

CLIMATE CHANGE COMMITTEE

Date of Meeting	17 th January 2024
Report Subject	Carbon Emissions of Factory Farming in Flintshire
Cabinet Member	Collective Responsibility
Report Author	Chief Officer Planning, Environment & Economy
Type of Report	Operational

EXECUTIVE SUMMARY

Agriculture contributes 8.6% of total greenhouse gas emissions in Flintshire, with 1.6% of carbon dioxide, 55.6% of methane and 64.2% of nitrous oxide emissions coming from the sector.

Information regarding farming and factory farming practices in Flintshire is difficult to source, and so it is not possible to detail the number and location of intensive agriculture and their emissions. However, data for Wales in 2016 states the majority (53%) of agricultural emissions are enteric (methane from cow and sheep digestion).

There are a number of carbon reduction activities available which focus on livestock nutrition, waste, and land management; however, these are generic in this report and further investigation is required to determine which actions are most suitable to farming in the county.

Lastly, considering what we as a Council can do to influence positive agricultural practices across the county.

RECOMMENDATIONS

1	To support engagement with tenant farmers on Flintshire County Council land to understand their farming practices and activities to address climate change.
2	To support engagement with the National Farmers Union (NFU) and known companies, and private farmers, to understand how we can engage and promote best practice across the county.

REPORT DETAILS

1.00 EXPLAINING THE REPORT

1.01 Across the county of Flintshire there are carbon emissions from a number of different sources including: Industry, Commercial, Domestic energy, Road transport, Railways, Public Sector and Agriculture. The chart below shows a breakdown of these emission sources from 2014 - 2019.

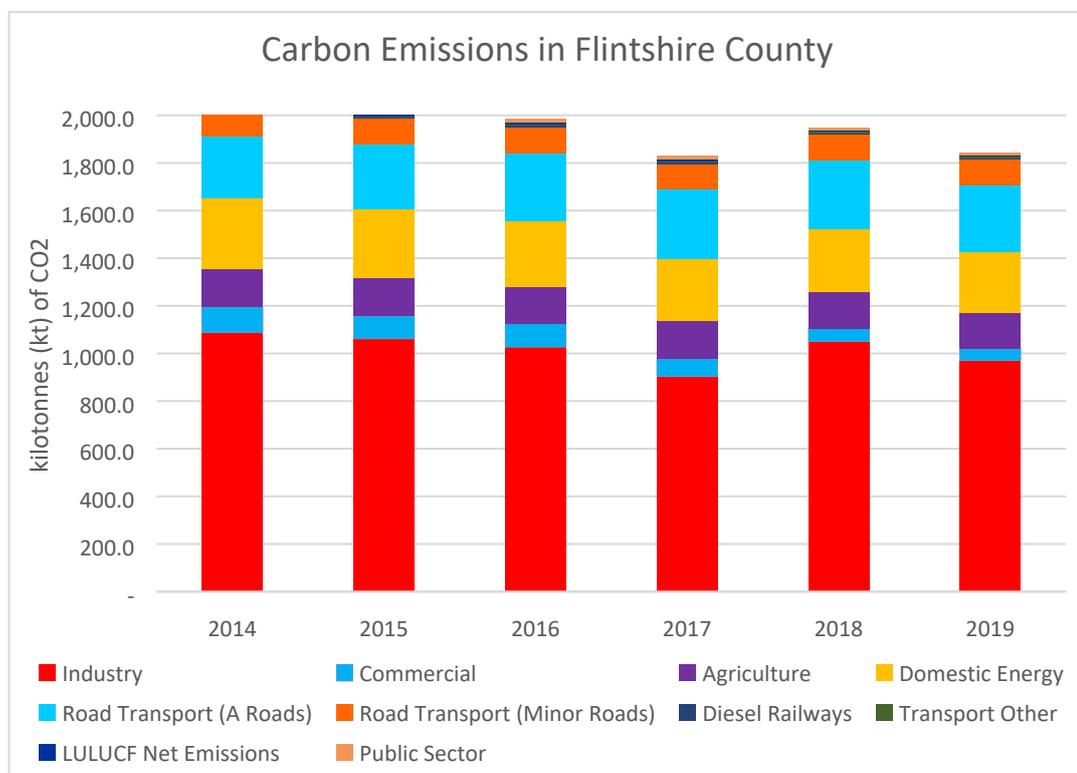


Figure 1: Emission sources of Flintshire county 2014-19. Raw data from <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021>

As can be seen in the chart, emissions from Agriculture account for a small percentage of the total emissions of the county – the largest contributors being Industry, Road transport and Domestic energy.

