

Greenhouse Gas Emissions on Northern Ireland Dairy Farms - A carbon footprint indicator

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Department of
**Agriculture, Environment
and Rural Affairs**

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Background

- Current Legislation: The UK Climate Change Act
- UK GHG inventory charts progress at the UK, regional, and sectoral levels
- Carbon footprints measure the emissions per unit of activity or product.

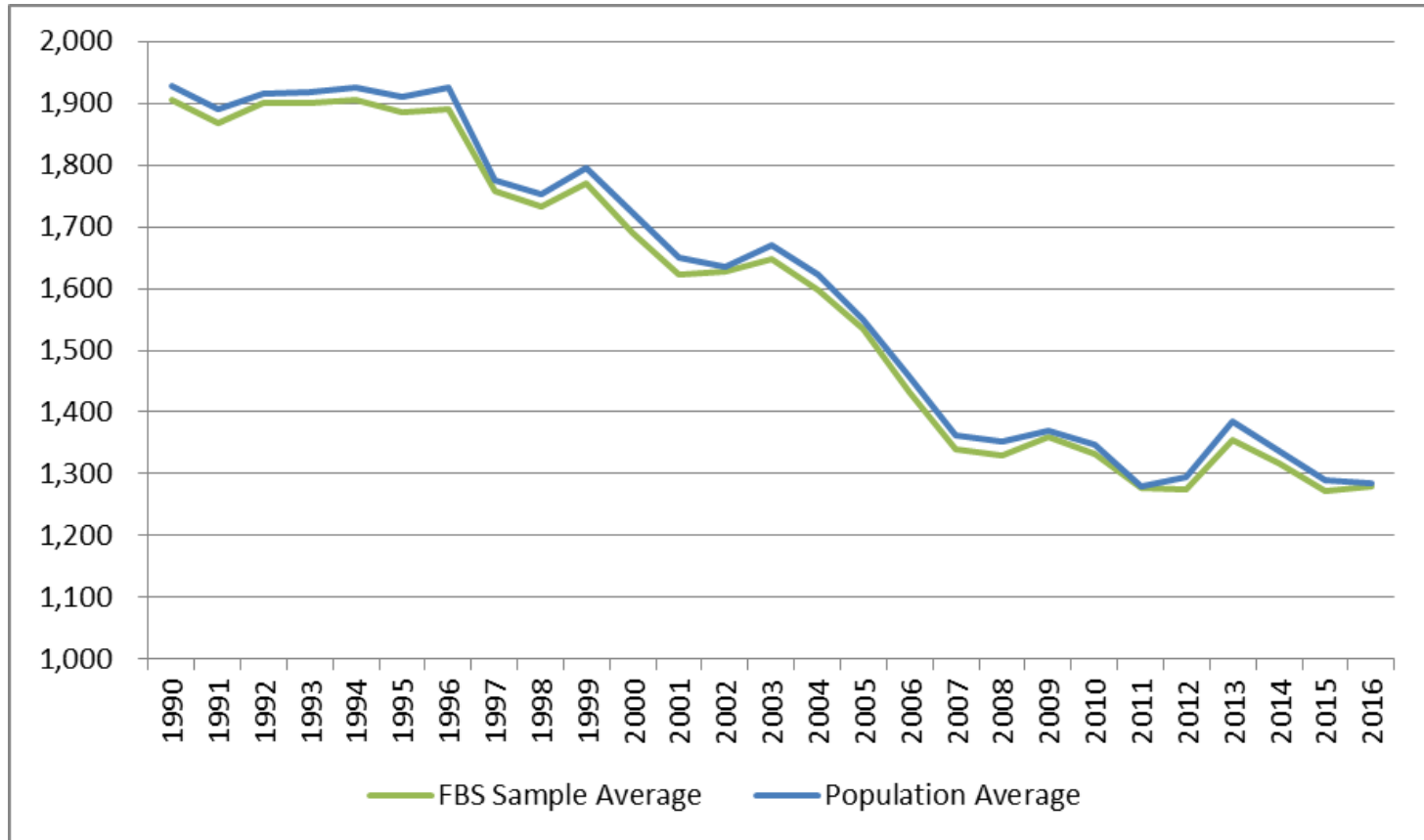
Objectives

- Estimate the average carbon footprints on Northern Ireland dairy farms for the years between 1990 and 2016.
- Identify the key physical and financial factors that influence carbon footprint levels on dairy farms.
- Allow benchmarking by presenting the average farm level characteristics of those farms in the 'top 25%', 'average' and 'bottom 25%' carbon footprint groups.

