Global view of environmental impact of ruminant livestock production

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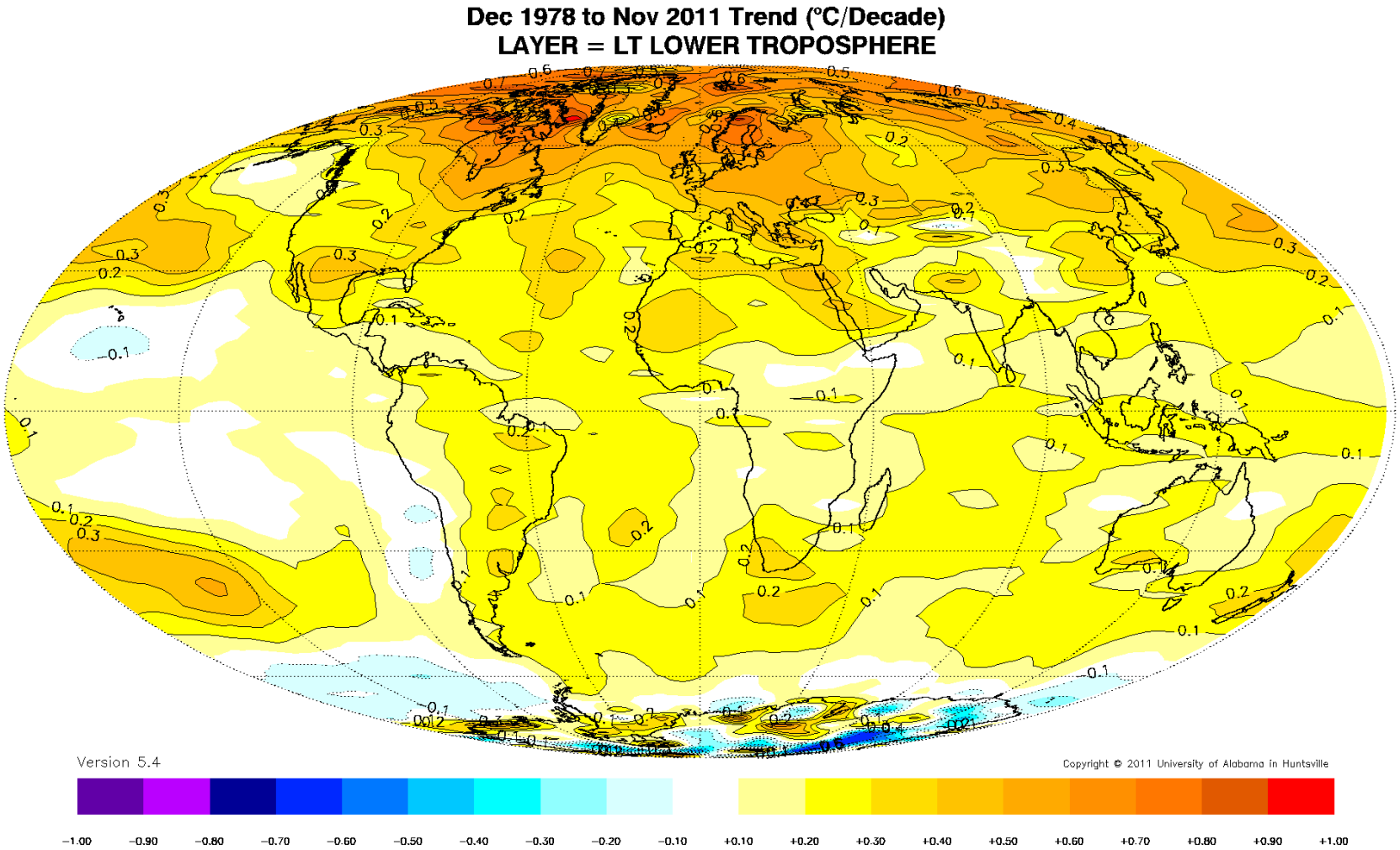
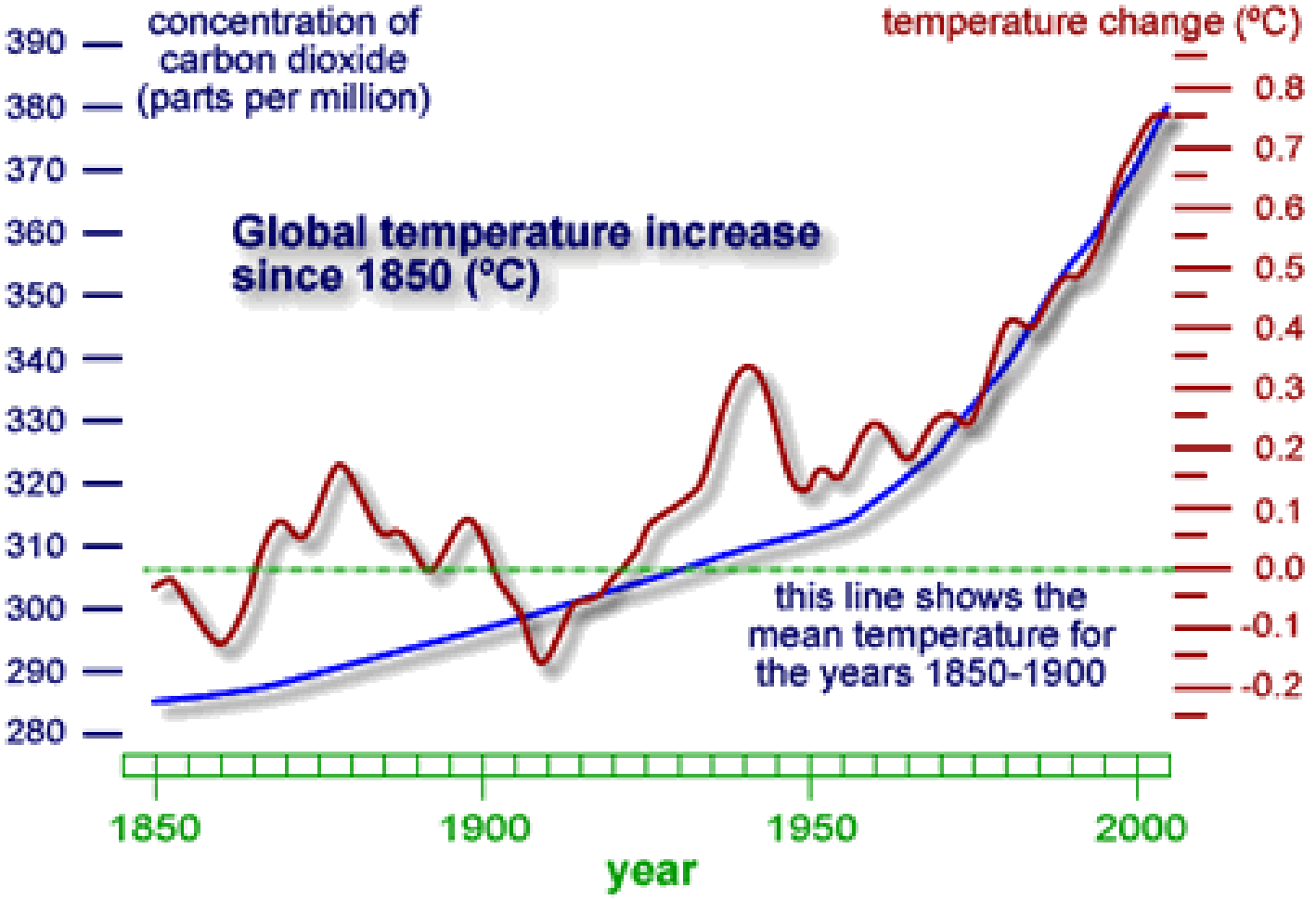
Why are we talking about GHGs ?