1.02 Figures for Flintshire in 2021 show that Agriculture contributes to 8.6% of greenhouse gas emissions in the county, emitting 163,200 tCO₂e.

GHG Emissions (ktCO ₂ e)	CO ₂ e	CO ₂	CH ₄	N ₂ O
Flintshire Total	1898.9	1659.8	191.6	47.5
Flintshire Agriculture	163.2	26.1	106.6	30.5
Agriculture Share	8.6%	1.6%	55.6%	64.2%

Figure 2: Table demonstrates share of emissions from Agriculture in Flintshire. Raw data from <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021>

When individual greenhouse gases are taken into consideration, Agriculture is a relatively small contributor of carbon dioxide emissions, but a significant contributor of methane and nitrous oxide, both of which are strong

greenhouse gases (28 and 273 times more warming than carbon dioxide respectively).

1.03	Agricultural Emission Sources (ktCO ₂ e)	CO ₂ e	CO ₂	CH ₄	N ₂ O
	Electricity	4.4	4.3	0.1	0
	Gas	3.8	3.7	0.1	0
	Other (solid and liquid fuels)	16.1	15.8	0.1	0.2
	Livestock (animal related)	121.4	0	106.3	15.1
	Soils (fertilisers, urea, and liming)	17.5	2.3	0	15.2
	Total	163.2	26.1	106.6	30.5

Figure 3: Table demonstrates sources of GHG emissions within agriculture. Raw data from <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021>

Figures show the sources of greenhouse gas emissions in Flintshire's agricultural sector. The majority of emissions come from livestock in the form of methane and nitrous oxide, with soils as the second largest contributor mostly in the form of nitrous oxide due to activities such as fertiliser application.

1.04 While information is not available to determine the largest source of agricultural emissions in Flintshire, in Wales over half emissions (53%) are from enteric sources (methane from cow and sheep digestion).

1.05 7 poultry farms have been identified in Flintshire which likely produce broiler chickens (meat). These systems house large numbers of birds with controlled environments and high-protein feed.

There are 45 dairy farms in Flintshire registered to the Food Standards Agency (as of 1 January 2024). It is not known what systems each farm uses.

There is little information on the number of sheep farms in Flintshire, however they are unlikely to utilise intensive methods. There are no known examples of the intensive rearing of pigs.

1.06 Research suggests animals raised in intensive systems are more 'environmentally efficient' than extensive systems as they are more productive for a given quantity of emissions and land.

1.07 Typical sources of carbon emissions in the agricultural sector are:

- Buildings and Machinery
- Enteric (animal digestion)
- Imported livestock feed (supply chain emissions)
- Manure