Methodology

- Utilise AFBI BovIS Dairy Greenhouse Gas (GHG) calculator (PAS 2050)
- DAERA Farm Business Survey (FBS) specialist dairy farms (representative time series data).
- Individual and annual average carbon footprints calculated for the years between 1990 and 2016.
- Key relationships investigated and benchmarking statistics tabulated.

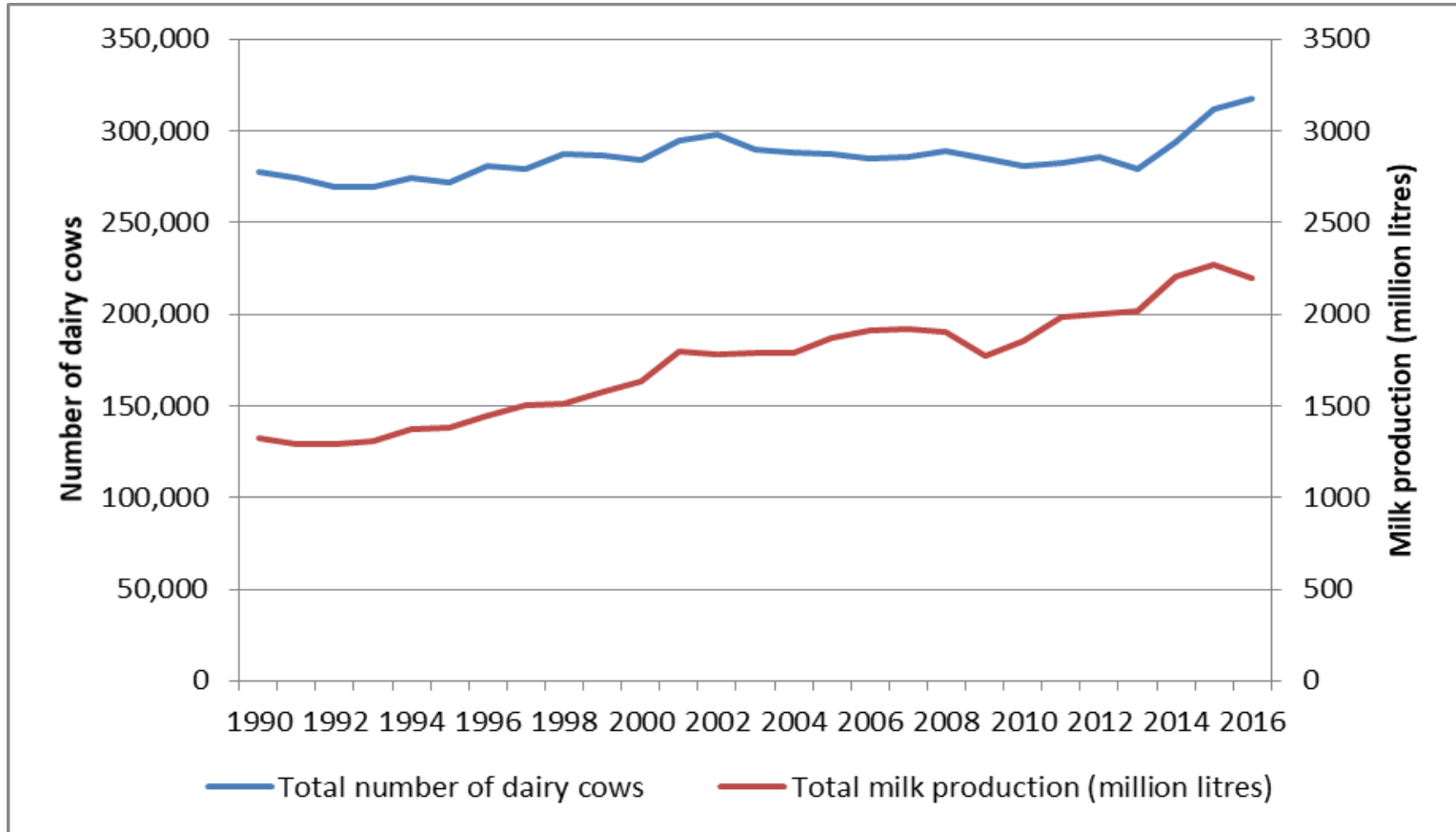
Emissions intensity of milk production (grams CO_{2e}/kg ECM (excl. Seq.))