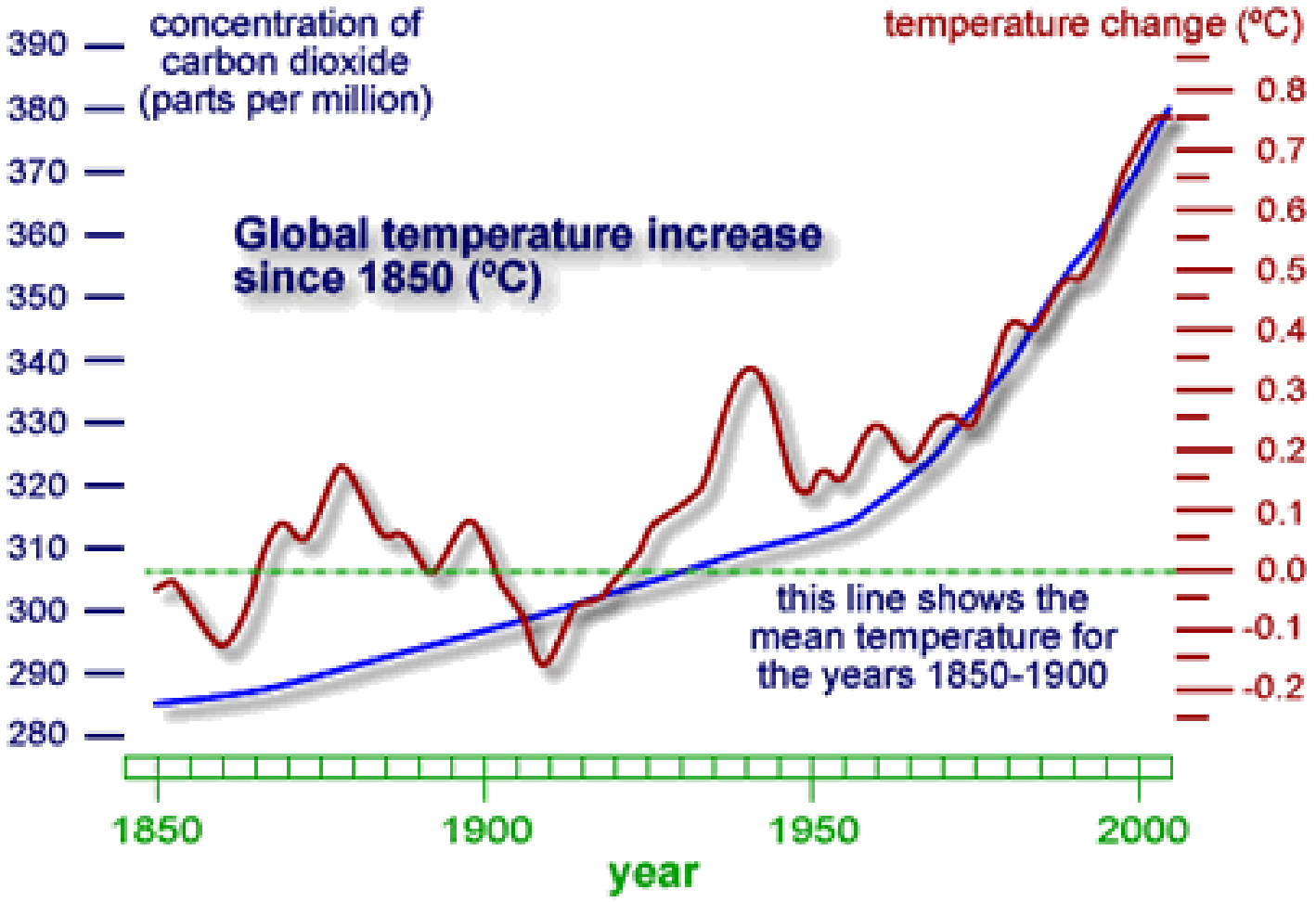
Broken lines outline areas that have a negative decadal trend; solid lines outline areas that have a positive decadal trend. Each contour represents 0.1 degree Celsius, starting at −0.10 and +0.10 degrees C.

the warming trend has actually accelerated over time, from 0.06°C per decade for the past 125 years to 0.22°C per decade for the past 25 years.

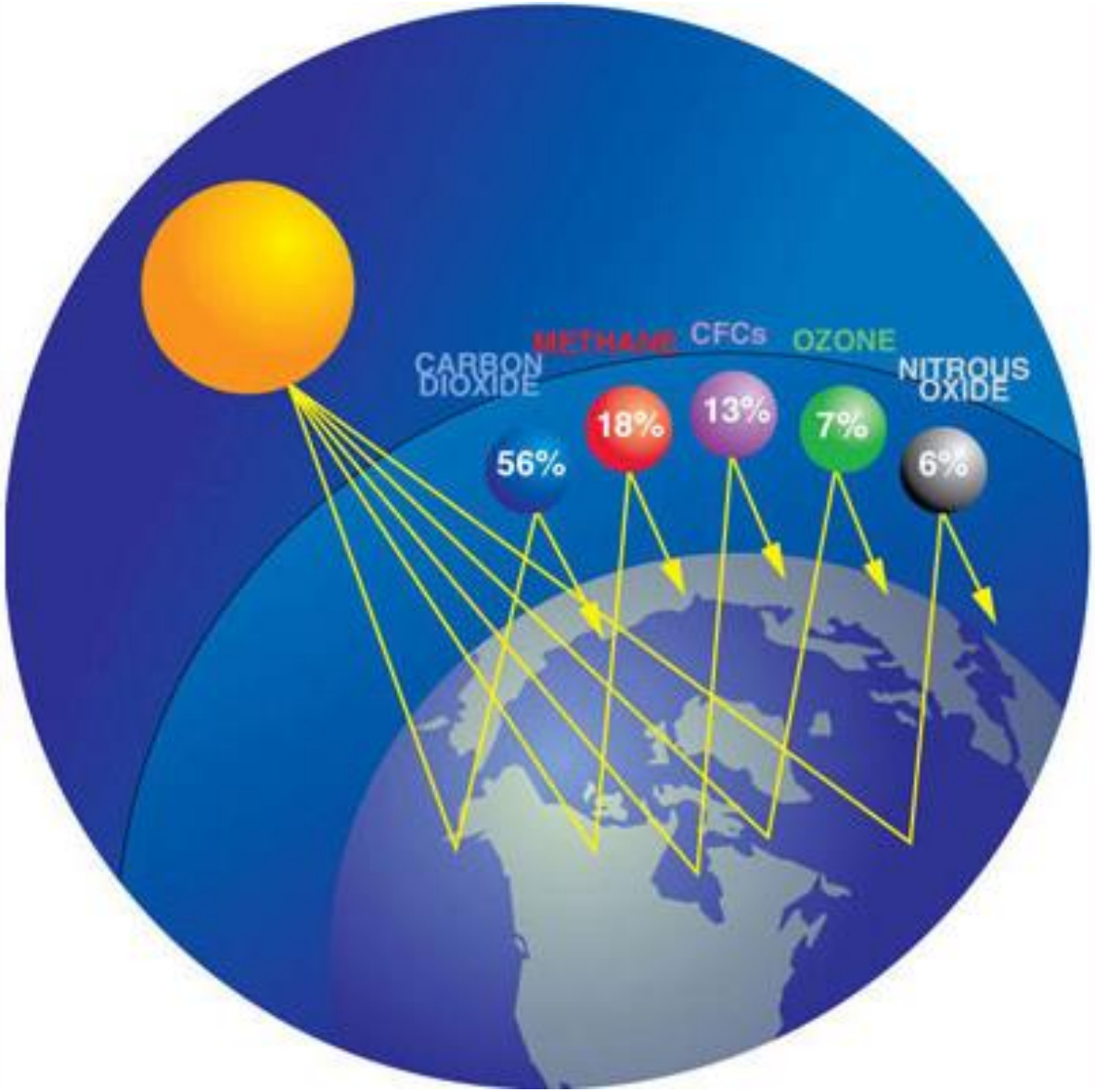


To "hold the increase in global temperature below 2 °C" and avoid "dangerous" climate change, deep cuts in global emissions are urgently required.

