Farm Carbon Calculators and Agricultural Support - Delivering Climate and Nature Outcomes in Northern Ireland

A Technical Note from Northern Ireland Environment Link's Sustainable Agricultural Policy Working Group (SAPWG) - October 2026

Executive Summary

- **Carbon calculators have a valuable role in farm management.** We can only manage what we can measure. NIEL supports their use to establish baselines, identify improvements and demonstrate progress. NIEL also supports linking public payments to environmental performance, applying the principle that public money should deliver public goods.
- **The central issue is emissions intensity versus absolute emissions.** Most calculators measure emissions per unit of output. A farm can improve this score while increasing production, leaving total emissions unchanged or higher. Northern Ireland's carbon budgets require absolute reductions, not intensity gains alone.
- **Policy must assess both.** Metrics should combine emissions intensity with total farm emissions, emissions per hectare, sequestration, land use and wider environmental performance. Otherwise, support may reward efficiency without securing required emissions reductions.
- **Carbon efficiency is not sustainability.** Extensive and High Nature Value systems may have lower total emissions, emissions per hectare and inputs, but higher emissions per unit because output is lower. Productive systems may score well on intensity while emitting more overall. The problem is judging diverse systems through one metric, not any sector itself.
- **Carbon tunnel vision risks unintended consequences.** Rewarding carbon efficiency alone could encourage changes that worsen biodiversity, water quality, ammonia pollution or soil health, or disadvantage nature-rich farming systems. Carbon accounting should therefore sit within a wider framework covering nutrient management, resilience and ecosystem services alongside these outcomes, rather than act as a standalone test of eligibility or performance for public support.
- **Livestock policy must remain balanced.** Carbon metrics should not unintentionally favour one sector or production model over another. Focusing on emissions per unit of output risks undervaluing extensive High Nature Value systems because this measure does not fully capture their wider environmental benefits.

Overall position: NIEL supports carbon calculators and linking public agricultural funding to environmental outcomes, but decisions on eligibility for that funding and assessment of environmental performance should be based on a broader sustainability scorecard. The most carbon-efficient farm is not always the most environmentally sustainable farm.

1. The importance of carbon calculators

NIEL supports

- the use of farm carbon calculators across Northern Ireland agriculture and continued development of evidence-based emissions accounting;
- carbon auditing as an advisory and farm-management tool that can establish baselines, identify improvements, support business planning, inform public investment and respond to supply-chain requirements;
- environmental conditionality attached to public agricultural support and the principle that public money should deliver public goods; and
- action that helps Northern Ireland meet its statutory climate obligations and carbon budgets.

Agriculture is a structurally important industry in NI and as a result is a significant source of greenhouse gas emissions. We believe the sector must contribute its fair share to achieving climate objectives but note the significant challenges in achieving these. The UK Climate Change Committee has identified agriculture as a principal sector for emissions reduction and has indicated that deeper reductions may be needed over time.

Core qualification

Despite our support for carbon accounting NIEL believes that this must not become the sole measure by which farming systems are judged. Future policy should reward a combination of:

- greenhouse gas reductions, including absolute reductions and improved emissions intensity;
- carbon sequestration and climate resilience;
- biodiversity recovery and habitat condition;
- healthy soils, nutrient management and improved water quality;
- reduced ammonia emissions;
- ecosystem service delivery; and
- sustainable food production.

Conditionality

NIEL supports conditionality of farm support payments. This is not a new concept. Farm Sustainability Standards, Agri-environment schemes and the Soil Nutrient Health Scheme already connect public intervention with environmental outcomes and sustainability. Carbon accounting should be treated similarly, as one of a number of important components of environmental accountability.

2. A Critical Distinction: Intensity and Absolute Emissions

The efficiency paradox

- **Emissions intensity** measures emissions per unit of output, normally per litre of milk or kilogram of meat or other agricultural product.

- **Absolute emissions** measure the total greenhouse gases emitted by the farm or sector.
- Improving carbon efficiency means reducing emissions per unit of output, but this can accompany more intensive production and does not necessarily reduce total emissions. For example, a dairy enterprise can reduce emissions per litre while increasing production; total emissions may then remain unchanged or rise.
- A farm can therefore appear more climate-efficient without delivering the overall reductions required by Northern Ireland's carbon budgets. This is an example of the efficiency aka Jevons paradox in action.

What policy should measure

Public policy should not rely exclusively on emissions-per-unit metrics. A balanced assessment should include:

- total farm emissions and progress in reducing them;
- emissions intensity, to support efficient production;
- emissions per hectare, interpreted in its land-use context;
- carbon stored or sequestered in soils, peat, woodland and semi-natural habitats;
- land-use and habitat outcomes; and
- wider environmental performance.