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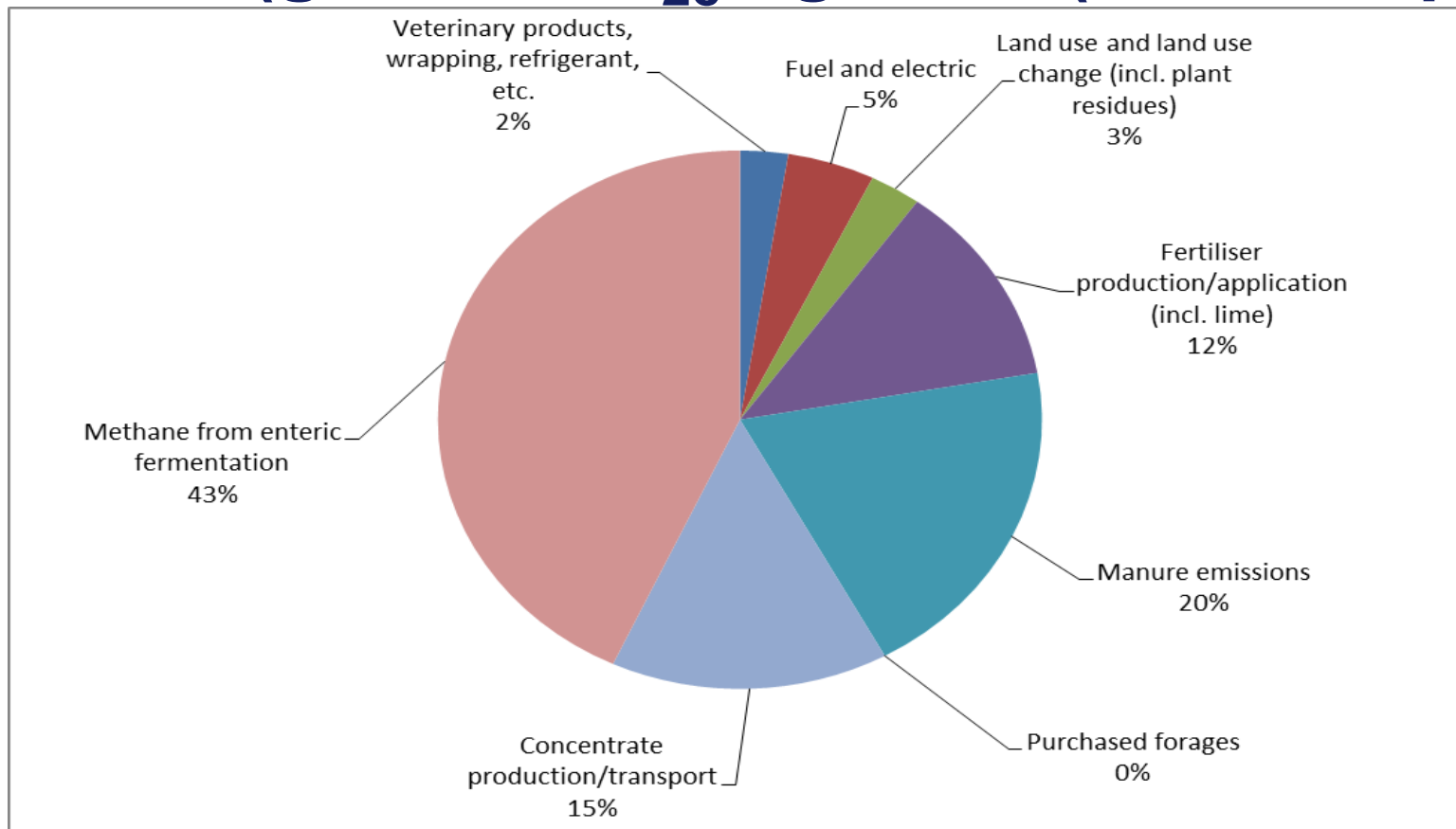
Dairy cows and milk production in Northern Ireland