(Copenhagen Accord, 2009)




Extreme weather



CO2 - Carbon dioxide

CH4 - Methane

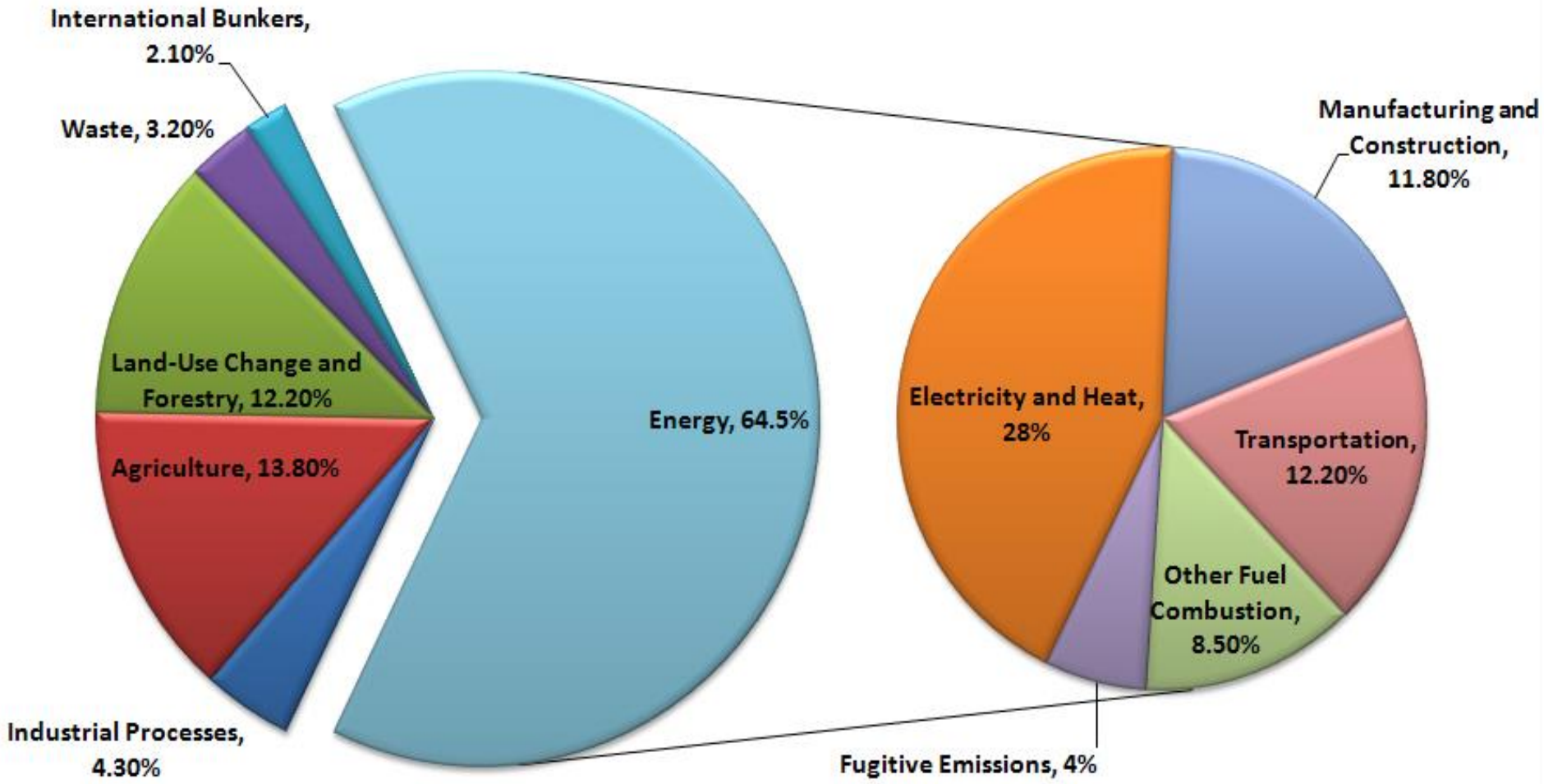
N2O - Nitrous oxide

PFCs - Perfluorocarbons

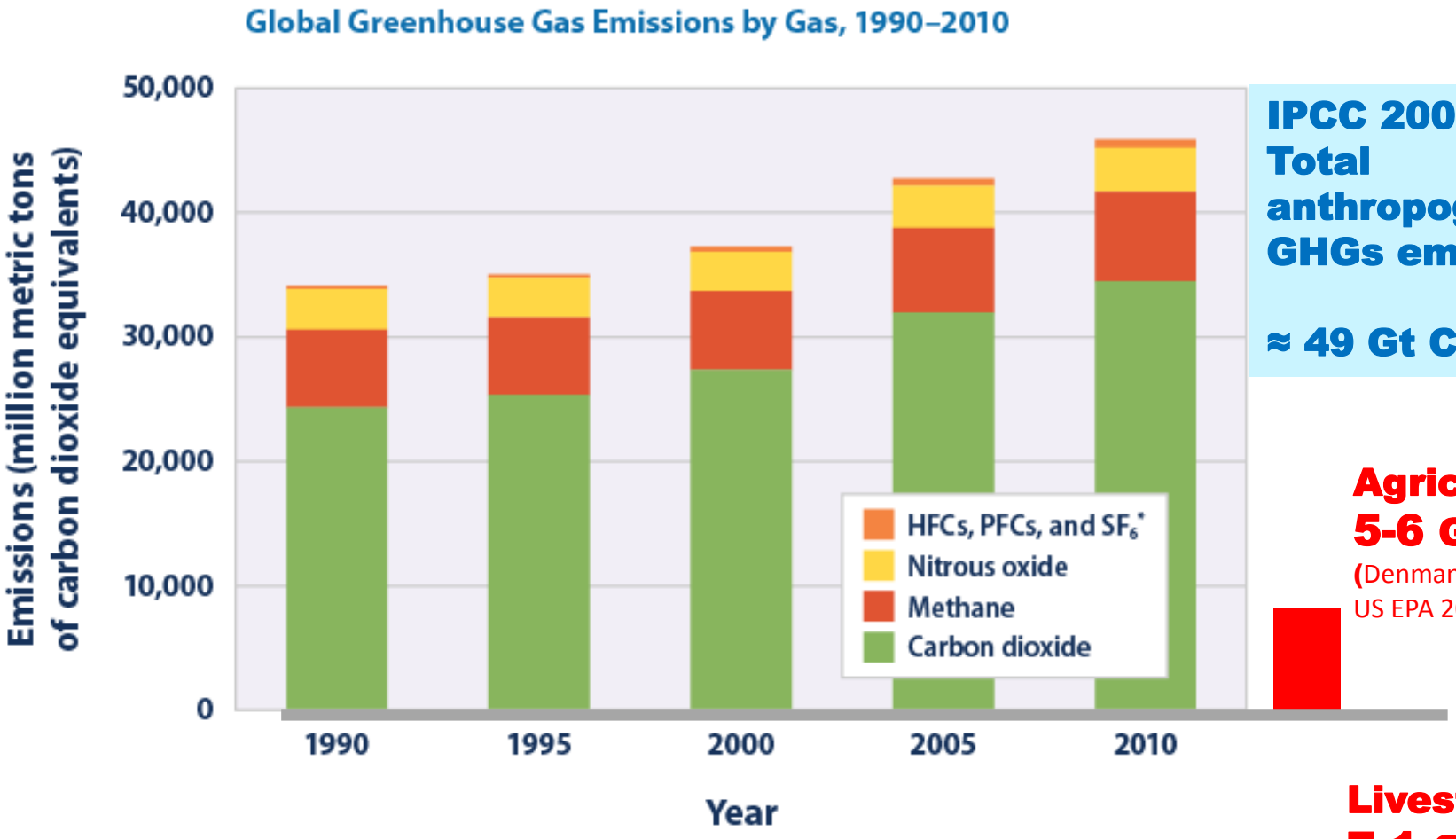
HFCs - Hydrofluorocarbons

SF6 - Sulphur hexafluoride

Global Anthropogenic GHG Emissions by Sector 2005



Agriculture, and related sectors, is not the main indicted but contributes significantly to GHG emissions



IPCC 2007 Total anthropogenic GHGs emissions

≈ 49 Gt CO_2 eq

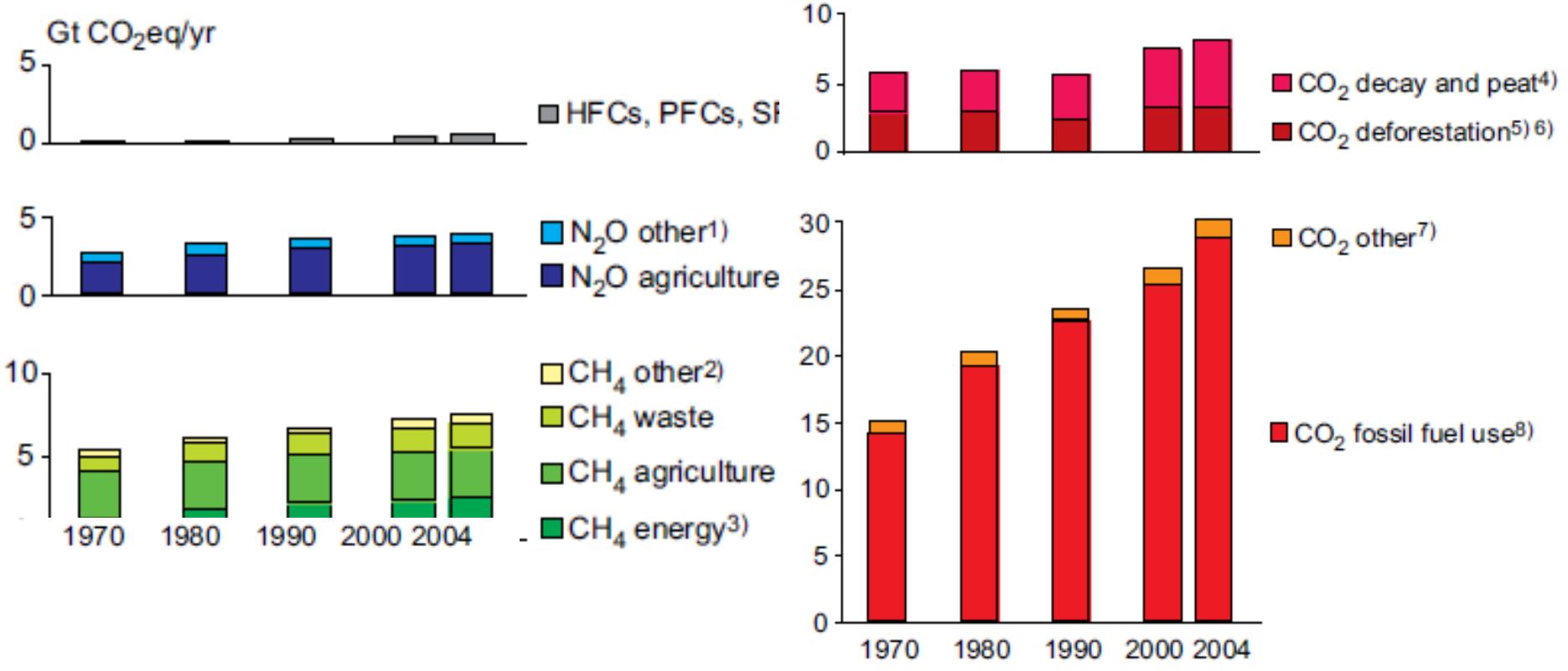
Agriculture
5-6 Gt CO2 eq
(Denman 2007, US EPA 2006)

Livestock
7.1 Gt CO2 eq
FAO 2013

* HFCs are hydrofluorocarbons, PFCs are perfluorocarbons, and SF_6 is sulfur hexafluoride.

Data sources:

- WRI (World Resources Institute). 2014. Climate Analysis Indicators Tool (CAIT) 2.0: WRI's climate data explorer. Accessed May 2014. http://cait.wri.org.
- FAO (Food and Agriculture Organization). 2014. FAOSTAT: Emissions—land use. Accessed May 2014. http://faostat3.fao.org/faostat-gateway/go/to/download/G2/*/E.



Carbon dioxide is the largest contributor

Why did we focus on methane ??

