

TEMPLATE FOR COUNTRY PROFILES FOR ANIMAL WASTE MANAGEMENT

UK RESPONSE

1. Summary of emissions and characterisation of the animal waste management sector

a. Briefly provide information on national and regional methane emissions for animal waste management systems by type of system and animal type.

Data is available from the National Atmospheric Emissions Inventory which includes projections up to 2025. These show that methane emissions from animal wastes have declined slightly from 139kt CH₄ in 1990, to 105kt in 2005. Rates of decline stabilise from around 2004 leading to a projection of 104kt in 2025. Of all livestock sectors, cattle are the biggest source of methane.

Detailed information on methane emissions from agriculture in the UK is contained in the tables Annexed to this note, as follows:

Table 1.1 - Information on national methane emissions for animal waste management systems by type (1970-2025)

Table 1.2 - Summary of agricultural methane emissions (1990-2025)

Table 1.3 – Summary of methane emissions from different livestock types (2004 data)

b. Briefly describe current animal waste management practices (e.g. land application, pasture/range, solid storage, liquid storage, lagoon) and livestock types (e.g. swine, dairy cattle, beef cattle, poultry).

- The Farm Practice Survey (for England and Wales) contains data on animal waste management practices, and extracts are shown in Tables 2.1-2.3 of the Annex.
- These data show that, on average, the majority (41%) of those reporting as having farm yard manure (FYM) stored it in the 'open field site on no constructed base' after removal from livestock buildings. However, manure handling practices vary with farm type, with 'no further storage' being the preferred options for pig/poultry systems and cattle/sheep in the uplands.
- For slurry storage, unlined earthbank lagoons were the most commonly used across all farm systems, although circular tanks above ground and tanks/structures outside were also widely used. As with FYM, different

practices were popular under different agricultural systems – e.g. cellars, pits and channels were especially used in the pigs/poultry industry.

c. Briefly provide information on methane recovery and use practices in use.

- There are several examples of methane recovery systems using animal manures in use in the UK, but these are limited in number and cover only a very small proportion of the livestock sector.
- An in-depth research report on the 'Holsworthy' plant has been commissioned to provide further information on systems in use, and is due to report at the end of the year.
- Table 3 below lists those large-scale, animal manure, AD projects we are aware of in UK and Ireland, although many of these are still at a developmental stage.
- It should also be noted that AD is more commonly used in the processing of other waste streams. Although the work of the Taskforce is focused on capturing agricultural methane, in practice methane recovery systems for agriculture may also be co-digesting food waste or municipal waste. This will affect the acceptability and economic viability of any such systems.

Table 3 - Summary of large-scale AD plant in UK and Ireland

Plant Type	(Technology provider)	Feedstock.	Status.
Holsworthy.	Mesophilic-(Farmatic technology).	Cattle, pig and poultry manure, organic food, waste.	Operational large scale.
Leicester.	Mesophilic.	Biodegradable Municipal Waste.	Operational large scale.
Scottish Executive	Mesophilic-(Greenfinch technology)	Sheep and cattle manure and slurries	7 Operational plants – small scale
Silver Hill Duck Farm- Ireland	Mesophilic	Duck slurry	Operational large scale
Ludlow	Mesophilic-(Greenfinch technology)	Biodegradable Municipal Waste	Under development
Ballytobin , Kilkenny, Ireland	Mesophilic-(BiogasNord technology)	Animal slurry, food processing wastes	Operational – small scale
Western Isles Scotland	Mesophilic-(Linde technology)	Biodegradable Municipal Waste	Under construction
Five mile town N Ireland	Mesophilic	Animal slurry, dairy waste	Planning preparation
Isle of Bute	Mesophilic	Animal slurry, dairy waste	Feasibility study
Westray	Mesophilic	Animal Slurry, fish waste	Feasibility study
Isle of Mull	Mesophilic	Animal Slurry	Feasibility study

4. Describe the key stakeholders in the animal waste management sector

Key stakeholders so far identified include:

- Farmers and their representative organizations such as National Farmers Union, the Country, Land and Business Association etc, as well as those who advise farmers e.g. Rural Development Service and private sector farm/environmental consultants.
- Industries involved in the production of AD technology, biogas companies, waste processors.
- Regulators and Government Agencies tasked with monitoring pollution and environmental conditions etc, for example the Environment Agency
- Planning authorities, waste disposal authorities, and the Health and Safety Executive for centralised, large scale plants
- Utilities sector – especially water utilities if related to diffuse pollution issues, electricity sector if gas production is used for energy generation
- Researchers/Academics
- Within government, policy interests include climate change, renewable energy, waste, sustainable agriculture, water quality, air quality, trade and industry, particularly within the Department for Environment, Food and Rural Affairs (Defra) and the Department of Trade and Industry (DTI)

5. Overview of methane recovery potential

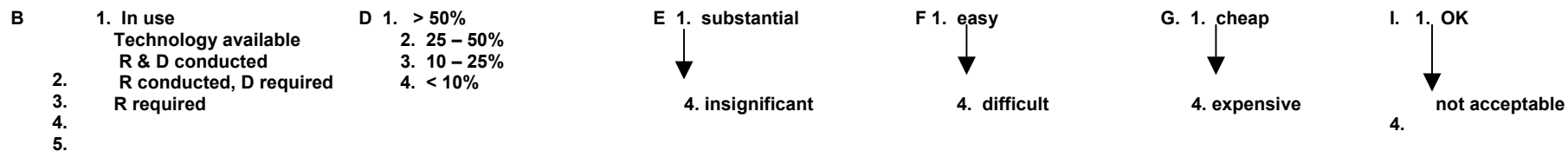
- The UK Department for Environment Food and Rural Affairs is continuing our research in this area to improve our understanding of current technical potential as well as market/economic potential, investigation of any barriers that limit further development potential, and ways to overcome them. We are also drawing on experience and evidence from other Government Departments, Agencies, and Research Institutes.
- A research project which will consolidate existing R&D and carry out further economic evaluation of methane recovery systems has recently been commissioned by the Sustainable Agriculture Strategy Division of Defra, and is due to report at the end of 2005. This will be fed into the Methane to Markets Task Force.
- A recently published study by an independent Biomass Task Force in the UK noted that AD offered a potential solution to the use of 'wet' biomass (such as animal manure and slurry) for energy production, and encouraged exploration of means to expand AD capacity.
- Table 4 below shows the output from a previous research project, showing the potential of various waste management systems compared to other mitigation options for greenhouse gas emissions from agriculture. This highlights that on the whole, technology is already available or R&D is being

conducted on the techniques described. The table also shows some of the difficulties in implementing some of this technology, and the range of complex criteria that need to be considered. For example, the technology which would lead to greatest reduction in overall emissions – advanced digesters- is considered likely to meet farmer opposition and would also be relatively expensive to implement. The option that is likely to receive least resistance and still be effective in reducing emissions is reduced animal numbers/increased productivity. However, this is not, of course, a specific technology option and has wider economic, social and environmental implications.

Table 4 Options for mitigation: animal manure/waste management

(Source: Cost curve assessment of mitigation options in greenhouse gas emission from agriculture, Institute of Grassland and Environmental Research (CC0229))

A. Option Description	B. Technology availability	C. Applicability	D. Effectiveness (reduction in emission)	E. Overall impact % total emission	F. Ease of on-farm implementation	G. Cost of on-farm implementation	H. Other 'knock-on'/ interactions + on-farm effects	I. Acceptability	
								Farmer	Public
Covered lagoons	½	Intensive livestock	2/3	3	3	2/3	Reduced NH ₃ loss	2/3	1
Low tech digesters	½	Housed cattle production	2/3	3/4	2/3	4	'Clean' energy source Creates potential for greater CH ₄ release high 'quality' organic residues	3	1
Advanced high tech digesters	½	Intensive large scale animal production	2/3	2/3	4	4	'Clean' energy source creates potential for greater CH ₄ release high 'quality' organic residues	4	1
Improved seals to lids on slurry tanks	2/3	Intensive dairy, pig and beef	1-2	3	1	1-3	Reduced NH ₃ (more N ₂ O + NO ₃ ?)	3	2
Improved diets for pigs	2/3	Intensive pigs	2	3	2	2	Improved production efficiency	3	2
Switch from anaerobic to aerobic (FYM) storage	2	Intensive cattle/pig	3	3	2	3	Changes in N availability	2/3	2
Increase frequency of slurry spreading	2	Intensive livestock	4	3	2	2	Reduced storage capacity	4	3
Reduced animal numbers/increased productivity per L.U.	½	Intensive livestock	3	2/3	2	2/3	Reduced inputs and other losses	1	3
Combustion of poultry litter	½	Intensive poultry	3	3	3	3	Reduced odours Energy source	2	2