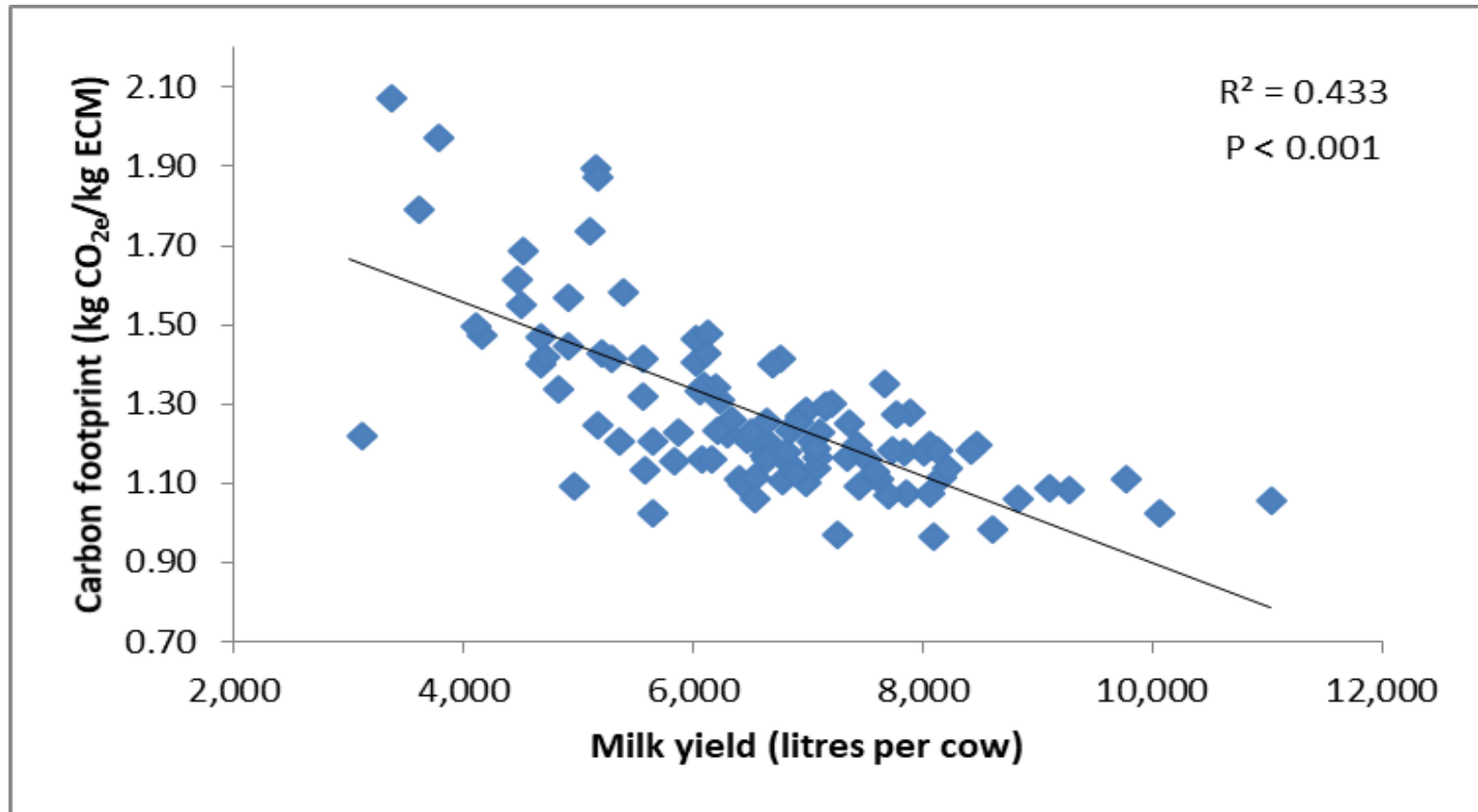
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