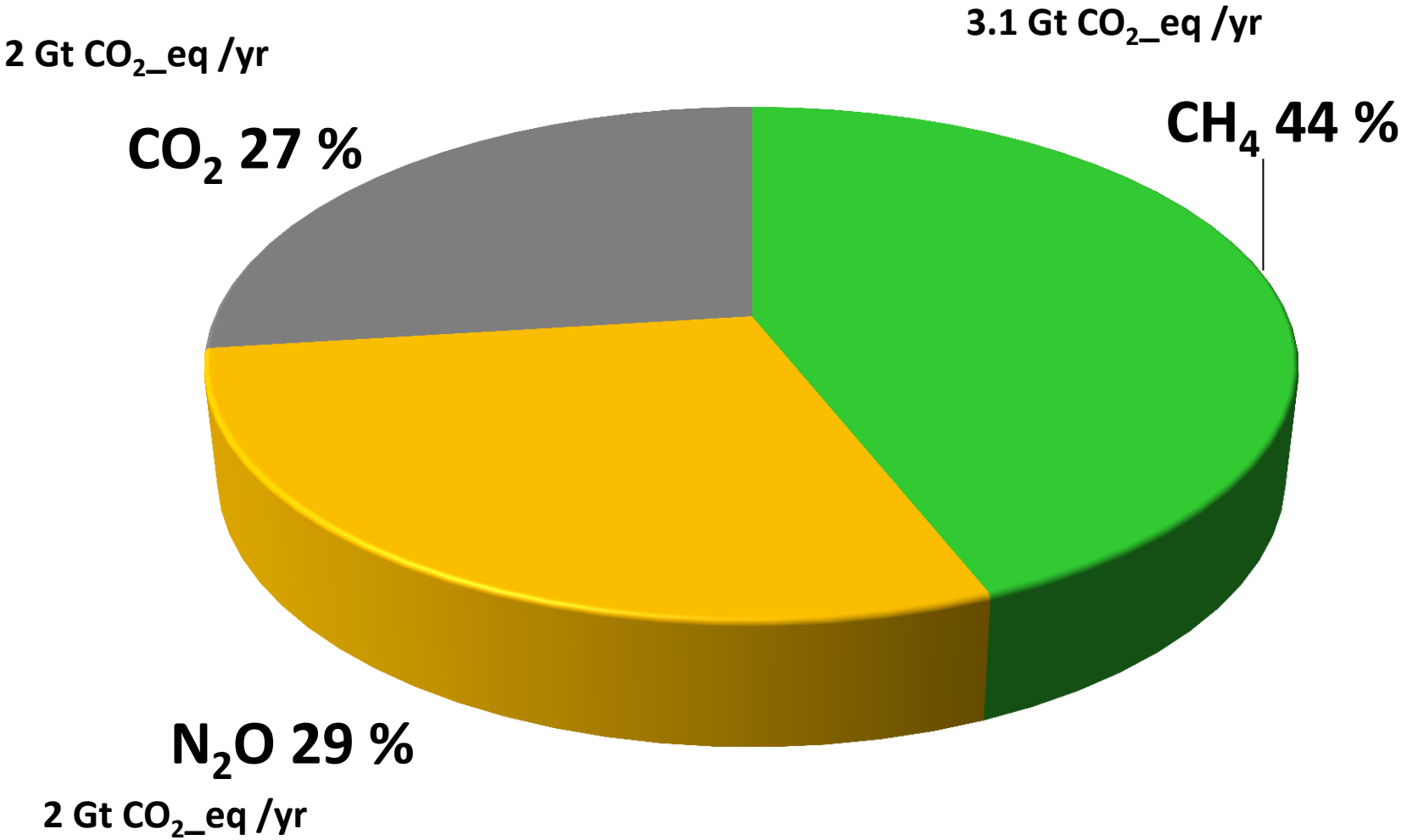
Figure SPM.1: *Global Warming Potential (GWP) weighted global greenhouse gas emissions 1970-2004. 100 year GWPs from IPCC 1996 (SAR) were used to convert emissions to CO_2-eq. (cf. UNFCCC reporting guidelines). CO_2, CH_4, N_2O, HFCs, PFCs and SF$_6$ from all sources are included.*

Recent Greenhouse Gas Tropospheric Concentrations

GAS	Pre-1750	Recent	Increase %	GWP[3](100-yr time horizon)	Atmospheric lifetime (years)	Increased radiative forcing (W/m^2)
CO_2 (ppm)	280	395	40	1	100-300	1.88
CH_4 (ppb)	720	1850	253	23 (21/27)	9/12	0.49
N_2O (ppb)	270	325	20	265	121	0.17

Looking at agriculture….

Global GHGs emissions, by gas (% of the sector)



FAO 2013 / IPCC 2007)