6. Challenges and/or priorities to greater methane recovery and use.

Potential issues include:

- For centralised/community digesters there are challenges around transport, nuisance, health and safety, biosecurity and planning
- For all methane recovery systems, financial viability may be a challenge. Economics of the market place at present suggest that the majority of income from AD comes from the gate fee for processing waste, and not from the methane mitigation/capture (or the digestate produced) so technology is not optimized for this.
- An EU report noted that AD offers considerable reduction potential and an additional source of income for farmers, but the cost effective potential may only reach 10% of the technical potential at this stage. This would lead to a reduction of only 0.4% of agricultural emissions.
- Adequate year round supply of input to digesters can be a problem. In the case of animal manures, this favours the siting of AD plants in areas of the UK with large pig populations. Most pigs are housed continuously; and additionally there is less of a problem with land availability for disposal - and more of an opportunity for sale - of digestate. In the past AD has sometimes been seen by some in UK as a mechanism for dealing with the problem of manure management for the dairy industry, but in many systems cattle are grazed for 6 months of the year so slurry supply is seasonal. Siting an AD plant in a dairy area (where land for disposal is in short supply) also precludes a major advantage and potential income earner, that of co-digestion with waste from other streams, because the resulting digestate is nutrient enriched. This enrichment would be advantageous if the digestate were to be marketed as say an arable fertilizer for use locally (pig producing areas are usually surrounded by arable land as pigs are fed on locally grown cereal-based diets) but makes disposal to land even more problematic in a dairy area.
- Exporting energy from AD, matching supply of energy to demand, and connection to the main electricity grid for electricity production can be a problem (linked to irregularity of supply). On smaller farm-based systems, heat or combined heat and power (CHP) may be more appropriate and there may also be barriers associated with these systems.
- Co-digestion of manures/slurry with e.g. municipal waste can improve the economics and can increase quality of output. However, the solid output may still be subject to waste regulations (depending on the input, processing and final use etc) which may attract charges for handling and disposal
- Industry reports that lack of standard for the digestate from AD is a barrier to development, and the Department for Environment Food and Rural Affairs is currently scoping what further relevant work might be undertaken.
- Badly designed, maintained or poorly operated digesters can potentially release more methane, for example fugitive emissions of methane from low-

tech small digesters, and when the digestate is removed and spread on land before the AD process is completed

- Regulation may add further challenges, although for example recent changes allowing AD to contribute towards composting standards in local authority 'best value performance standards' are likely to have a positive effect.

7. List of existing or planned methane capture and/or use projects (if available)

See question 1c above.

8. Market assessment and reform issues

We are conducting research at the moment which will focus significantly on market issues relating to economic potential for methane recovery systems, including the issues discussed in question 6 above. This will report at the end of 2005.

9. Financing Options (characterise)

Again, this will be investigated through our research project due to report later in 2005 (see above), but may include for example consideration of existing mechanisms relating to GHG mitigation/renewable energy (Renewable Obligation Certificates) plus potential new systems (e.g. capital grants, enhanced capital allowances, gate fees). Fiscal regimes in related areas will also have an impact, for example landfill tax, waste regulations, animal by-product regulations etc.

10. Current cooperation among countries or non-governmental organizations

No existing arrangements in place, although our research draws on international experience and best practice.

11. Country Priorities

- The UK is determined to keep action to tackle climate change high on the international agenda. We have made climate change a key priority for our presidencies of both the G8 and the EU in 2005. The joint EU Informal meeting of the agriculture and environment councils, chaired by the UK and held in London on 11 September 2005 was on the topic of climate change and agriculture.
- Agriculture accounts for over 40% of methane emissions in the UK and we are actively exploring ways to try and minimise these emissions. We agree that the main issue for the Agricultural Taskforce is related to animal

- wastes, however, given that 80% of emissions of methane are from enteric fermentation, we would also be interested in looking into options to address this issue in the future, consistent with the overall focus of the Partnership.
- The UK is currently reviewing its Climate Change Programme, issued in November 2000, and the Agriculture, Forestry and Land Management section will address what further can be done to reduce methane emissions from this sector. The new Climate Change Programme is expected to be published before the end of 2005.
 - Our research suggests that the technology in this area offers promising opportunities, although there are still further technological advances to be made, in addition to market supply issues. We are keen to learn from other countries' experience and best practice to tackle barriers to implementation. We therefore strongly support the inclusion of agriculture in the work of the Methane to Markets Partnership, and firmly believe that it should have the same status as methane emissions from coal, oil and gas, and landfill.

12. Other issues related to animal waste management

- We recognise that sustainable animal waste management has a number of benefits wider than methane mitigation, including improved water quality, waste management, renewable energy generation, farm diversification and a potential additional income stream for rural communities.
- We are currently exploring how the agricultural sector can contribute to and benefit from the delivery of the national waste objectives. The use of anaerobic digestion to manage farm and other wastes will be integral to this. We will need to consider with stakeholders the full range relevant issues, such as financial drivers, public perceptions, planning controls, waste disposal infrastructure and the capacity of the land to accept compost.
- Indeed, the potential for other wider environmental objectives can help market development for methane as increased pressures from other areas may alter the economics for agricultural systems.
- Development of a market for methane from agriculture should be promoted in a way that is compatible with these and wider sustainability objectives, at local, national and international level.

13. Conclusions and Observations

- The UK is highly supportive of the Agricultural Taskforce and its work is in keeping with our commitment to address greenhouse gas emissions from all sources. The international experience which the Taskforce brings will be particularly helpful to the UK in addressing emissions from the agricultural sector.
- We are conducting further research and evaluation in this area, particularly in relation to market issues for methane in agriculture and will be able to provide an updated and more comprehensive response to this questionnaire towards the end of 2005.
- We believe it would be helpful for the Taskforce, and hopefully the future Agricultural Sub-Committee, to consider how it will include environmental and social considerations in discussions on market development. For example, large pig units may provide an economically viable biogas plant, but there are potential environmental (and animal health and social) implications of intensive production on this scale.

Furthermore, in addition to the climate change benefits of any actions to bring about emission reductions, there are likely to be links to a number of other policy areas with potential ancillary environmental benefits, which may also affect the economic viability and overall cost-benefit calculations related to agricultural methane reduction.

- When considering markets for methane, issues of scale and the opportunity for co-digestion need to be considered, as different challenges will arise depending on whether we are dealing with on-farm or centralised waste management systems.

14. References and Sources

- *UK Greenhouse Gas Inventory 1990-2003* (Source: National Atmospheric Emissions Inventory). Annual report for submission under the Framework Convention on Climate Change. Baggott et al
- *Farm Practice Survey 2005 – Statistical Notice*, Defra and National Statistics
- *Mitigation potential of GHG in agricultural sector – WG7 Agriculture - Final Report*. European Commission Agriculture Directorate General

- *Synopsis and review of relevant projects to assess mitigation options for nitrous oxide and methane to inform the UK Climate Change Programme Review*, Institute of Grassland and Environmental Research
- *Methane UK*, Environmental Change Institute, Jardine et al
- *Cost curve assessment of mitigation options in greenhouse gas emissions from agriculture*, Institute of Grassland and Environmental Research

TABLE 1.1**Information on national methane emissions for animal waste management systems by type of system**

(note - regional breakdown not available at present)

Source: National Atmospheric Emissions Inventory

UK Greenhouse Gas Inventory, 1990-2003. Annual report for submission under the Framework Convention on Climate Change

AGRICULTURAL EMISSIONS OF METHANE 1970-2025

Emission factors EF and EFi for pre 1990 and post 1997 are estimates - see previous page

	<i>As at Oct 98</i>	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
CH4 from dairy	EF, kg CH4 hd-1 yr-1	88.23804	88.25823	87.09745	86.07203	85.7226	87.15092	89.17409	91.35693	93.71445	93.79805
cattle in milk	EF1, kg CH4 hd-1 yr-1	9.928762	9.931034	9.80042	9.685037	9.645718	9.806437	10.03409	10.27971	10.54498	10.55439
		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Enteric CH4	Dairy EF, kg CH4/hd/yr	88.23804	88.25823	87.09745	86.07203	85.7226	87.15092	89.17409	91.35693	93.71445	93.79805
Waste CH4	Dairy EFi, kg CH4/hd/yr	9.928762	9.931034	9.80042	9.685037	9.645718	9.806437	10.03409	10.27971	10.54498	10.55439