	<ul style="list-style-type: none"> - Fertiliser
1.08	<p>There are a number of activities that can reduce agricultural emissions and these have been evidenced in good practice across the nation.</p> <p>They include:</p> <ul style="list-style-type: none"> - Amino Acid supplementation with reduced protein levels in poultry can maintain animal productivity with reduce nitrogen in waste, as well as reducing demand on imported feed - Lipid supplementation in feed can reduce methane production in the rumen. - Concentrates instead of forages (containing increased starch) can reduce methane production through chemical competition for hydrogen but may be nullified by land use change for production of concentrates. - Improving forage quality and availability (via grazing management) can reduce emissions intensity (not necessarily absolute emissions) as the animal becomes more productive. - Forages rich in tannin such as Birdsfoot trefoil have been shown to lower methane emissions from housed sheep by 33% compared to those offered perennial rye grass. - Grazing on herbs such as chicory and plantain have seen methane reductions in cattle and sheep compared to rye grass and white clover. - Other possibilities are macro-algae and 3-NOP which can reduce methane production but are awaiting developments of technologies for commercial scale up and/or further research to address food safety and environmental concerns before regulatory approval can be granted. - Deforestation-free feed - Alternative feeds such as insects for poultry - Improved animal health and fertility - Controlled storage of manure - Manure Acidification - Anaerobic Digestion of Manure - Improved soil fertility using nitrogen-fixing cover crops. - Precision application of fertilisers - Energy efficiency works within farm buildings - Renewable energy systems on farm buildings - Agri-voltaics utilising land for renewable energy generation and agriculture - Correct Maintenance of farm equipment - Use of non-fossil fuels in farm equipment and vehicles - Planting of trees and hedgerows
1.09	<p>Welsh Government Sustainable Farming Scheme (SFS)</p> <p>Introduction</p> <p>The Sustainable Farming Scheme (SFS) sits within the Agricultural (Wales) Act 2023 and is currently being developed by Welsh Government. Its purpose is to replace the Basic Payment Scheme by rewarding farmers who subscribe to taking action on their farm that makes them more sustainable.</p>

Time-frames

The SFS transition phase will begin on the 1st April 2025, phasing out BPS and introduce payments from SFS. The transition phase is due to be completed on 31st March 2029.

Principles and Outcomes

The Sustainable Farming Scheme falls under Welsh Government's Sustainable Land Management principles. Objectives of these principles are:

- Produce food in a sustainable manner.
- Mitigate and adapt to climate change.
- maintain and enhance the resilience of ecosystems and the benefits they provide.
- conserve and enhance the countryside and cultural resources, promoting public access and engagement with them.

The scheme focuses on the "land-sharing" principle where sustainable activities are integrated into farming (e.g., nitrogen fixing species in crop rotations, multi-species swards for grazing animals and soil management). Land with low agricultural and habitat value can be used for activities such as large-scale tree planting.

Sustainable Farming Activities

In the scheme, there are several activities farmers can do to receive payments, such as monitoring, soil management, animal health and habitat creation.

- Precision application of fertilisers, reducing farm inputs
- Soil Accounting and Nutrient Management (supported by testing and monitoring)
- Crop rotations to improve soil health and fix nutrients (e.g., Nitrogen)
- Multi-species swards for grazing livestock
- Renewable energy generation on buildings
- Animal Health Improvement Cycles for greater animal productivity and reduced inputs
- Habitat Management and Creation to sequester carbon and support nature
- Ponds, scrapes and other flood management that can sequester carbon

1.10 How can the Council influence change?

The Council can work with tenant farmers in Flintshire to make them aware of SFS and the positive practices that can be utilised to support this and the Council's own ambitions towards net zero carbon.

	<p>There are ever growing examples where farmers are embracing a move towards low carbon practices, and these can be promoted to others to share best practice and also learn from mistakes.</p> <p>By identifying common council objectives with SFS and their location, it is possible to link with nearby farmers to widen the impacts (e.g., Larger connected area of tree planting across neighbouring land, supporting sequestration, biodiversity and flood management).</p> <p>Lastly, through engagement with member groups and agricultural organisations such as NFU, the Council can better understand the challenges the industry faces in transitioning to low carbon, to help to influence change and support where it is needed.</p>
--	--

2.00	RESOURCE IMPLICATIONS
2.01	Staff time from the Climate Change, Biodiversity, and Estates teams will be required to engage with tenant farmers and external organisations.

3.00	CONSULTATIONS REQUIRED / CARRIED OUT
3.01	Not Required/ None

4.00	RISK MANAGEMENT	
4.01	<p>The lack of local information on farming and factory farming in Flintshire makes it difficult to understand what emissions reduction activities would be suitable in the region.</p> <p>Poor understanding of emission reduction activities may produce negative environmental and financial impacts.</p>	
4.02	Ways of Working (Sustainable Development) Principles Impact	
	Long-term	Positive: Climate Change Committee will be informed of the council's progress towards Net Zero Carbon by 2030 as well as successes and barriers involve. In doing so, Climate Change Committee will be informed enough to advise and support on potential solutions to barriers identified.
	Prevention	Positive: The report highlights the significant greenhouse gases from the agricultural sector, helping to identify and prioritise relevant reduction actions