Global emissions from livestock supply chains by category

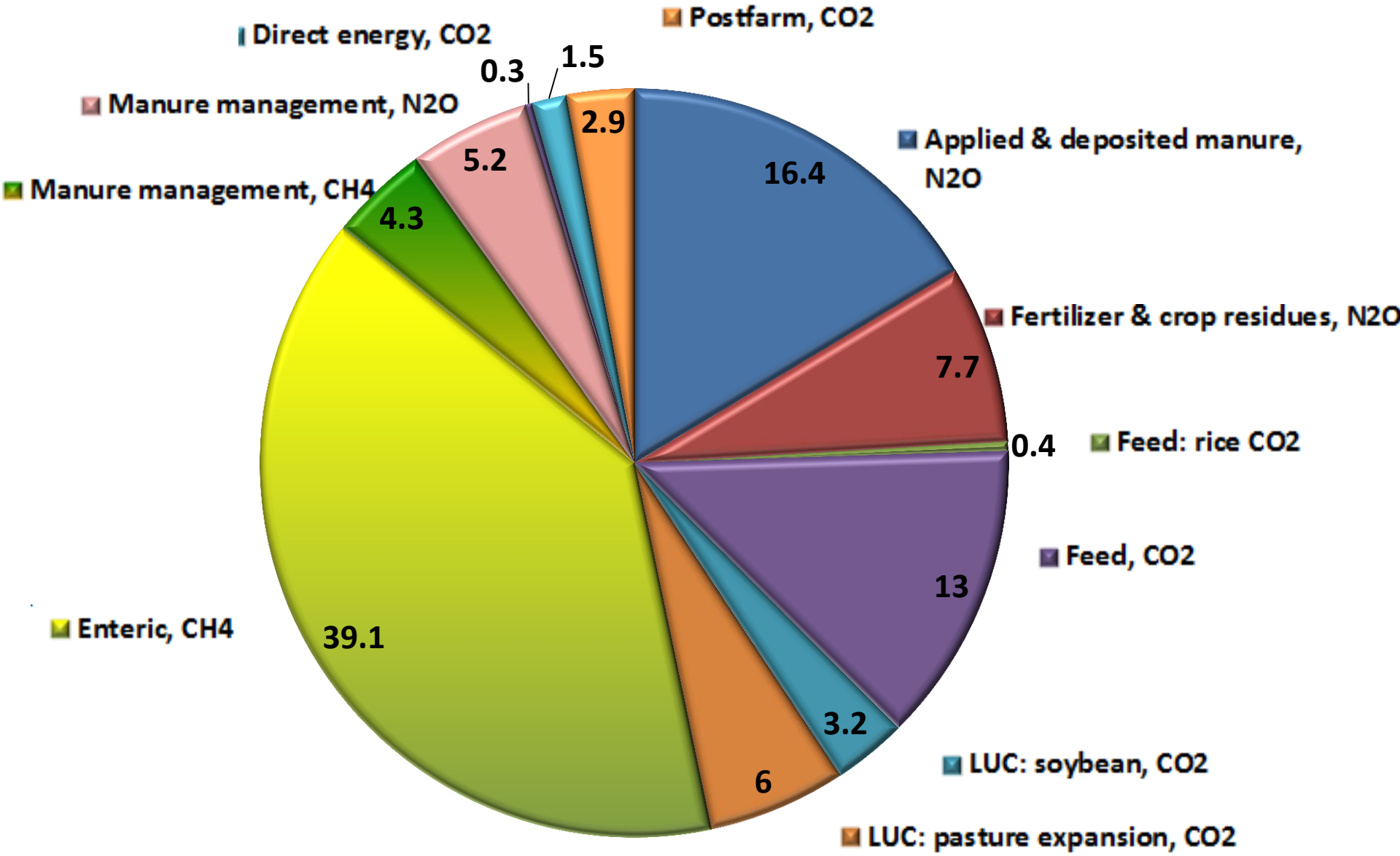
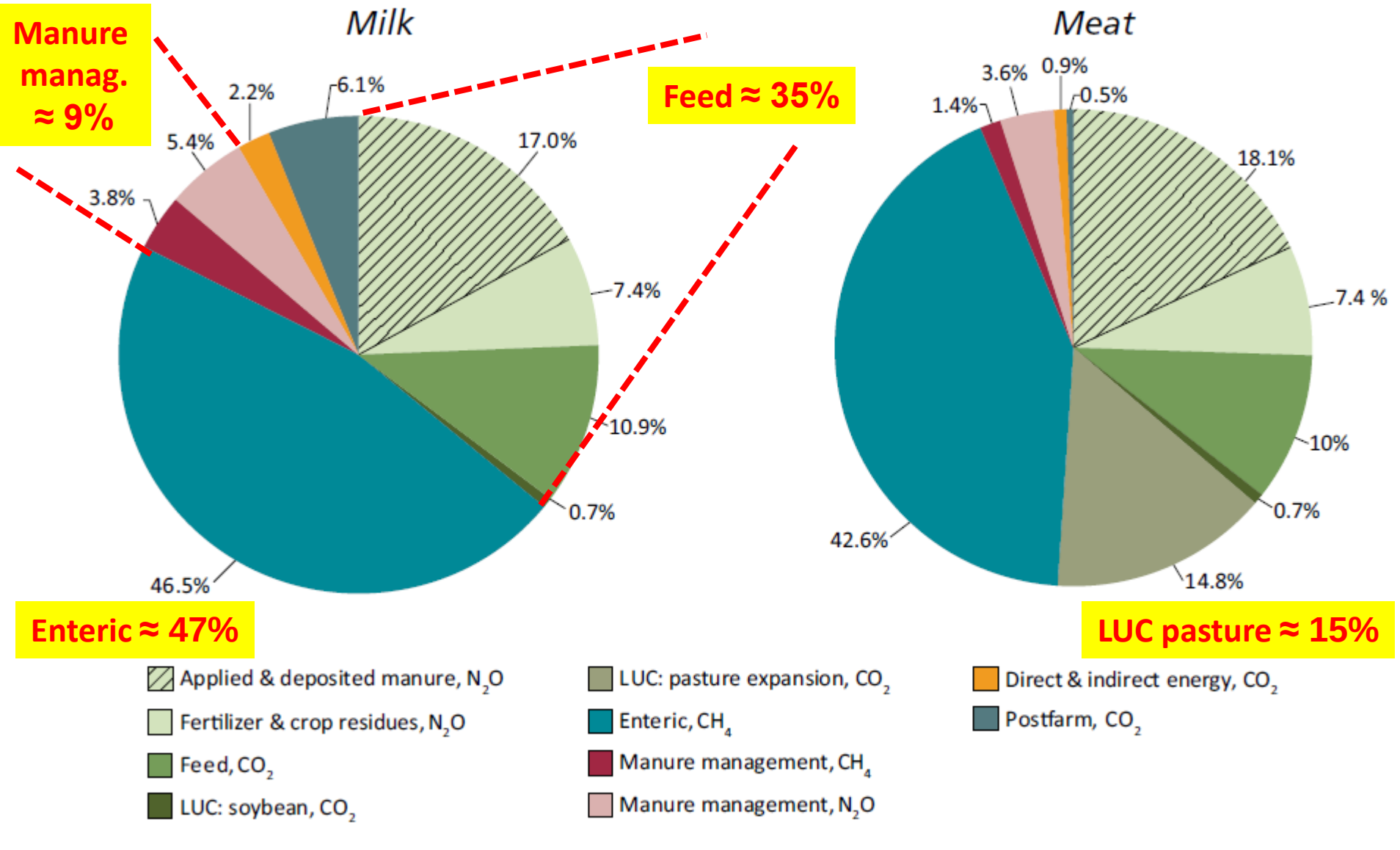
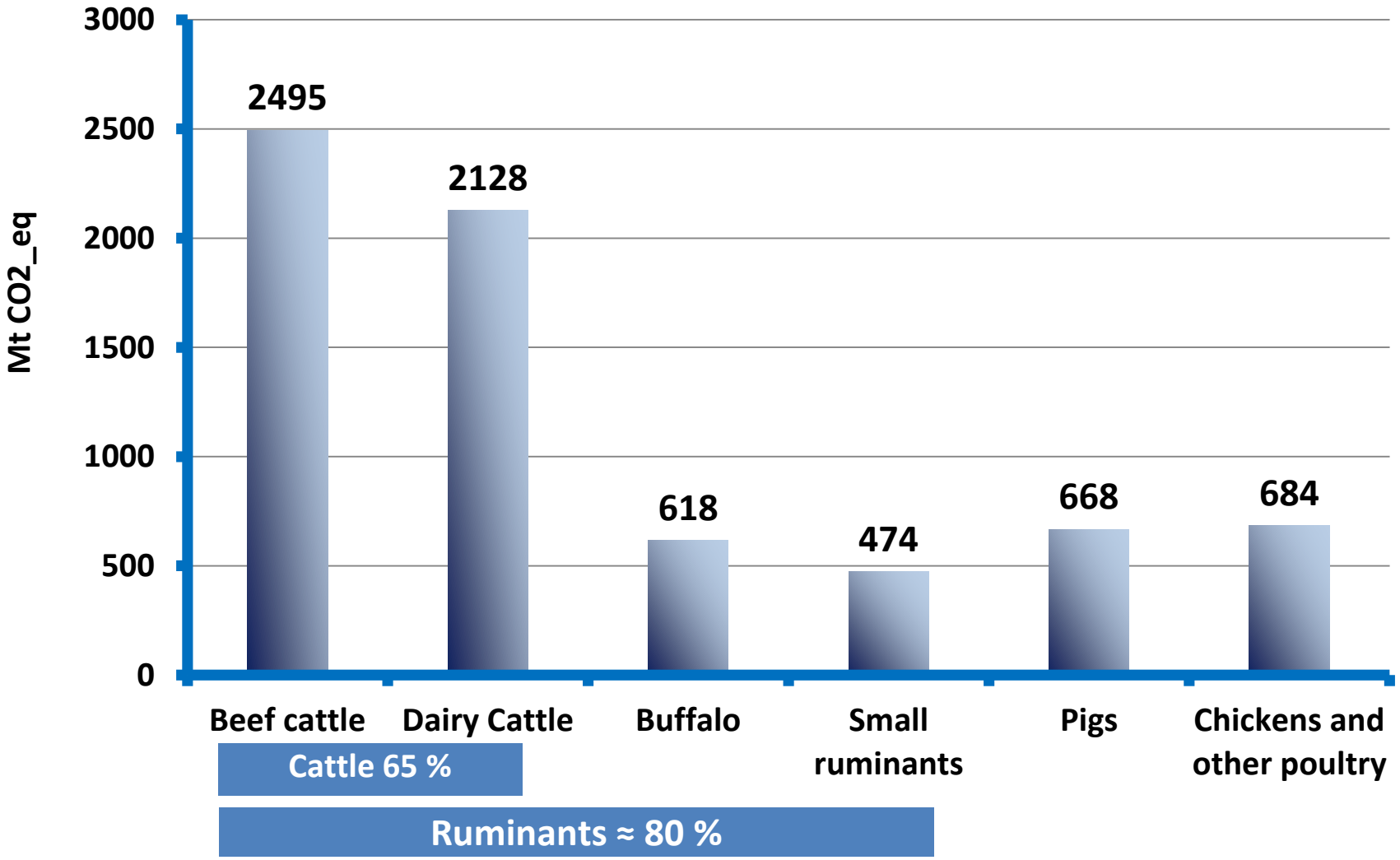


FIGURE 7. Global emissions from cattle milk and beef supply chains, by category of emissions



Source: GLEAM.