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AGRICULTURAL EMISSIONS OF METHANE 1970-2025

Emission factors

1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
95.03665	95.75942	97.82338	98.74792	97.04528	99.27434	100.4576	99.77869	101.3522	101.8124	88.04821	88.37265	90.07282
10.69376	10.77509	11.00733	11.11136	10.91977	11.17059	11.30374	11.22734	11.4044	11.45618	21.6261	21.7058	22.0629
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
95.03665	95.75942	97.82338	98.74792	97.04528	99.27434	100.4576	99.77869	101.3522	101.8124	88.0482	88.3726	90.0728
10.69376	10.77509	11.00733	11.11136	10.91977	11.17059	11.30374	11.22734	11.4044	11.45618	21.62611	21.70579	22.06294

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AGRICULTURAL EMISSIONS OF METHANE 1970-2025

Emission factors

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
90.76823	90.91793	92.28943	93.20856	95.98207	96.82595	97.79828	98.65856	99.3603	102.7031	103.7839	124.6884	125.6344
22.2942	22.3310	22.6678	22.8310	23.5748	23.7821	24.0209	24.2322	24.4045	25.2256	25.4911	14.0302	14.1367
90.7682	90.9179	92.2894	93.2086	95.9821	96.8260	97.7983	98.6586	99.3603	102.7031	103.7839	124.6884	125.6344
22.29419	22.33096	22.66782	22.83103	23.5748	23.78207	24.02089	24.23219	24.40455	25.22558	25.49105	14.03025	14.13669

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AGRICULTURAL EMISSIONS OF METHANE 1970-2025

Emission factors

<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>
126.7476	127.8708	129.1663	130.1479	131.3019	132.4663	133.8082	134.8268	136.0231	137.2302	138.6203	139.6773	140.9174
14.2619	14.3883	14.5341	14.6446	14.7744	14.9054	15.0564	15.1710	15.3057	15.4415	15.5979	15.7168	15.8564
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
126.7476	127.8708	129.1663	130.1479	131.3019	132.4663	133.8082	134.8268	136.0231	137.2302	138.6203	139.6773	140.9174
14.26195	14.38834	14.53411	14.64456	14.77441	14.90543	15.05643	15.17104	15.30565	15.44148	15.5979	15.71683	15.85638

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AGRICULTURAL EMISSIONS OF METHANE 1970-2025

Banking scenario averages 2008-2012

Emission factors

2019	2020	2021	2022	2023	2024	2025
142.1688	143.6089	144.7057	145.9914	147.2887	148.7805	149.9187

15.9972	16.1592	16.2826	16.4273	16.5733	16.7412	16.8692
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2019	2020	2021	2022	2023	2024	2025	Stable hig	Stable low A2Ke (as NAEI for CH4)	GO4c	NAEI		
142.1688	143.6089	144.7057	145.9914	147.2887	148.7805	149.9187	131.3781	127.031	127.031	127.031	127.031	0.0000
							14.78299	14.29385	14.29385	14.29385	14.29385	0.0000
15.99719	16.15923	16.28264	16.42731	16.57329	16.74115	16.86922						

YEAR	CENSUS CLASS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
CATTLE	Dairy	3112	3132	3229	3335	3296	3190	3193	3224	3247	3266
(000 HEAC	Emissions, CH4 kt										
Ruminants	Methane wastes	30.89687	31.10015	31.64853	32.29649	31.7948	31.28046	32.03966	33.13988	34.23815	34.46564
	Methane enteric	274.584	276.3906	281.2641	287.0226	282.5641	277.993	284.7401	294.5179	304.2783	306.3
	Methane total	305.4808	307.4907	312.9127	319.3191	314.3589	309.2735	316.7798	327.6578	338.5165	340.7657
	Beef	1467	1547	1744	1994	2210	2146	1999	1878	1769	1723
head - helc	Others > 1	3820	3914	4072	4391	4648	4585	4334	4325	4254	4229
head	Beef & others > 1	5287	5461	5816	6385	6858	6731	6333	6203	6023	5952
head	Others < 1	3354.997	3448.282	3656.958	3952.987	4233.918	4121.222	3838.134	3793.379	3695.781	3661.272
head	Beef & all others	8642	8909	9473	10338	11092	10852	10171	9996	9719	9613
head	Total cattle	12581	12805	13484	14445	15210	14762	14115	13899	13671	13589
head	[Difference x-check]	827	764	782	772	822	720	751	679	705	710
	[Difference x-chk scenarios]										
	Emissions, CH4 kt										
	Methane wastes	36.87039	37.928	40.03541	43.51048	46.47629	45.58752	42.84133	42.32185	41.31188	40.93075
	Methane enteric	363.82	375.2181	399.1182	436.1386	468.0604	458.2534	429.8684	422.1486	410.3361	405.7727
	Methane total	400.6904	413.1461	439.1536	479.6491	514.5367	503.8409	472.7097	464.4705	451.648	446.7034
	Total cattle emissions, CH4 kt										
	Methane wastes	67.76725	69.0282	71.6839	75.80697	78.27109	76.86798	74.88099	75.4617	75.5500	75.39639
	Methane enteric	638.404	651.6087	680.3824	723.1612	750.6245	736.2464	714.6085	716.6665	714.6144	712.0727
	Methane total	706.1713	720.6369	752.0663	798.9681	828.8956	813.1144	789.4895	792.1283	790.1645	787.4691
PIGS	TOTAL	8088	8724	8619	8979.317	8544	7532	7947	7756	7728	7864
(000 HEAC	Emissions, kt CH4										
Psuedo-rur	Methane wastes	24.264	26.172	25.857	26.93795	25.632	22.596	23.841	23.268	23.184	23.592
	Methane enteric	12.132	13.086	12.9285	13.46898	12.816	11.298	11.9205	11.634	11.592	11.796
	Methane total	36.396	39.258	38.7855	40.40693	38.448	33.894	35.7615	34.902	34.776	35.388

YEAR	CENSUS CLASS	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CATTLE	Dairy	3225	3190886	3250005	3332630	3280597	3149706	3138137	3043460	2912694	2865876
(000 HEAC	Emissions, CH4 kt										
Ruminants	Methane wastes	34.48644	34.38207	35.77387	37.03005	35.82338	35.18409	35.47268	34.16997	33.21752	32.83199
	Methane enteric	306.485	305.5574	317.9265	329.0903	318.3664	312.685	315.2497	303.6725	295.2079	291.7817
	Methane total	340.9714	339.9395	353.7004	366.1203	354.1898	347.8691	350.7224	337.8424	328.4254	324.6137
	Beef	1640	1,612	1,582	1,546	1,534	1,534	1,506	1,553	1,631	1,757
head - helc	Others > 1	4208	4,824	4,801	4,770	4,751	4,683	4,412	4,199	4,127	4,017
head	Beef & others > 1	5848	6,436	6,383	6,316	6,285	6,217	5,918	5,752	5,758	5,774
head	Others < 1	3673.134	3,620	3,723	3,754	3,765	3,662	3,592	3,497	3,338	3,461
head	Beef & all others	9521	10,056	10,106	10,070	10,051	9,878	9,510	9,249	9,096	9,235
head	Total cattle	13426	13,247	13,356	13,403	13,331	13,028	12,648	12,293	12,008	12,101
head	[Difference x-check]	680	0	0	0	0	0	0	0	0	0
	[Difference x-chk scen:										
	Emissions, CH4 kt										
	Methane wastes	40.61327	44.07435	44.16264	43.96815	43.85574	43.1388	41.23056	39.80066	39.11021	39.16076
	Methane enteric	401.1764	427.6508	428.5062	426.3061	425.1981	418.5038	401.873	390.8031	385.8503	390.6811
	Methane total	441.7896	471.7252	472.6688	470.2743	469.0539	461.6426	443.1035	430.6038	424.9605	429.8419
	Total cattle emission:										
	Methane wastes	75.0997	78.4564	79.9365	80.9982	79.6791	78.3229	76.7032	73.9706	72.3277	71.99275
	Methane enteric	707.6613	733.2082	746.4326	755.3964	743.5646	731.1888	717.1227	694.4756	681.0581	682.4628
	Methane total	782.761	811.6646	826.3691	836.3946	823.2437	809.5117	793.8259	768.4462	753.3858	754.4556
PIGS	TOTAL	7815	7930	8129	8280	7790	7967	8038	8044	8084	7606
(000 HEAC	Emissions, kt CH4										
Psuedo-rur	Methane wastes	23.445	23.79145	24.38582	24.8399	23.36898	23.89994	24.11504	24.13053	24.25183	22.81813
	Methane enteric	11.7225	11.89573	12.19291	12.41995	11.68449	11.94997	12.05752	12.06526	12.12591	11.40906
	Methane total	35.1675	35.68718	36.57872	37.25986	35.05347	35.84991	36.17256	36.19579	36.37774	34.22719