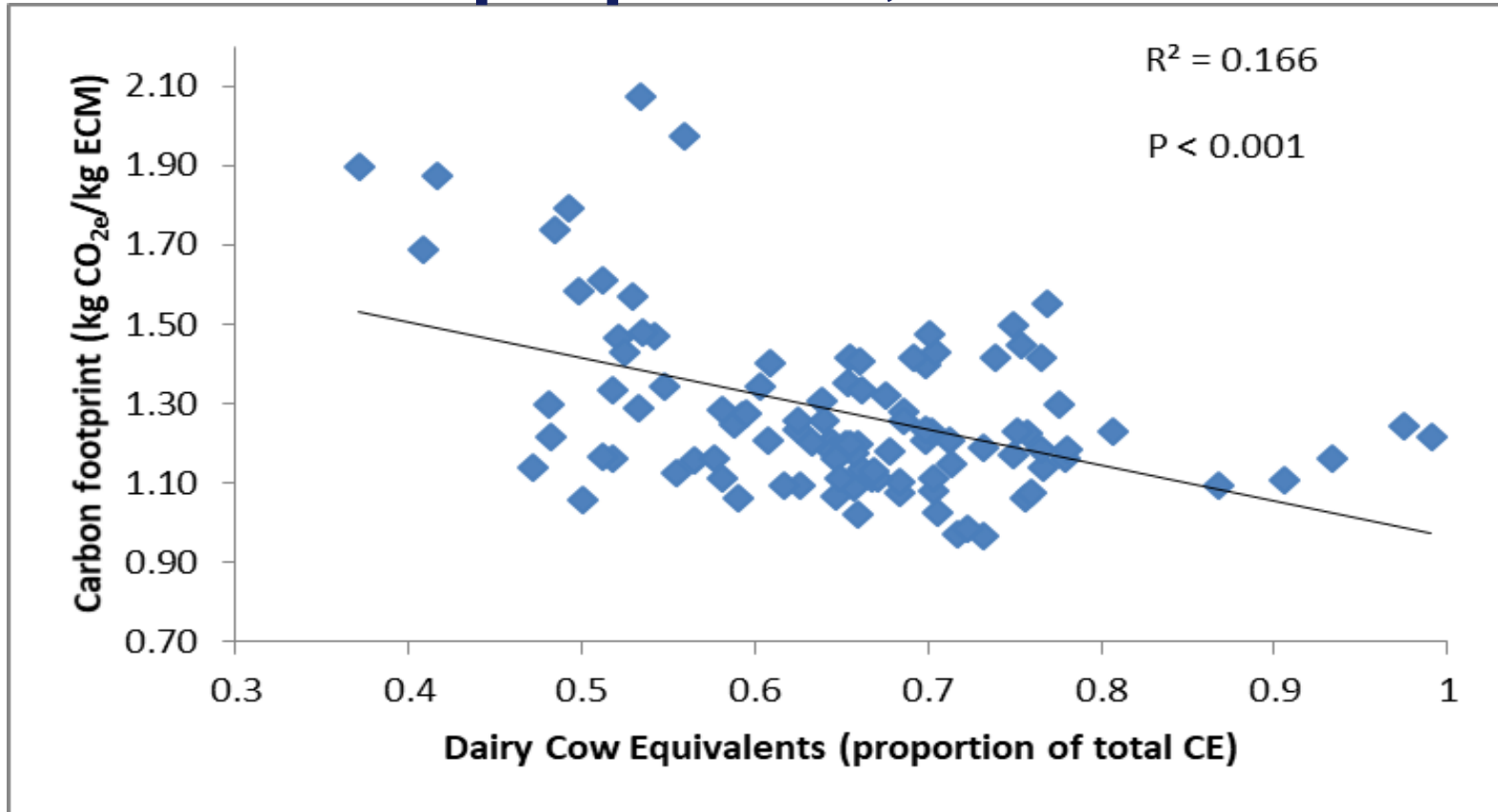
Emissions intensity of milk production by source (grams CO_{2e}/kg ECM (excl. Seq.))