Why this changes comparisons between farms

- Many extensive livestock and High Nature Value systems have lower stocking densities, lower fertiliser input and lower imported-feed dependence resulting in lower total emissions/emissions per hectare.
- Because they produce less saleable output, they can record higher emissions per kilogram of product and perform poorly on an intensity-only score.
- Highly productive systems can achieve stronger intensity scores because output is high relative to emissions, even where their total emissions are greater.
- This does not establish that one farming sector is inherently more or less sustainable. It shows that a single metric cannot capture the climate and environmental performance of different systems.

NIEL ask: calculators used to guide support must show whether efficiency gains are accompanied by absolute emissions reductions and must avoid penalising farms whose lower-output systems deliver important land-management and environmental outcomes.

3. Livestock Farming, Nature Recovery and Carbon Tunnel Vision

Balanced livestock framing

- NIEL recognises that beef, sheep and dairy are integral to Northern Ireland's economy, rural communities, landscapes and future sustainable food production.
- All livestock sectors should reduce greenhouse gas emissions and improve environmental performance. The objective is better systems, not favouring one sector over another.
- There is currently no Northern Ireland policy proposal to mandate livestock reductions. However, more demanding carbon budgets may intensify debate about agricultural emissions, making the design of metrics critical.
- An intensity-led framework could disadvantage lower-output extensive beef and sheep systems irrespective of their wider contribution, while also failing to test whether efficiency improvements in more productive systems reduce total emissions.

Recognising high nature grazing systems

High Nature Value and extensive farms can provide:

- management of species-rich grasslands and upland habitats;
- support for priority species and landscape character;
- carbon storage in soils and semi-natural habitats;
- flood management, water regulation and ecosystem resilience; and
- support for rural communities.

Grazing animals are often a conservation management tool rather than an environmental pressure. Without appropriate grazing, important habitats can deteriorate through scrub encroachment, altered vegetation structure and loss of species diversity. Climate policy should ensure these grazing systems needed for habitat management are not inadvertently penalised through climate focused metrics.

Avoiding carbon tunnel vision

Climate change is a defining challenge, with legal targets, but Northern Ireland also faces biodiversity loss, ammonia pollution, nutrient enrichment, habitat fragmentation, peatland degradation and declining ecosystem resilience. Policies that optimise carbon intensity alone may shift pressures to nutrients, ammonia, imported-feed dependence or biodiversity.

Agriculture policy should therefore optimise multiple outcomes rather than maximise one score. This wider framing also supports the NIEL request to distinguish emissions intensity from absolute emissions.

4. Policy Recommendations

NIEL recommends that MLAs and policy maker's support:

1. **Continued farm carbon auditing** across Northern Ireland as an advisory, management and evidence tool.
2. **Assessment of both total emissions and emissions per unit of output**, with transparent reporting of whether improved carbon efficiency is accompanied by absolute emissions reductions at farm and sector level.
3. **Assessment of carbon performance in its land-use context**, considering farm size, emissions per hectare, existing carbon stores, sequestration and habitat management alongside total emissions and emissions per unit of output.
4. **Environmental conditionality** for public agricultural funding, applying the principle that public money should deliver public goods.
5. **A broader sustainability scorecard** covering climate, biodiversity, habitat condition, water quality, nutrient management, ammonia, soil health, resilience and ecosystem services.
6. **Recognition and support for the wider environmental benefits of extensive High Nature Value farming**, including grazing needed for habitat management and nature recovery.
7. **Fair assessment across livestock sectors and production models**, ensuring carbon metrics do not favour one at another's expense or undervalue the wider environmental benefits of extensive High Nature Value systems.
8. **Regular review of calculators and payment rules** to identify unintended environmental, social or economic consequences and respond as methodologies improve.

Conclusion

NIEL supports carbon accounting and linking public funding to environmental outcomes. Carbon calculators are useful tools, but they are not complete measures of sustainability.

Future agricultural policy must not optimise emissions per unit while overlooking total emissions. Nor should it disregard biodiversity, water quality, air quality, landscape management, carbon storage, food production, rural communities and ecosystem resilience.

Future agricultural policy should link public agricultural funding to a broader sustainability scorecard that rewards absolute emissions reductions alongside nature recovery, clean water, healthy soils, resilient landscapes and sustainable food production. It must recognise the wider environmental benefits of extensive High Nature Value systems, rather than reward carbon efficiency alone.

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