YEAR	CENSUS CLASS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CATTLE	Dairy	2847200	2767900	2682529	2667818	2715968	2602770	2587405	2478412	2424120	2440300
(000 HEAC	Emissions, CH4 kt										
Ruminants	Methane wastes	61.57385	60.07947	59.18447	59.47684	60.65017	58.99912	59.07311	58.42806	57.65058	58.61817
	Methane enteric	250.6909	244.6067	241.6229	242.1531	246.9302	240.2082	241.1683	237.8831	234.7177	238.6571
	Methane total	312.2647	304.6861	300.8074	301.63	307.5803	299.2073	300.2414	296.3112	292.3683	297.2753
	Beef	1,831	1,869	1,952	2,018	2,030	2,049	2,073	2,111	2,181	2,138
head - helc	Others > 1	3,999	3,885	3,965	3,890	3,918	3,918	4,089	3,924	3,817	3,842
head	Beef & others > 1	5,830	5,753	5,917	5,908	5,948	5,967	6,162	6,036	5,998	5,979
head	Others < 1	3,403	3,362	3,326	3,276	3,291	3,287	3,291	3,119	3,069	3,004
head	Beef & all others	9,232	9,115	9,243	9,184	9,239	9,255	9,453	9,155	9,067	8,984
head	Total cattle	12,079	11,883	11,925	11,852	11,954	11,857	12,040	11,633	11,491	11,424
head	[Difference x-check]	0	0	1	-3	-723	1	-4	-802	5	6
	[Difference x-chk scen:										
	Emissions, CH4 kt										
	Methane wastes	39.08029	38.37847	38.98154	38.56435	38.81246	38.85308	39.95607	38.56411	37.96117	37.79993
	Methane enteric	391.4213	386.4222	393.0877	391.0271	393.4462	394.2496	403.7292	392.024	388.5721	385.5561
	Methane total	430.5016	424.8006	432.0693	429.5915	432.2587	433.1027	443.6853	430.5881	426.5333	423.356
	Total cattle emission:										
	Methane wastes	100.6541	98.45794	98.16601	98.04119	99.46263	97.85221	99.02918	96.99217	95.61176	96.4181
	Methane enteric	642.1121	631.0288	634.7107	633.1802	640.3764	634.4577	644.8975	629.9072	623.2899	624.2132
	Methane total	742.7663	729.4868	732.8767	731.2214	739.839	732.31	743.9267	726.8993	718.9016	720.6313
PIGS	TOTAL	7548	7695	7707	7853	7892	7627	7590	8072	8121	7303
(000 HEAC	Emissions, kt CH4										
Psuedo-rur	Methane wastes	22.64441	23.08353	23.11985	23.55912	23.67582	22.8809	22.76986	24.21618	24.36314	21.90965
	Methane enteric	11.3222	11.54176	11.55993	11.77956	11.83791	11.44045	11.38493	12.10809	12.18157	10.95483
	Methane total	33.96661	34.62529	34.67978	35.33868	35.51373	34.32134	34.15479	36.32427	36.54471	32.86448

YEAR	CENSUS CLASS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CATTLE	Dairy	2335613	2251162	2227202	2192258	2148413	2105445	2063336	2022069	1981628	1941995
(000 HEAC	Emissions, CH4 kt										
Ruminants	Methane wastes	56.59701	54.93859	56.18246	55.88297	30.14277	29.76401	29.42719	29.09422	28.8012	28.43966
	Methane enteric	230.4282	223.6761	228.7404	227.5211	267.8822	264.5162	261.5228	258.5636	255.9595	252.7465
	Methane total	287.0252	278.6147	284.9229	283.404	298.025	294.2802	290.95	287.6578	284.7607	281.1862
	Beef	2,028	1,907	1,914	1,939	1,939	1,939	1,939	1,939	1,939	1,939
head - helc	Others > 1	3,776	3,657	3,534	3,558	3,529	3,470	3,441	3,414	3,386	3,359
head	Beef & others > 1	5,804	5,564	5,449	5,497	5,468	5,408	5,380	5,352	5,325	5,297
head	Others < 1	2,995	2,787	2,669	2,828	2,800	2,772	2,744	2,717	2,690	2,663
head	Beef & all others	8,798	8,351	8,118	8,325	8,268	8,180	8,124	8,069	8,014	7,960
head	Total cattle	11,133	10,602	10,345	10,517	10,416	10,286	10,188	10,091	9,996	9,902
head	[Difference x-check]	-717	0	0	0	0	0	0	0	0	0
	[Difference x-chk scen:										
	Emissions, CH4 kt										
	Methane wastes	37.07564	35.41592	34.35289	35.03322	34.7755	34.33481	34.08368	33.83507	33.58894	33.34527
	Methane enteric	376.8031	358.4867	349.0942	356.6182	354.2986	350.5177	348.2559	346.0167	343.7999	341.6052
	Methane total	413.8787	393.9026	383.4471	391.6515	389.0741	384.8525	382.3395	379.8517	377.3888	374.9505
	Total cattle emission:										
	Methane wastes	93.67265	90.35451	90.53535	90.91618	64.91827	64.09882	63.51087	62.92928	62.39014	61.78494
	Methane enteric	607.2313	582.1628	577.8347	584.1393	622.1808	615.0338	609.7786	604.5803	599.7594	594.3518
	Methane total	700.9039	672.5173	668.37	675.0555	687.0991	679.1327	673.2895	667.5096	662.1496	656.1367
PIGS	TOTAL	6482	5845	5588	5047	7710	7605	7553	7522	7491	7459
(000 HEAC	Emissions, kt CH4										
Psuedo-rur	Methane wastes	19.44648	17.53611	16.76413	15.14051	23.12859	22.81604	22.65977	22.566	22.47224	22.37848
	Methane enteric	9.72324	8.768055	8.382063	7.570253	11.5643	11.40802	11.32988	11.283	11.23612	11.18924
	Methane total	29.16972	26.30417	25.14619	22.71076	34.69289	34.22407	33.98965	33.849	33.70836	33.56771

YEAR	CENSUS CLASS	2020	2021	2022	2023	2024	2025				
CATTLE	Dairy	1827790	1827790	1827790	1827790	1827790	1827790		2,116	1,912	1,966
(000 HEAC	Emissions, CH4 kt										
Ruminants	Methane wastes	29.53567	29.76125	30.02567	30.29249	30.59931	30.8334		31.27435	27.3286	28.10203
	Methane enteric	262.4869	264.4916	266.8416	269.2128	271.9396	274.02		277.9387	242.8724	249.746
	Methane total	292.0226	294.2529	296.8673	299.5053	302.5389	304.8534		309.2131	270.201	277.848
	Beef	1,939	1,939	1,939	1,939	1,939	1,939				
head - helc	Others > 1	3,278	3,278	3,278	3,278	3,278	3,278		5,555	5,635	5,619
head	Beef & others > 1	5,217	5,217	5,217	5,217	5,217	5,217		5,555	5,635	5,619
head	Others < 1	2,584	2,584	2,584	2,584	2,584	2,584		3,011	3,010	3,025
head	Beef & all others	7,801	7,801	7,801	7,801	7,801	7,801		8,566	7,907	8,645
head	Total cattle	9,628	9,628	9,628	9,628	9,628	9,628		10,681	10,557	10,611
head	[Difference x-check]	0	0	0	0	0	0		0	737944	0
	[Difference x-chk scen:								0	-737944	1
	Emissions, CH4 kt										
	Methane wastes	32.62879	32.62879	32.62879	32.62879	32.62879	32.62879		42.24143	42.71858	42.67168
	Methane enteric	335.1521	335.1521	335.1521	335.1521	335.1521	335.1521		365.3913	369.1988	368.9642
	Methane total	367.7809	367.7809	367.7809	367.7809	367.7809	367.7809		407.6327	411.9174	411.6359
	Total cattle emission:										
	Methane wastes	62.16447	62.39004	62.65447	62.92129	63.22811	63.4622		73.51578	70.04718	70.77372
	Methane enteric	597.639	599.6438	601.9937	604.365	607.0917	609.1721		643.33	612.0711	618.7102
	Methane total	659.8035	662.0338	664.6482	667.2863	670.3198	672.6343		716.8458	682.1183	689.484
PIGS	TOTAL	7369	7369	7369	7369	7369	7369		7429	7429	7429
(000 HEAC	Emissions, kt CH4										
Psuedo-rur	Methane wastes	22.10679	22.10679	22.10679	22.10679	22.10679	22.10679		22.28756	22.28756	22.28756
	Methane enteric	11.0534	11.0534	11.0534	11.0534	11.0534	11.0534		11.14378	11.14378	11.14378
	Methane total	33.16019	33.16019	33.16019	33.16019	33.16019	33.16019		33.43134	33.43134	33.43134

