodiversity).

In considering the timescale needed to adopt new approaches in the livestock sector, DAERA needs to be cognisant that farmers are conditioned in their attitudes by previous DAERA and CAP policies. Changes to the farm payments system are still at a relatively early stage and will take time to have an impact.

Metrics Used

The impacts of agriculture on the national greenhouse gas (GHG) inventory are currently assessed using the metric, "Global Warming Potential 100" (GWP100). GWP100 was developed to enable comparisons of the global warming impacts of different gases as it measures how much energy the emissions of 1 tonne of different gases will absorb over 100 years, relative to the emissions of 1 tonne of carbon dioxide (CO₂). The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that time period.

Methane (CH₄) is one of the primary GHGs emitted by ruminant livestock and is estimated to have a GWP100 of 27-30 over 100 years. However, CH₄ only stays in the atmosphere for around 10-12 years, which is much less time than CO₂, but it also absorbs more energy than CO₂. Limitations in the GWP100 measurement approach were identified some years ago by researchers at the University of Oxford (Allen et al, 2016). Its main limitation is that it assumes that all greenhouse gases are stagnant in the atmosphere and remain there for many years. However, methane is a short-lived gas and is removed from the atmosphere relatively quickly after being emitted. This atmospheric effect is not accounted for in the GWP100 calculation. Furthermore, in situations where livestock numbers are stable, methane emissions will remain constant, with no additional methane released into the atmosphere and therefore no additional warming from methane will arise.

As GWP100 does not fully account for the shorter-term impacts of methane in the atmosphere, this leads to an overestimate of its contribution to global warming patterns., Recent analysis by Lynch et al, (2020) concluded that basing climate policies

on GWP100 was flawed as it fails to reflect the impact of different gaseous emissions on global temperature and risks undermining confidence in well-intentioned policy initiatives.

In order to account for this effect, a new metric (GWP*) has been developed (Allen et al, 2016) as a means of measuring carbon in the atmosphere, taking the shorter lifespan of methane from the atmosphere into consideration. GWP* provides a better estimate of temperature change for different GHG emissions as it captures differences in short- and long - lived GHGs. GWP* makes allowance for the fact that methane emissions will cause warming for about 12 years before declining and calculations made using this metric demonstrate that livestock can eventually become climate neutral and no longer actively contribute to warming, providing that appropriate interventions are taken to reduce emissions.

However, current government policy remains based on GWP100 and does not take the new metric into consideration. In a recent research report McAuliffe et al, (2023) concluded that 'much of the information currently being communicated to stakeholders and laypeople alike may provide an incomplete or, potentially even misleading, representation of the impact of agriculture towards climate change.'

As a result, McAuliffe et al, (2023) recommended that in calculating the environmental impact of agri-food systems, it is important to test the robustness of assumptions by adopting multiple sensitivity analyses in life cycle analysis using GWP100 and GWP*, whilst also reporting GHG emissions individually. These authors also noted that using a 100-year horizon alone to assess GHG impacts underestimates the full significance of the short-term gains, in terms of reduced planetary warming, of targeted mitigation of CH₄.

We recognise, however, that the use of the GWP100 metric is embedded in current international deliberations and while there is an emerging appreciation of the deficiencies in its use, there is no guarantee that an alternative, such as, GWP* will be preferred, and certainly not in an early time frame. Accordingly, we consider that it would be prudent for DAERA to adopt a split-gas approach, as in New Zealand. This would involve the provision of two targets with Methane having a lower target than other gases.

AgriSearch welcome the investment that DAERA have made in investigating alternative metrics for biogenic methane and we welcome the publication of the paper by John Lynch *"What does the large range in potential methane 'CO₂ equivalent' evaluation imply for climate policy targets? An initial exploration in the context of agricultural emission*

scenarios for Northern Ireland."⁵ While we note that the selection of metric will have no significant effect on the 2023-27 Climate Action Plan it is important that this is kept under review.

While the limitations of GWP100 in assessing methane's impact are well documented, it is equally important to recognise that current emissions metrics often fail to account for the impact of animal health on productivity and emissions. Kyriazakis et al. (2024)⁶ argue that emissions from unhealthy animals are systematically underestimated in national inventories, leading to a bias that obscures the true mitigation potential of health interventions.

AgriSearch recommends that DAERA explore the integration of **animal health-adjusted emissions factors** into future inventory methodologies and support the development of **Tier 3-compatible** models that reflect the metabolic and immunological costs of disease.

⁵ <https://www.cabidigitallibrary.org/doi/10.31220/agriRxiv.2025.00321>

⁶ <https://doi.org/10.1098/rspb.2024.0675>

Response to Consultation Questions

Question 1 – Fourth Carbon Budget Target

Context:

DAERA is required by the Climate Change Act (Northern Ireland) 2022 to set the Fourth Carbon Budget which covers the period 2038 to 2042 in line with the 2040 and 2050 emissions reduction targets in the Act. DAERA proposes to set the Fourth Carbon Budget at an average annual reduction of 77%, in line with the advice received from the UK Climate Change Committee (CCC).

Question:

Q1. Do you feel this would provide the necessary trajectory to reduce Northern Ireland emissions and meet the legislative requirements?

AgriSearch Response: Neither Agree nor Disagree

Additional Comments:

While we recognise that to meet the requirements of the Climate Change Act (Northern Ireland) 2022 DAERA has little choice but to set the 77% reduction target, this does not mean that this target is either achievable or proportionate. AgriSearch calls for an urgent review of the Climate Change Act (Northern Ireland) 2022. We would highlight the fact that the 2050 targets contained within the Act were not in accordance with the recommendations from the Climate Change Committee and in its Advice Report the CCC makes it clear how challenging it will be for Northern Ireland to achieve Net Zero by 2050.