Carbon footprint and milk yield, 2016



Carbon footprint and dairy cow equivalent proportion, 2016



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Average farm level physical characteristics, 2016

	2016 All Farms	2016 Top 25%	2016 Bottom 25%	2016 % Difference
Number of farms	108	27	27	-
GHG Emissions (kg CO ₂ e/kg ECM)	1.28	1.06	1.60	-34%
Adjusted forage area (ha per farm)	81.2	85.7	72.8	18%
Average number of dairy cows (per farm)	108.8	124.1	75.5	64%
Milk yield per cow (litres)	6524	7588	4961	53%
Total milk production (litres)	755462	1004631	375037	168%
Summer milk (%)	50%	49%	54%	-9%
Concentrates per cow (kg)	2216	2596	1670	55%
Concentrates per litre (kg)	0.33	0.33	0.33	-1%
Stocking Rate (cow equivalents per ha)	2.10	2.13	2.01	6%
Nitrogen used per hectare (kg)	144	149	129	16%
Cow equivalents-dairy cows (Q)	110	125	76	63%
Cow equivalents-other (Q) ¹	60	58	57	2%

Average financial results per litre, 2016

	2016 All Farms	2016 Top 25%	2016 Bottom 25%	2016 % Difference
Number of farms	108	27	27	0%
GHG Emissions (kg CO ₂ e/kg ECM)	1.28	1.06	1.60	-34%
Milk (p/litre)	20.97	21.22	20.33	4%
Calves (p/litre)	1.68	1.45	2.04	-29%
Herd replacement (p/litre)	-2.48	-2.26	-3.03	-26%
Total Enterprise Output (p/litre)	20.17	20.42	19.34	6%
Concentrates (p/litre)	6.89	6.91	6.96	-1%
Other purchased feed (p/litre)	0.18	0.15	0.15	1%
Hay, silage, forage and grazing (p/litre)	2.26	2.19	2.48	-12%
Sundries (p/litre)	1.19	1.35	1.23	10%
Vet and medicines (p/litre)	0.76	0.78	0.84	-7%
Total Variable Costs (p/litre)	11.29	11.37	11.66	-2%
Gross Margin (p/litre)	8.88	9.05	7.68	18%

Conclusions

- Agriculture inventory has seen little change in overall Greenhouse Gas emissions (i.e. an increase of 1.6% since 1990).
- Dairy farming has made substantial progress in **reducing its emissions on a per unit of production basis** (i.e. a 33.3% reduction since 1990).
- Growth in milk yields has spread the emissions burden associated with each dairy cow over more units of production.
- Emissions intensity in 2016 was found to vary between 0.97 and 2.07 kg CO_{2e}/kg ECM (excl. Sequestration) with an average of 1.28
- Main factor causing variation in carbon footprint between individual dairy farms was milk yield per cow
- Another factor identified as causing variation in carbon footprint levels between individual dairy farms is the proportion of total cow equivalents that are dairy cows.