YEAR	CENSUS CLASS
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CATTLE Dairy	2,041	1,912	0.0000
(000 HEAD Emissions, CH4 kt			
Ruminants Methane wastes	29.1708	27.3286	0.0000
Methane enteric	259.2443	242.8724	0.0000
Methane total	288.4151	270.201	0.0000
Beef			
head - helc Others > 1	5,651	3,506	2128669.3890
head Beef & others > 1	5,651	5,635	0.0000
head Others < 1	3,019	3,010	0.0000
head Beef & all others	8,670	7,907	0.0000
head Total cattle	10,710	10,557	0.0000
head [Difference x-check]	0	737944	0.0000
[Difference x-chk scen:	0	-737944	0.0000
Emissions, CH4 kt			
Methane wastes	42.83988	29.94657	12.7720
Methane enteric	370.2538	369.1988	0.0000
Methane total	413.0937	399.1453	12.7720
Total cattle emission:			
Methane wastes	72.01068	57.27516	12.7720
Methane enteric	629.498	612.0711	0.0000
Methane total	701.5087	669.3463	12.7720
PIGS TOTAL	7429	7429	0.0000
(000 HEAD Emissions, kt CH4			
Psuedo-rur Methane wastes	22.28756	22.28756	0.0000
Methane enteric	11.14378	11.14378	0.0000
Methane total	33.43134	33.43134	0.0000

YEAR CENSUS CLASS		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
SHEEP	Breeding	13207.8	13001.81	13386.1	13881.79	14118.61	14081.25	13849.69	13925.22	14428.57	14827.34
	Others	929.2343	925.7026	957.6408	995.6193	1015.408	1010.321	1010.134	1004.413	1060.768	1066.971
(000 HEAC	Lambs < 1 yr	11942.89	12053.3	12533.45	13065.68	13364.46	13264.14	13490.65	13260.26	14282.23	14051.35
Ruminants	TOTAL	26079.93	25980.81	26877.19	27943.09	28498.48	28355.71	28350.47	28189.9	29771.57	29945.66
	(Live average)	19643.87	19491.31	20131.64	20912.44	21308.54	21218.48	21100.08	21057.56	22100.07	22386.5
Emissions, kt CH4											
<i>Breeding</i>											
	Methane wastes	2.5095	2.4703	2.5434	2.6375	2.6825	2.6754	2.6314	2.6458	2.7414	2.8172
	Methane enteric	105.6624	104.0145	107.0888	111.0543	112.9489	112.65	110.7975	111.4018	115.4286	118.6188
	Methane total	108.1719	106.4848	109.6321	113.6919	115.6314	115.3254	113.429	114.0476	118.17	121.436
<i>Other</i>											
	Methane wastes	0.088277	0.087942	0.090976	0.094584	0.096464	0.09598	0.095963	0.095419	0.100773	0.101362
	Methane enteric	3.716937	3.702811	3.830563	3.982477	4.061631	4.041284	4.040537	4.017652	4.243073	4.267885
	Methane total	3.805215	3.790752	3.921539	4.077061	4.158095	4.137264	4.1365	4.113071	4.343846	4.369248
<i>Lambs < 1 yr</i>											
	Methane wastes	0.45383	0.458025	0.476271	0.496496	0.50785	0.504037	0.512645	0.50389	0.542725	0.533951
	Methane enteric	19.10863	19.28528	20.05352	20.90508	21.38314	21.22263	21.58503	21.21642	22.85156	22.48215
	Methane total	19.56246	19.7433	20.52979	21.40158	21.89099	21.72667	22.09768	21.72031	23.39428	23.0161
<i>Total</i>											
	Methane wastes	3.0516	3.0163	3.1106	3.2286	3.2868	3.2755	3.2400	3.2451	3.3849	3.4525
	Methane enteric	128.488	127.0026	130.9729	135.9419	138.3936	137.9139	136.4231	136.6358	142.5232	145.3688
	Methane total	131.5396	130.0189	134.0835	139.1705	141.6805	141.1893	139.6631	139.8809	145.9082	148.8213
GOATS	TOTAL	25	25	25	25	25	25	48	48	48	48
(000 HEAC	Emissions, kt CH4										
Ruminants	Methane wastes	0.003	0.003	0.003	0.003	0.003	0.0030	0.0058	0.0058	0.0058	0.0058
	Methane enteric	0.125	0.125	0.125	0.125	0.125	0.125	0.24	0.24	0.24	0.24
	Methane total	0.128	0.128	0.128	0.128	0.128	0.1280	0.2458	0.2458	0.2458	0.2458

YEAR CENSUS CLASS		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SHEEP	Breeding	15082.98	15325.52	15844.71	16243.3	16661.99	17002.1	17534.02	18395.82	19373.42	20368.33
	Others	1120.427	1143.64	1178.192	1213.9	1141.926	1145.653	1189.716	1212.104	1288.076	1322.602
(000 HEAC	Lambs < 1 yr	15242.54	15628.28	16044.29	16612.23	17181.23	17676.36	18504.2	19595.61	20833.65	21897.05
Ruminants	TOTAL	31445.94	32097.43	33067.19	34069.43	34985.14	35824.12	37227.94	39203.54	41495.14	43587.99
	(Live average)	23264.46	23711.48	24455.95	25156.36	25823.56	26413.11	27380.98	28799.68	30434.28	31978.16
Emissions, kt CH4											
<i>Breeding</i>											
	Methane wastes	2.8658	2.9118	3.0105	3.0862	3.1658	3.2304	3.3315	3.4952	3.6809	3.8700
	Methane enteric	120.6638	122.6041	126.7577	129.9464	133.2959	136.0168	140.2722	147.1666	154.9873	162.9467
	Methane total	123.5296	125.516	129.7682	133.0326	136.4617	139.2472	143.6036	150.6618	158.6683	166.8167
<i>Other</i>											
	Methane wastes	0.106441	0.108646	0.111928	0.115321	0.108483	0.108837	0.113023	0.11515	0.122367	0.125647
	Methane enteric	4.481707	4.574558	4.712769	4.8556	4.567704	4.582612	4.758864	4.848416	5.152304	5.290408
	Methane total	4.588147	4.683204	4.824697	4.970921	4.676187	4.691449	4.871887	4.963566	5.274671	5.416055
<i>Lambs < 1 yr</i>											
	Methane wastes	0.579216	0.593874	0.609683	0.631265	0.652887	0.671702	0.70316	0.744633	0.791679	0.832088
	Methane enteric	24.38806	25.00524	25.67087	26.57956	27.48996	28.28218	29.60672	31.35298	33.33384	35.03528
	Methane total	24.96728	25.59912	26.28055	27.21083	28.14285	28.95388	30.30988	32.09762	34.12552	35.86737
<i>Total</i>											
	Methane wastes	3.5514	3.6144	3.7321	3.8328	3.9271	4.0109	4.1476	4.3550	4.5950	4.8277
	Methane enteric	149.5336	152.1839	157.1413	161.3816	165.3536	168.8816	174.6378	183.368	193.4735	203.2724
	Methane total	153.0850	155.7983	160.8734	165.2144	169.2807	172.8925	178.7854	187.7229	198.0685	208.1001
GOATS	TOTAL	48	48	48	48	9.471	11.057	12.119	66.36758	102.3647	114.224
(000 HEAC	Emissions, kt CH4										
Ruminants	Methane wastes	0.0058	0.0058	0.0058	0.0058	0.0011	0.0013	0.0015	0.0080	0.0123	0.013707
	Methane enteric	0.24	0.24	0.24	0.24	0.047355	0.055285	0.060595	0.331838	0.511823	0.57112
	Methane total	0.2458	0.2458	0.2458	0.2458	0.0485	0.0566	0.0620	0.3398	0.5241	0.584827