Global emissions by species



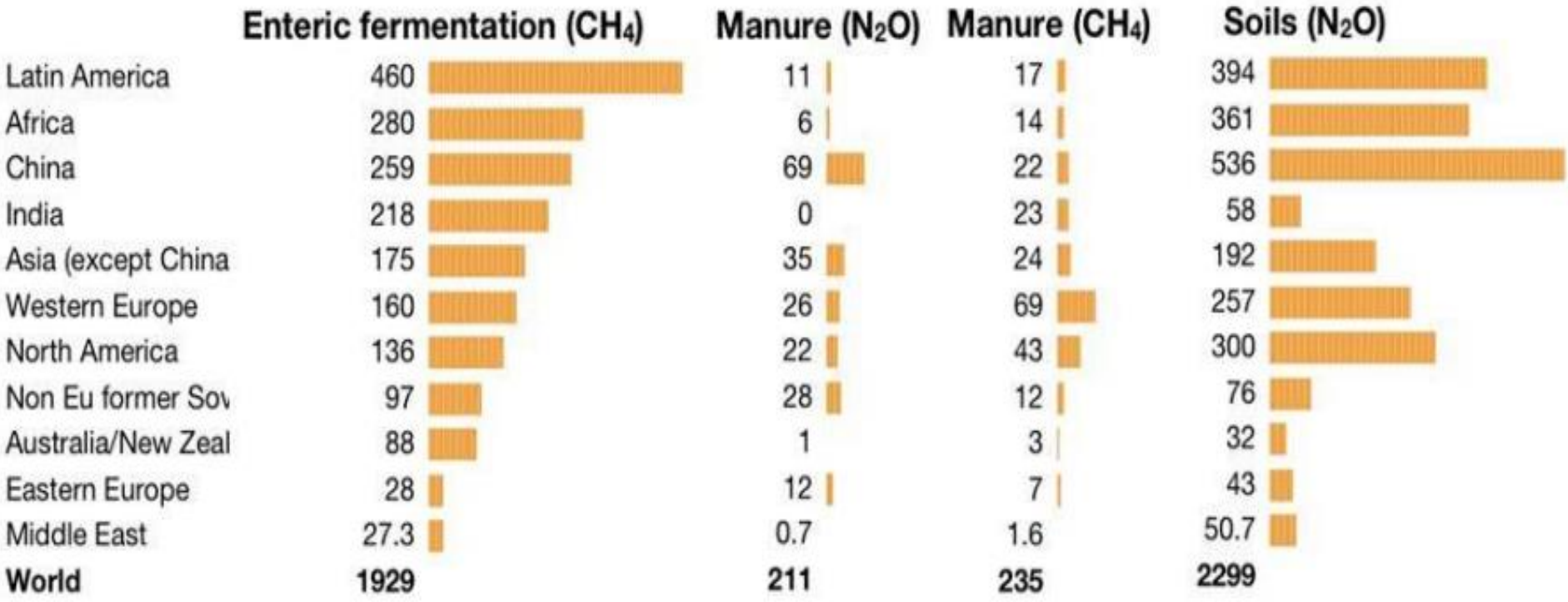
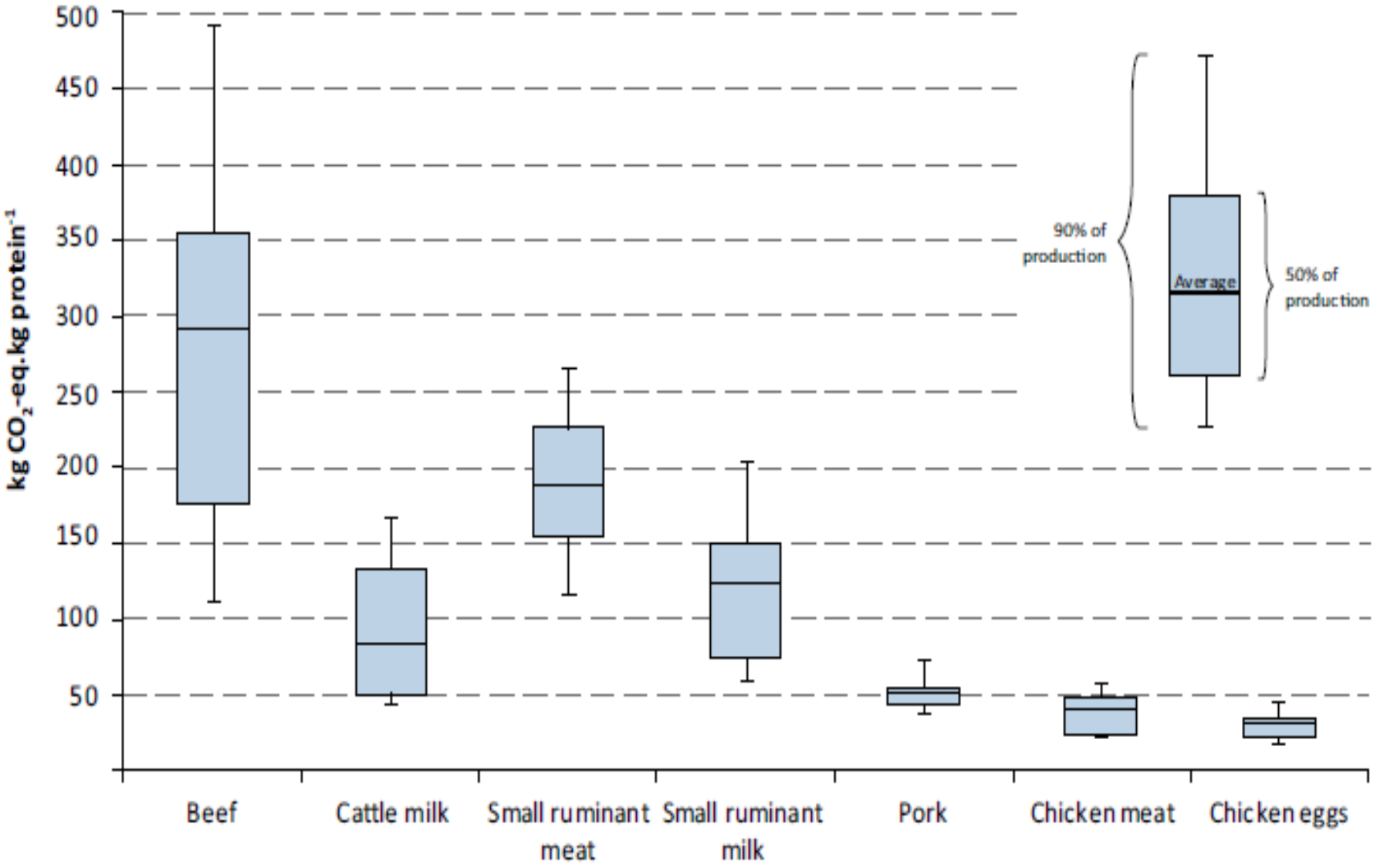