	Integration	Positive: The report begins to create an understanding of emissions across the county, supporting the action CCL15 set within the Council's Climate Change Strategy Action Plan
	Collaboration	Positive: Working with the estates team to establish contact with tenant farmers in Flintshire
	Involvement	Positive: The report highlights the need to further understand the agricultural practices in Flintshire and will require engagement with agricultural stakeholders to achieve this.
4.03	Well-being Goals Impact	
	Prosperous Wales	Positive: Agricultural efficiencies can reduce costs to farmers in the form of reduced feed or solar generation.
	Resilient Wales	Positive: Resilience can be increased through reduced energy demand and reliance on feed and fertiliser. On-farm efficiencies can help farmers become more resilient to cost increases, and improved management of grazing land (e.g. introducing varieties of cover crop) can improve soil fertility.
	Healthier Wales	Positive: Reduced nitrogen emissions improve air quality
	More equal Wales	Neutral: No impact identified.
	Cohesive Wales	Neutral: No impact identified.
	Vibrant Wales	Neutral: No impact identified
	Globally responsible Wales	Positive: Potential reduction of agricultural emissions can contribute to the mitigation of climate change.

5.00	APPENDICES
5.01	None

6.00	LIST OF ACCESSIBLE BACKGROUND DOCUMENTS
6.01	<ul style="list-style-type: none"> • UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019 • Business Wales article on GHG emissions within poultry industry part 1 https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/part-2-greenhouse-gas-emissions-environmental-impacts-poultry-industry • Business Wales article on GHG emissions within poultry industry part 2 https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/part-2-greenhouse-gas-emissions-environmental-impacts-poultry-industry • AHDB article on soil fertility https://ahdb.org.uk/knowledge-library/cover-crops-to-improve-soil-fertility • Farming Connect article on nutrition in reducing emissions https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/reducing-greenhouse-gas-emissions-ruminant-farming-part-1-nutritional-strategies-reduce-enteric • University of Oxford article on environmental impacts of intensive and extensive systems https://www.leap.ox.ac.uk/environmental-impacts-intensive-and-extensive-systems • WWF white paper on solutions to responsible sourcing, regenerative agriculture and feeding innovations https://www.worldwildlife.org/publications/solutions-to-meet-the-need-for-feed

7.00	OFFICER CONTACT DETAILS
7.01	<p>Contact Officer: Ben Turpin – Climate Change Project Officer Telephone: 01352 703393 E-mail: ben.turpin@flintshire.gov.uk</p>

8.00	GLOSSARY OF TERMS
8.01	<p>Basic Payment Scheme (BPS): Income support paid to farmers. You are paid per hectare of eligible land used for farming.</p> <p>Carbon Dioxide Equivalent (CO₂e): the equivalent amount of carbon dioxide that would produce the same amount of global warming over a 100 year timescale.</p>

Concentrate: Type of animal feed that is used with another feed to improve the nutrient balance of the total feed.

Emission Intensity: The quantity of greenhouse gases per unit of product. Not to be confused with absolute emissions which is the total greenhouse gases of a farm.

Enteric Emissions: The greenhouse gas emissions that are produced by the animal's digestive process.

Extensive Systems: Farming practices which have low inputs of labour, fertiliser and capital into the land (e.g., sheep grazing)

GHG emissions: Greenhouse gas emissions

Intensive Systems: Farming practices which have high inputs of labour, fertiliser and capital into the land (e.g., broiler chicken factories)

Land Sharing: Land-based sustainable activities are integrated with farming on that same land (e.g., mixed species swards for grazing livestock)

Mixed Systems: A mixture of crop production alongside raising livestock

Net Zero Carbon: Emissions of greenhouse gases are balanced by the removal of greenhouse gases from the atmosphere such as by trees, peatland and carbon capture and storage technologies.

Rumen/Ruminant: Animal that chews the cud regurgitated from its rumen (cows and sheep)

Sequestration: Removing carbon dioxide from the atmosphere and then storing it, usually through environmental processes such as photosynthesis, absorption by soil, oceans etc.