YEAR CENSUS CLASS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SHEEP	Breeding	20786.91	20664.73	20732.43	20881.42	20861.38	20668	20516.08	20696	21250.8	21458
	Others	1302.491	1288.157	1200.776	1159.968	1193.551	1119	1095.104	1095	1067.8	1106
(000 HEAC	Lambs < 1 yr	22379.99	22213.12	22606.74	22394.16	21758.15	21267	20474.81	21032	22091.3	22092
Ruminants	TOTAL	44469.39	44166.01	44539.95	44435.55	43813.07	43054	42086	42823	44409.9	44656
	(Live average)	32628.15	32415.37	32636.19	32658.49	32337.22	31861	31301.04	31759.5	32830.35	33057
Emissions, kt CH4											
<i>Breeding</i>											
	Methane wastes	3.9495	3.9263	3.9392	3.9675	3.9637	3.9269	3.8981	3.9322	4.0377	4.0770
	Methane enteric	166.2953	165.3178	165.8594	167.0514	166.891	165.344	164.1287	165.568	170.0064	171.664
	Methane total	170.2448	169.2441	169.7986	171.0189	170.8547	169.2709	168.0267	169.5002	174.0441	175.741
<i>Other</i>											
	Methane wastes	0.123737	0.122375	0.114074	0.110197	0.113387	0.106305	0.104035	0.104025	0.101441	0.10507
	Methane enteric	5.209964	5.152628	4.803104	4.639872	4.774204	4.476	4.380415	4.38	4.2712	4.424
	Methane total	5.333701	5.275003	4.917178	4.750069	4.887591	4.582305	4.484449	4.484025	4.372641	4.52907
<i>Lambs < 1 yr</i>											
	Methane wastes	0.85044	0.844099	0.859056	0.850978	0.82681	0.808146	0.778043	0.799216	0.839469	0.839496
	Methane enteric	35.80799	35.54099	36.17079	35.83066	34.81303	34.0272	32.7597	33.6512	35.34608	35.3472
	Methane total	36.65843	36.38509	37.02985	36.68164	35.63984	34.83535	33.53775	34.45042	36.18555	36.1867
<i>Total</i>											
	Methane wastes	4.9237	4.8928	4.9123	4.9286	4.9039	4.8414	4.7801	4.8355	4.9786	5.0216
	Methane enteric	207.3132	206.0115	206.8333	207.5219	206.4782	203.8472	201.2688	203.5992	209.6237	211.4352
	Methane total	212.2369	210.9042	211.7456	212.4506	211.3821	208.6886	206.0489	208.4347	214.6022	216.4568
GOATS	TOTAL	113.27	105.955	104.774	97.709	90.465	85.378	81.56268	79.928	79.522	77
(000 HEAC	Emissions, kt CH4										
Ruminants	Methane wastes	0.013592	0.012715	0.012573	0.011725	0.010856	0.010245	0.009788	0.009591	0.009543	0.00924
	Methane enteric	0.56635	0.529775	0.52387	0.488545	0.452325	0.42689	0.407813	0.39964	0.39761	0.385
	Methane total	0.579942	0.54249	0.536443	0.50027	0.463181	0.437135	0.417601	0.409231	0.407153	0.39424

		YEAR	CENSUS	
			CLASS	
SHEEP	Breeding	21386	21386	0.0000
	Others	1115	1115	0.0000
(000 HEAC	Lambs < 1 yr	22320	22320	0.0000
Ruminants	TOTAL	44821	44821	0.0000
	(Live average)	33103.5	33103.5	0.0000
Emissions, kt CH4				
<i>Breeding</i>				
	Methane wastes	4.0633	4.0633	0.0000
	Methane enteric	171.088	171.088	0.0000
	Methane total	175.1513	175.1513	0.0000
<i>Other</i>				
	Methane wastes	0.105925	0.105925	0.0000
	Methane enteric	4.46	4.46	0.0000
	Methane total	4.565925	4.565925	0.0000
<i>Lambs < 1 yr</i>				
	Methane wastes	0.84816	0.84816	0.0000
	Methane enteric	33.928	33.928	0.0000
	Methane total	34.77616	34.77616	0.0000
<i>Total</i>				
	Methane wastes	5.0174	5.0174	0.0000
	Methane enteric	209.476	209.476	0.0000
	Methane total	214.4934	214.4934	0.0000
GOATS	TOTAL	79.93	79.93	0.0000
(000 HEAC	Emissions, kt CH4			
Ruminants	Methane wastes	0.009592	0.009592	0.0000
	Methane enteric	0.39965	0.39965	0.0000
	Methane total	0.409242	0.409242	0.0000

YEAR CENSUS CLASS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
HORSES England & Wales	148.205	148.205	148.205	148.205	148.205	148.205	136.729	136.729	136.729	136.729
(000 HEAD) Scotland	12.211	12.211	12.211	12.211	12.211	12.211	12.211	12.211	12.211	12.211
Pseudo-rur Northern Ireland	8.3	8.3	8.3	8.3	8.3	8.4	8.9	8.8	9.3	9.4
TOTAL	168.716	168.716	168.716	168.716	168.716	168.816	157.84	157.74	158.24	158.34
Methane wastes	0.2362	0.2362	0.2362	0.2362	0.2362	0.2363	0.2210	0.2208	0.2215	0.2217
Methane enteric	3.0369	3.0369	3.0369	3.0369	3.0369	3.0387	2.8411	2.8393	2.8483	2.8501
Methane total	3.2731	3.2731	3.2731	3.2731	3.2731	3.2750	3.0621	3.0602	3.0699	3.0718
POULTRY (000 HEAD) Total hens, ducks, geese & turkeys (see figs below)	143430	139016	140045	144079	139672	136572	142222	134887.6	137930.6	134700
Non-ruminant Emissions, kt CH4										
Methane wastes	11.1875	10.8432	10.9235	11.2382	10.8944	10.6526	11.0933	10.5212	10.7586	10.5066
Methane enteric	0	0	0	0	0	0	0	0	0	0
Methane total	11.1875	10.8432	10.9235	11.2382	10.8944	10.6526	11.0933	10.5212	10.7586	10.5066
(000 head) Fowls	137207	132929	133214	135929	132038	130259	134917	127851	130514	126832
Total ducks, geese, gu	1430	1538	1545	1637	1441	1313	1399	1327	1444	1514
Ducks	1256	1395	1409	1489	1313	1201	1272	1206	1320	1382
Geese	174	143	136	148	128	112	127	121	124	132
Turkeys	4793	4548	5286	6513	6192	5000	5905	5108	5371	6354
Total	143430	139015	140045	144079	139671	136572	142221	134286	137329	134700

YEAR CENSUS CLASS	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
HORSES England & Wales	119.76	119.76	119.76	119.76	180.295	180.295	180.295	180.295	180.295	180.295
(000 HEAD) Scotland	12.211	12.211	12.211	12.211	11.826	11.851	12.161	12.524	12.532	13.269
Pseudo-rur Northern Ireland	6.8	7.49	7.499	7.138	6.195	6.707	6.515	6.569	6.669	6.844
TOTAL	138.771	139.461	139.47	139.109	198.316	198.853	198.971	199.388	199.496	200.408
Methane wastes	0.1943	0.1952	0.1953	0.1948	0.2776	0.2784	0.2786	0.2791	0.2793	0.2806
Methane enteric	2.4979	2.5103	2.5105	2.5040	3.5697	3.5794	3.5815	3.5890	3.5909	3.6073
Methane total	2.6922	2.7055	2.7057	2.6987	3.8473	3.8577	3.8600	3.8681	3.8702	3.8879
POULTRY (000 HEAD) Total hens, ducks, geese & turkeys (see figs below)	135104.8	132285.9	135362.7	127618	127880.4	129326.2	131802.4	139777.7	142615.7	132200.3
Non-ruminant Emissions, kt CH4										
Methane wastes	10.5382	10.3183	10.5583	9.9542	9.9747	10.0874	10.2806	10.9027	11.1240	10.3116
Methane enteric	0	0	0	0	0	0	0	0	0	0
Methane total	10.5382	10.3183	10.5583	9.9542	9.9747	10.0874	10.2806	10.9027	11.1240	10.3116
(000 head) Fowls	127063	122639	126091	117854	119509	120071	121359	129529	131699	121029
Total ducks, geese, gu	1523	1480	1600	1566	1530	1654	1756	1768	1848	2110
Ducks	1390	1333	1443	1410	1367	1498	1590	1562	1635	1884
Geese	133	147	157	138	148	142	152	179	184	197
Turkeys	6519	8167	7672	8198	7134	7864	8952	8840	9403	9391
Total	135105	132286	135363	127618	128173	129589	132067	140137	142950	132530