The CCC advice is clear that not all parts of the UK are required to get to net zero emissions for the UK to meet its 2050 net zero target which is in line with the Paris agreement. Advice to NI outlined that an 82% reduction target (later upgraded to 83% reduction) reflects a fair contribution to the overall UK Net Zero 2050 target. All other regions within the UK are following CCC advice and have set targets in line with that advice. The balanced pathway is already extremely ambitious and a significant challenge for NI and for the agri-food sector.

In passing the Climate Change (Northern Ireland) Act 2022 the Northern Ireland Assembly chose to ignore the CCC advice and have imposed a more stringent 2050 target for carbon dioxide. However, CCC information to date shows that it will be impossible to achieve this and they have struggled to find a credible and affordable pathway to achieve this ambition. The CCC have highlighted that this pathway towards net zero in NI by 2050 could lead to 'distorting actions' in NI.

If the targets set are widely perceived to be unrealistic (which we believe they are), it will be much more difficult to achieve farmer uptake of any proposed new measures. More realistic targets are likely to have greater buy in. There is an urgent need to review the entirety of the Climate Change (Northern Ireland) Act as it contains multiple contradictions in addition to the aforementioned unrealistic targets. As recent developments concerning the A5 has shown, the Act has the potential to hamstring economic development in Northern Ireland if it is not amended. Furthermore, there will be even greater resistance to meeting targets set for the agri-food sector if other targets within the Act are 'cherry picked' for removal in order to facilitate specific economic projects (e.g. progression of the A5) whilst reducing the economic competitiveness of the agri-food sector.

It is essential that DAERA and MLAs re-consider the unachievable targets with the Climate Change Act (Northern Ireland) 2022. Already considerable amounts of resource and funding have been allocated to the delivery of this flawed legislation which will ultimately have to be amended as it is extremely unlikely that NI will be able to meet the targets imposed by the Act.

Question 2 – Importance of different considerations / factors to be used when setting carbon budgets.

Context:

NI must balance ambition in reducing emissions with many other considerations, including economic and social considerations and fairness for future generations.

Question:

Q2. Whilst DAERA must set carbon budgets in line with the targets in the Act, what considerations/factors are important to you?

Please select all that apply:

Equity among sectors - this means ensuring that all sectors of our economy play their part.	
Fairness for citizens - including our children and young people and across regions and communities.	
Innovation and Technological readiness.	
Economic opportunities including green jobs.	
Environmental and public health benefits.	
Maintaining alignment with UK, Ireland, and global emissions reduction targets.	
Taking account of scientific advice and the particular circumstances of Northern Ireland.	
Fairness to future generations.	
Other, please specify.	

AgriSearch believe that out of the list provided the following should be factors should be given particular attention (note our amendments to these in red text:

1. Equity among sectors - this means ensuring that all sectors of our economy play their part **(in proportion to their capacity to make changes)**.
2. Innovation and Technological readiness
3. Economic opportunities **(and costs)**
4. Environmental and public health benefits **(and costs)**.
5. Taking account of scientific advice and the particular circumstances of Northern Ireland.

In addition to those listed in the consultation we would also like to highlight the need for Food Security (on a UK basis) to be considered when setting carbon budgets as well as the impacts of carbon leakage (i.e. reductions in Northern Ireland's carbon footprint leading to equal or greater increases in carbon emissions elsewhere).

Question 3 – Potential impacts (positive and negative)

Context:

Northern Ireland taking action to meet the proposed Fourth Carbon Budget may have impacts and bring benefits to society. The Department recognises specific benefits and impacts will be dependent on emissions reduction policies that are agreed by the NI Executive closer to 2038.

Question:

Q3. Do you have any views on the potential impacts (positive and negative) that will be realised in Northern Ireland reducing its emissions to meet the proposed Fourth Carbon Budget?

You may wish to consider the impacts / benefits in the categories below:

- A) Financial impacts*
- B) Economic impacts*
- C) Social impacts*
- D) Rural impacts*
- E) Equality impacts*
- F) Impact on children and young people*

While it is impossible to give an accurate assessment of the impacts of a carbon action plan that is so far away, it is fair to say that the unrealistic targets set in this budget as a consequence of unrealistic targets set in the Climate Change Act (Northern Ireland) 2022 will have detrimental impacts across all of the above categories.

It is critical that comprehensive economic impact assessments are undertaken on the impact of these targets and the policy measures which will need to be brought in in order to achieve them. We note with regret that DAERA / NI Executive did not carry out any impact assessments prior to the launch of this consultation.

Question 4 – Additional Comments

Q4. We appreciate your feedback on the questions above, this comments box is to provide you with the opportunity to add anything further that you have not already had an opportunity to do so regarding the Fourth Carbon Budget.

The comments contained in our introduction and in the metrics sections should be taken as our response to this question.

Conclusion

AgriSearch appreciates the opportunity to contribute to the consultation on Northern Ireland's Fourth Carbon Budget. While we fully support the need for ambitious climate action, it is essential that such efforts are grounded in scientific evidence, economic realism, and social fairness. Agriculture must be recognised not only as a source of emissions but also as a vital part of the solution—delivering food security, environmental stewardship, and rural economic resilience.

We urge DAERA and policymakers to adopt a balanced, evidence-based approach that reflects the unique characteristics of Northern Ireland's agri-food sector. This includes revisiting the targets set out in the Climate Change Act (Northern Ireland) 2022, integrating more accurate emissions metrics such as GWP*, and ensuring that farmers are supported through a just transition.

Only through collaborative, transparent, and adaptive policymaking can Northern Ireland achieve meaningful climate progress while safeguarding its rural economy and future food production capacity.

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