Thanks for your attention

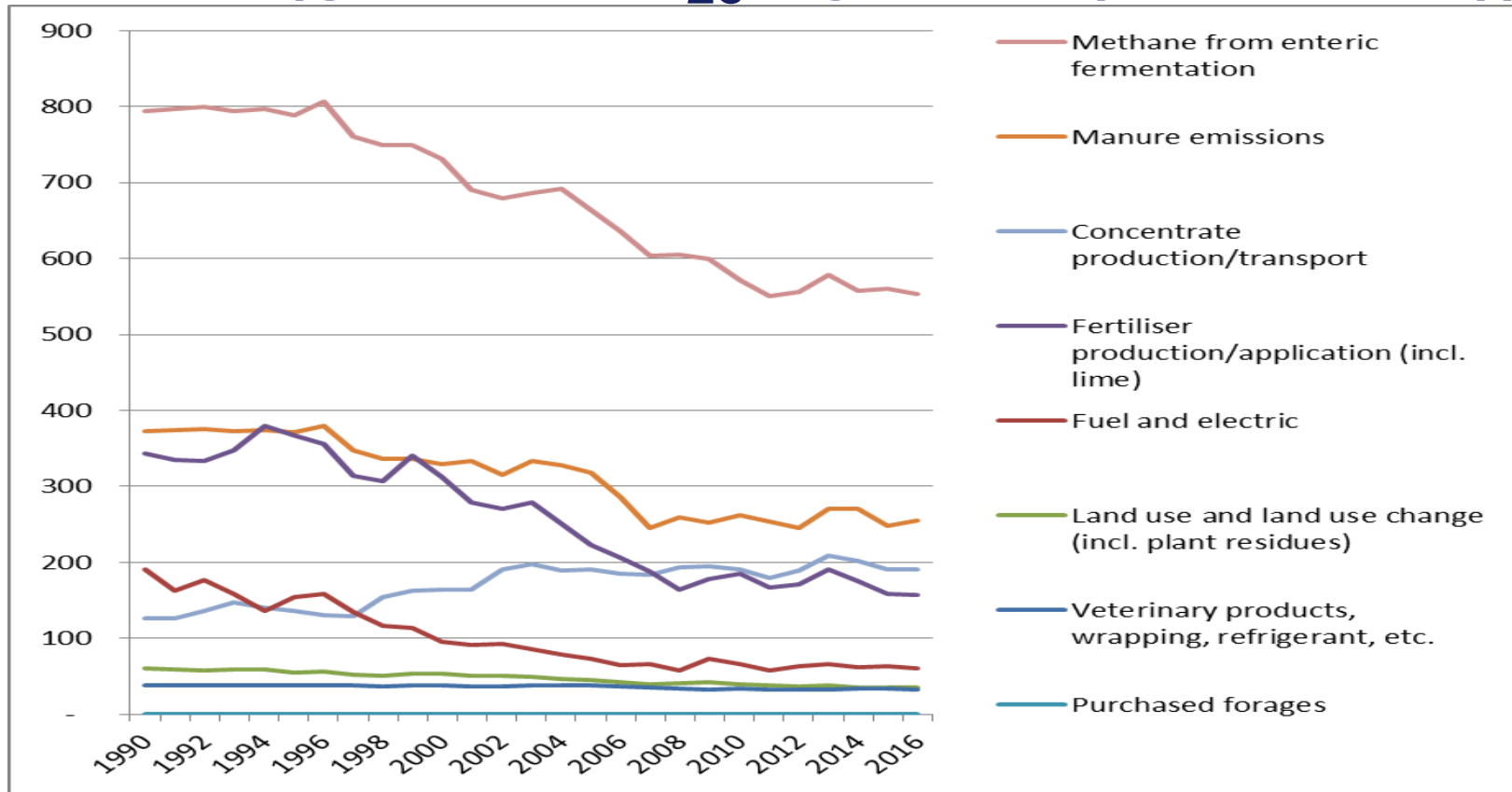
Q&A



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Emissions intensity of milk production by source (grams CO_{2e}/kg ECM (excl. Seq.))



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Average financial results per cow, 2016

	2016 All Farms	2016 Top 25%	2016 Bottom 25%	2016 % Difference
Number of farms	108	27	27	0%
GHG Emissions (kg CO ₂ e/kg ECM)	1.28	1.06	1.60	-34%
Milk (£ per cow)	1378	1623	1014	60%
Calves (£ per cow)	105	108	100	8%
Herd replacement (£ per cow)	-158	-176	-141	24%
Total Enterprise Output (£ per cow)	1325	1555	973	60%
Concentrates (£ per cow)	459	540	351	54%
Other purchased feed (£ per cow)	12	11	7	56%
Hay, silage, forage and grazing (£ per cow)	143	164	120	36%
Sundries (£ per cow)	78	101	61	67%
Vet and medicines (£ per cow)	49	60	41	48%
Total Variable Costs (£ per cow)	742	877	580	51%
Gross Margin (£ per cow)	583	678	393	72%