YEAR CENSUS CLASS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
HORSES England & Wales	180.295	186.86	186.86	216.854	225.987	235.031	250.444	271.56	0	0
(000 HEAD) Scotland	14.177	14.959	16.258	17.641	18.719	20.404	20.948	25.46	0	0
Pseudo-rur Northern Ireland	7.724	7.788	8.042	9.779	10.375	10.896	11.093	9.9	0	0
TOTAL	202.196	209.607	211.16	244.274	255.081	266.331	282.395	306.96	313.759	277
Methane wastes	0.2831	0.2934	0.2956	0.3420	0.3571	0.3729	0.3954	0.4297	0.4393	0.3878
Methane enteric	3.6395	3.7729	3.8009	4.3969	4.5915	4.7940	5.0831	5.5253	5.6477	4.9860
Methane total	3.9226	4.0664	4.0965	4.7389	4.9486	5.1668	5.4785	5.9550	6.0869	5.3738
POULTRY (000 HEAD) Total hens, ducks, geese & turkeys (see figs below)	136804.9	139600.5	137012	143871	143006	141202	139938	142016	163995	163149
Non-ruminant Emissions, kt CH4										
Methane wastes	10.6708	10.8888	10.6869	11.2220	11.1544	11.0138	10.9151	11.0772	12.7916	12.7256
Methane enteric	0	0	0	0	0	0	0	0	0	0
Methane total	10.6708	10.8888	10.6869	11.2220	11.1544	11.0138	10.9151	11.0772	12.7916	12.7256
(000 head) Fowls	125357	128025	124842	131093	126653	127035	126960	126960	148947	150102
Total ducks, geese, gu	2217	2191	2347	2553	2496	2648	2648	2648	2838	2943
Ducks	2012	1987	2159	2341	2317	2465	2429	4196	2676	0
Geese	175	148	141	153	134	133	151	165	141	0
Turkeys	9596	9759	10202	10225	13856	11519	10330	12408	12298	10339
Total	137170	139975	137391	143871	143006	141202	139938	142016	164083	163384

YEAR CENSUS CLASS

HORSES England & Wales				
(000 HEAD) Scotland				
Pseudo-rur Northern Ireland				
TOTAL	313.759	313.759	0.0000	
Methane wastes	0.4393	0.4393	0.0000	
Methane enteric	5.6477	5.6477	0.0000	
Methane total	6.0869	6.0869	0.0000	
POULTRY (000 HEAD) Total	160252	160252	0.0000	
hens, ducks, geese & turkeys (see figs below)				
Non-ruminants: Emissions, kt CH4				
Methane wastes	12.4997	12.4997	0.0000	
Methane enteric	0	0	0.0000	
Methane total	12.4997	12.4997	0.0000	
(000 head) Fowls	148519	148519	0.0000	
Total ducks, geese, gu	2193	2193	0.0000	
Ducks	0	0	0.0000	
Geese	0	0	0.0000	
Turkeys	9540	9540	0.0000	
Total	160252	160252	0.0000	

YEAR CENSUS CLASS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
DEER Total farmed E&W (head in Ju (red, fallow, others) except for (Total UK Ruminants Emissions, kt CH4	22447	22447	22447	22447	22447	22447	22447	22447	22447	22447
Methane wastes	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385
Methane enteric	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388
Methane total	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773
TOTAL All Animals										
Emissions, kt CH4										
Methane wastes	106.5160	109.3053	111.8206	117.4573	118.3299	113.6378	113.2885	112.7290	113.1112	120.6394
Methane enteric	782.4423	795.1155	827.7020	875.9903	905.2524	888.8784	866.2896	868.2721	872.0744	937.5179
Methane total ent+was	888.9583	904.4208	939.5226	993.4476	1023.582	1002.516	979.5781	981.0011	985.1856	1058.157
Methane total ent+ w	902.6688	919.2929	954.2755	1008.538	1040.741	1016.502	994.0226	996.4658	1003.136	1077.078
(All animals except cattle & sheep)										
Emissions, kt CH4										
Methane wastes	35.6971	37.2608	37.0261	38.4217	36.7720	33.4943	35.1674	34.0222	34.1763	34.3324
Methane enteric	15.5503	16.5043	16.3468	16.8873	16.2343	14.7181	15.2580	14.9697	14.9367	15.1425
Methane total	51.2474	53.7651	53.3729	55.3090	53.0063	48.2124	50.4254	48.9919	49.1130	49.4749

(=pigs+goats+horses+poultry+deer)

YEAR CENSUS CLASS	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
DEER Total farmed E&W (head in Ju (red, fallow, others) except for (Total UK Ruminants Emissions, kt CH4	22447	22447	22447	22447	22447	22447	22447	22447	22447	22447	36544
Methane wastes	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.006385	0.010395	
Methane enteric	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.256388	0.417402	
Methane total	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.262773	0.427797	
TOTAL All Animals											
Emissions, kt CH4											
Methane wastes	112.8407	116.3879	118.8201	119.8320	117.2351	116.6073	115.5329	113.6523	112.5965	110.2549	
Methane enteric	871.9117	900.2946	918.7737	932.1983	924.476	915.9114	907.7164	894.086	891.0166	901.7401	
Methane total ent+was	984.7524	1016.683	1037.594	1052.03	1041.711	1032.519	1023.249	1007.738	1003.613	1011.995	
Methane total ent+ w	1006.149	1038.543	1062.47	1077.77	1073.339	1052.321	1044.566	1026.139	1019.792	1030.592	
										% contrib	
(All animals except cattle & sheep)											
Emissions, kt CH4											
Methane wastes	34.1896	34.3171	35.1515	35.0010	33.6288	34.2735	34.6820	35.3267	35.6738	33.4344	
Methane enteric	14.7168	14.9024	15.1998	15.4203	15.5579	15.8410	15.9560	16.2425	16.4851	16.0049	
Methane total	48.9064	49.2196	50.3513	50.4213	49.1867	50.1145	50.6380	51.5692	52.1589	49.4394	

YEAR CENSUS CLASS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
DEER Total farmed E&W (head in Ju (red, fallow, others) except for (Total UK Ruminants Emissions, kt CH4	36544	36544	40616	40616	28500	28500	27097	28630	24070	25442
Methane wastes	0.010395	0.010395	0.011553	0.011553	0.008107	0.008107	0.008107	0.008107	0.008107	0.008107
Methane enteric	0.417402	0.417402	0.463912	0.463912	0.325524	0.325524	0.325524	0.325524	0.325524	0.325524
Methane total	0.427797	0.427797	0.475466	0.475466	0.333631	0.333631	0.333631	0.333631	0.333631	0.333631
TOTAL All Animals										
Emissions, kt CH4										
Methane wastes	139.2001	137.6396	137.2049	138.1162	139.5728	136.9794	137.9076	137.5685	138.2020	136.4801
Methane enteric	865.3708	853.3021	857.8926	857.8311	864.0618	855.2918	863.3677	851.8649	851.4659	852.2997
Methane total ent+was	1004.571	990.9418	995.0974	995.9473	1003.635	992.2712	1001.275	989.4334	989.6679	988.7799
Methane total ent+ w	#####	1001.788	1002.966	996.1152	1003.635	992.2712	1001.275	989.4334	989.6679	988.7799
	85									
	14									
(All animals except cattle & sheep)	1									
Emissions, kt CH4										
Methane wastes	33.6222	34.2889	34.1266	35.1463	35.2063	34.2859	34.0983	35.7409	37.6117	35.0404
Methane enteric	15.9455	16.2619	16.3486	17.1290	17.2072	16.9868	17.2014	18.3585	18.5524	16.6514
Methane total	49.5677	50.5508	50.4751	52.2753	52.4136	51.2727	51.2996	54.0994	56.1640	51.6918

YEAR CENSUS CLASS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DEER Total farmed E&W (head in Ju (red, fallow, others) except for (Total UK Ruminants Emissions, kt CH4	24070	24070	24070	21090	24070	24070	24070	24070	24070	24070
	36900	36900	36900	31448	36900	36900	36900	36900	36900	36900
Methane wastes	0.008107	0.008107	0.008107	0.006909	0.008107	0.008107	0.008107	0.008107	0.008107	0.008107
Methane enteric	0.325524	0.325524	0.325524	0.277428	0.325524	0.325524	0.325524	0.325524	0.325524	0.325524
Methane total	0.333631	0.333631	0.333631	0.284337	0.333631	0.333631	0.333631	0.333631	0.333631	0.333631
TOTAL All Animals										
Emissions, kt CH4										
Methane wastes	131.3341	126.2309	124.8228	124.2655	106.0209	104.8889	104.1447	103.4693	102.8364	102.1374
Methane enteric	823.6792	772.7530	764.8526	770.0032	851.3779	844.0747	838.7413	833.4961	828.6284	821.3898
Methane total ent+was	955.0133	898.9839	889.6754	894.2687	957.3988	948.9636	942.886	936.9654	931.4648	923.5273
Methane total ent+ w	955.0133	898.9839	889.6754	894.2687	957.3988	948.9636	942.886	936.9654	931.4648	923.5273
(All animals except cattle & sheep)										
Emissions, kt CH4										
Methane wastes	32.8930	31.6986	30.1950	29.2601	36.0852	35.7727	35.6164	35.5226	35.4289	35.3351
Methane enteric	15.6690	14.6851	14.7057	13.6879	17.9371	17.7809	17.7027	17.6558	17.6090	17.5621
Methane total	48.5620	46.3837	44.9007	42.9480	54.0223	53.5535	53.3191	53.1785	53.0378	52.8972

YEAR CENSUS CLASS	2020	2021	2022	2023	2024	2025				
DEER Total farmed E&W (head in Ju (red, fallow, others) except for (Total UK Ruminants Emissions, kt CH4	24070	24070	24070	24070	24070	24070		24070	24070	24070
	36900	36900	36900	36900	36900	36900		36900	36900	36900
Methane wastes	0.008107	0.008107	0.008107	0.008107	0.008107	0.008107	<i>NB. 31% a</i>	0.008107	0.008107	0.008107
Methane enteric	0.325524	0.325524	0.325524	0.325524	0.325524	0.325524	<i>Calf ef 50%</i>	0.325524	0.325524	0.325524
Methane total	0.333631	0.333631	0.333631	0.333631	0.333631	0.333631	<i>Waste ef 1</i>	0.333631	0.333631	0.333631
TOTAL All Animals										
Emissions, kt CH4										
Methane wastes	102.2453	102.4709	102.7353	103.0021	103.3089	103.5430		113.7774	110.3088	111.0353
Methane enteric	826.3253	828.3300	830.6800	833.0512	835.7780	837.8583		870.3226	839.0637	845.7029
Methane total ent+was	928.5706	930.8009	933.4153	936.0533	939.0869	941.4014		984.1	949.3725	956.7382
Methane total ent+ w	928.5706	930.8009	933.4153	936.0533	939.0869	941.4014		984.1	949.3725	956.7382
(All animals except cattle & sheep)										
Emissions, kt CH4										
Methane wastes	35.0634	35.0634	35.0634	35.0634	35.0634	35.0634		35.2442	35.2442	35.2442
Methane enteric	17.4262	17.4262	17.4262	17.4262	17.4262	17.4262		17.5166	17.5166	17.5166
Methane total	52.4896	52.4896	52.4896	52.4896	52.4896	52.4896		52.7608	52.7608	52.7608

YEAR CENSUS CLASS				
DEER	Total farmed E&W	24070	24070	0.0000
	(head in Ju (red, fallow, others)			
except for (Total UK	36900	36900	0.0000
Ruminants	Emissions, kt CH4			
	Methane wastes	0.008107	0.008107	0.0000
	Methane enteric	0.325524	0.325524	0.0000
	Methane total	0.333631	0.333631	0.0000
TOTAL	All Animals			
	Emissions, kt CH4			
	Methane wastes	112.2723	97.5368	12.7720
	Methane enteric	856.4907	839.0637	0.0000
	Methane total ent+was	968.7629	936.6005	12.7720
	Methane total ent+ w	968.7629	936.6005	12.7720
			-12.77202	12.7720
				*adjusted to add up vertically rather than horizontally only small difference, ca -0.09
	(All animals except cattle & sheep)			
	Emissions, kt CH4			
	Methane wastes	35.2442	35.2442	0.0000
	Methane enteric	17.5166	17.5166	0.0000
	Methane total	52.7608	52.7608	0.0000

Table 1.2**Summary of Agricultural Methane Emissions**

Source: National Atmospheric Emissions Inventory

UK Greenhouse Gas Inventory, 1990-2003. Annual report for submission under the Framework Convention on Climate Change

Agricultural CH4	YEAR								Forecasts			
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total CH4, kt	1017	1002	1003	996	1004	992	1001	989	990	989	955.01	899
Enteric CH4, kt	865	853	858	858	864	855	863	852	851	852	823.68	773
Waste CH4, kt	139	138	137	138	140	137	138	138	138	136	131.33	126
Burning CH4, kt	12.7	10.8	7.9	0.2	0	0	0	0	0	0	0	0

Table 1.3**Summary of Methane emissions from different livestock types (2004 data)**Table adapted from Jardine et al, *Methane UK* report. Data source - National Atmospheric Emissions Inventory 2004

Animal	Enteric	Manures
Dairy cows	115	13
Beef	48	6
Other cattle > 1yr	48	6
Other cattle < 1yr	33	6
Pigs	1.5	3
Sheep (methane per head per year)	8	0.2
Lambs < 1 yr	3.2	0.1
Goats	5	0.1
Horses	18	1.4
Poultry	Not estimated	0.1
Deer	10	0.3

Farm Yard Manure (FYM) and Poultry Manure Storage

Source: Farm Practice Survey Statistical Note 2005

2.1 Farm Yard Manure

What happens to your FYM after you have removed it from livestock buildings?

Of holdings that reported having FYM

	Farm Type										CI
	Cereals	General cropping and Horticulture	Pigs and Poultry	Dairy	Cattle and Sheep (Upland)	Cattle and Sheep (Lowland)	Mixed and other types	All types	All types 2001		
No further storage	21.2	15.5	40.2	28.5	38.9	36.2	29.9	31.5	21.4	± 2.6	
Stored under cover	0.7	1.6	1.0	2.9	3.7	1.1	1.6	2.0	2.0	± 0.7	
Stored in the open on a conc	15.9	15.5	29.4	37.0	26.9	20.7	18.8	25.4	24.6	± 2.2	
Stored in the open on a field	62.3	67.5	29.5	31.6	30.5	42.0	49.8	41.1	52.1	± 2.7	
Number of records used	120	82	102	589	176	224	222	1,515			

% of FYM

2.2 Poultry Manure (see note (a))

What happens to your Poultry manure after you have removed it from livestock buildings?

Of holdings that reported having poultry manure

% of Poultry Manure

	<i>Farm Type</i>		
	All types	All types 2001	CI
No further storage	50.1	54.3	± 9.8
Stored under cover	0.6	4.1	± 0.5
Stored in the open on a conc	9.6	11.4	± 4.9
Stored in the open on a field	39.7	30.2	± 9.5
Number of records used	142		

(a) Not enough data points in each category to allow breakdown by farm type

Slurry Storage

2.3 Percentage of total slurry capacity provided by the following types of store.

Analysis only includes holdings that reported having slurry storage capacity.

% of slurry capacity

	<i>Farm Type</i>									
	Cereals	General cropping and Horticulture	Pigs and Poultry	Dairy	Cattle and Sheep (Upland)	Cattle and Sheep (Lowland)	Mixed and other types	All types	All types 2001	CI
Weeping walls	20.2	10.5	3.3	19.2	13.1	27.4	21.0	18.9	15.8	± 5.2
Circular tanks above ground	1.0	25.0	17.5	25.0	14.0	21.4	19.1	22.0	24.9	± 5.0
Unlined earth bank lagoons	30.9	14.7	24.0	25.6	2.0	35.1	34.7	25.5	29.2	± 5.9
Plastic or butyl lined earth ba	0.0	0.0	3.8	2.0	0.0	0.0	0.9	1.5	1.8	± 1.9
Cellars, pits or channels bene	28.5	13.2	42.2	6.8	25.6	6.5	11.9	11.2	7.9	± 4.5
Tanks or structures outside b	19.5	36.6	9.2	21.5	45.3	9.5	12.5	20.9	20.4	± 5.7
Number of records used	13	13	71	467	46	39	82	731		