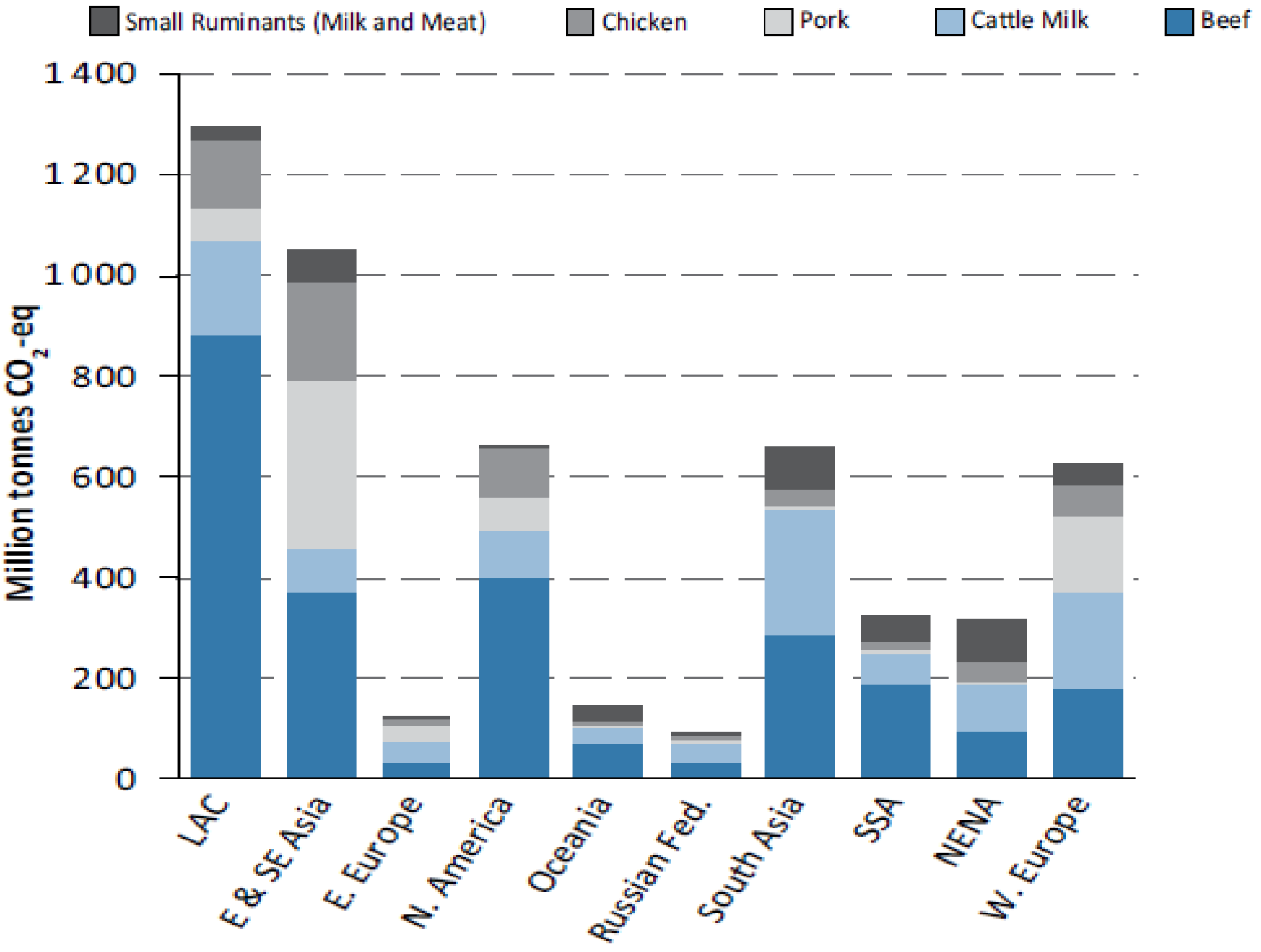
Figure 8: Regional emissions of major agricultural greenhouse gases (million tonnes of CO_2-eq/year) (EPA (2006) and O'Mara (2011), re-expressed by the author)

Global emissions intensity by commodity

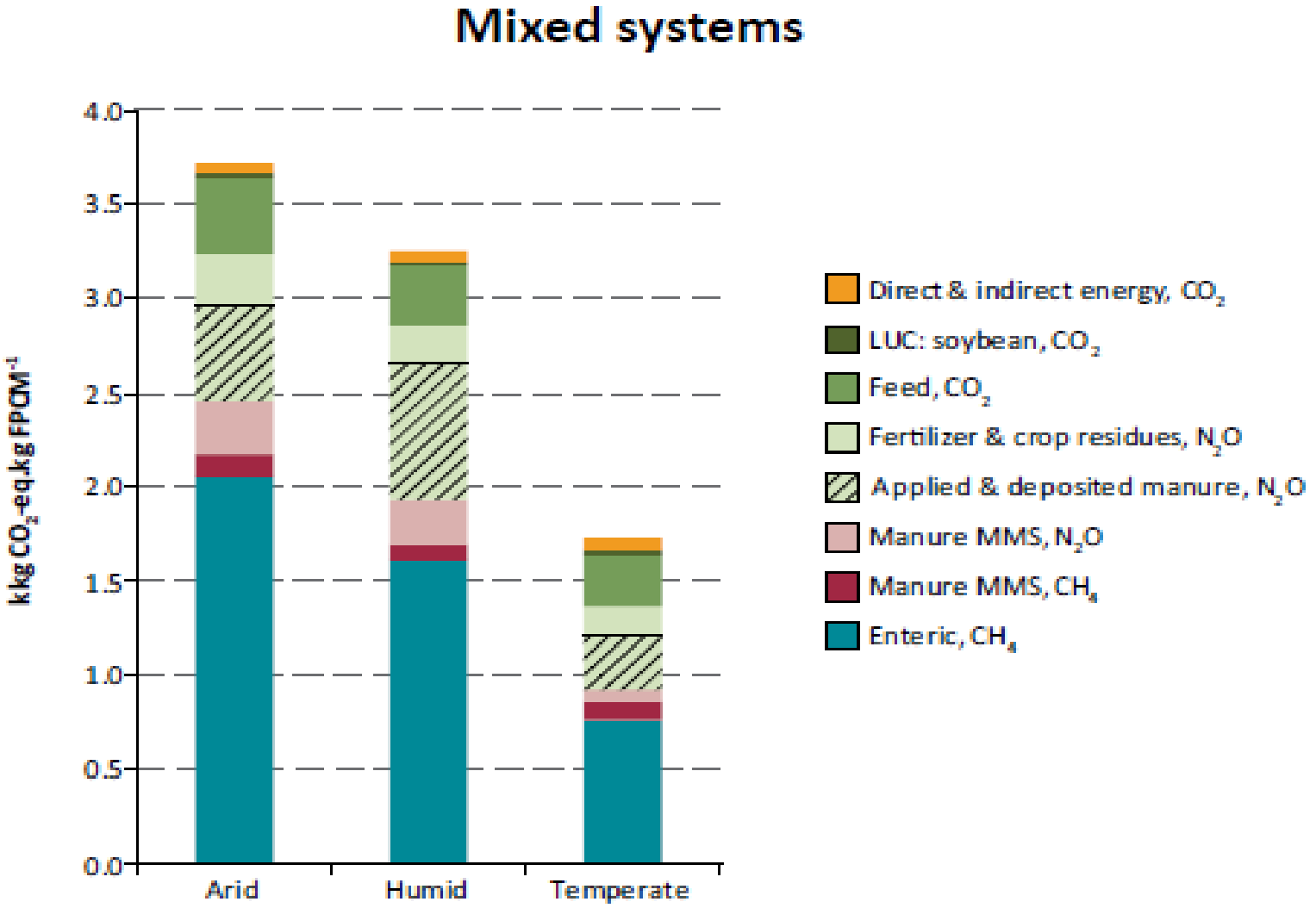


Source: GLEAM.

Global livestock GHG emissions, by commodity and regions



Emission intensities for milk by production system and agro-ecological zone[1]



[1] Excluding post farmgate and land-use change emissions (pasture expansion).

Source: GLEAM.

FIGURE 9. Regional variation in cattle milk production and GHG emission intensities

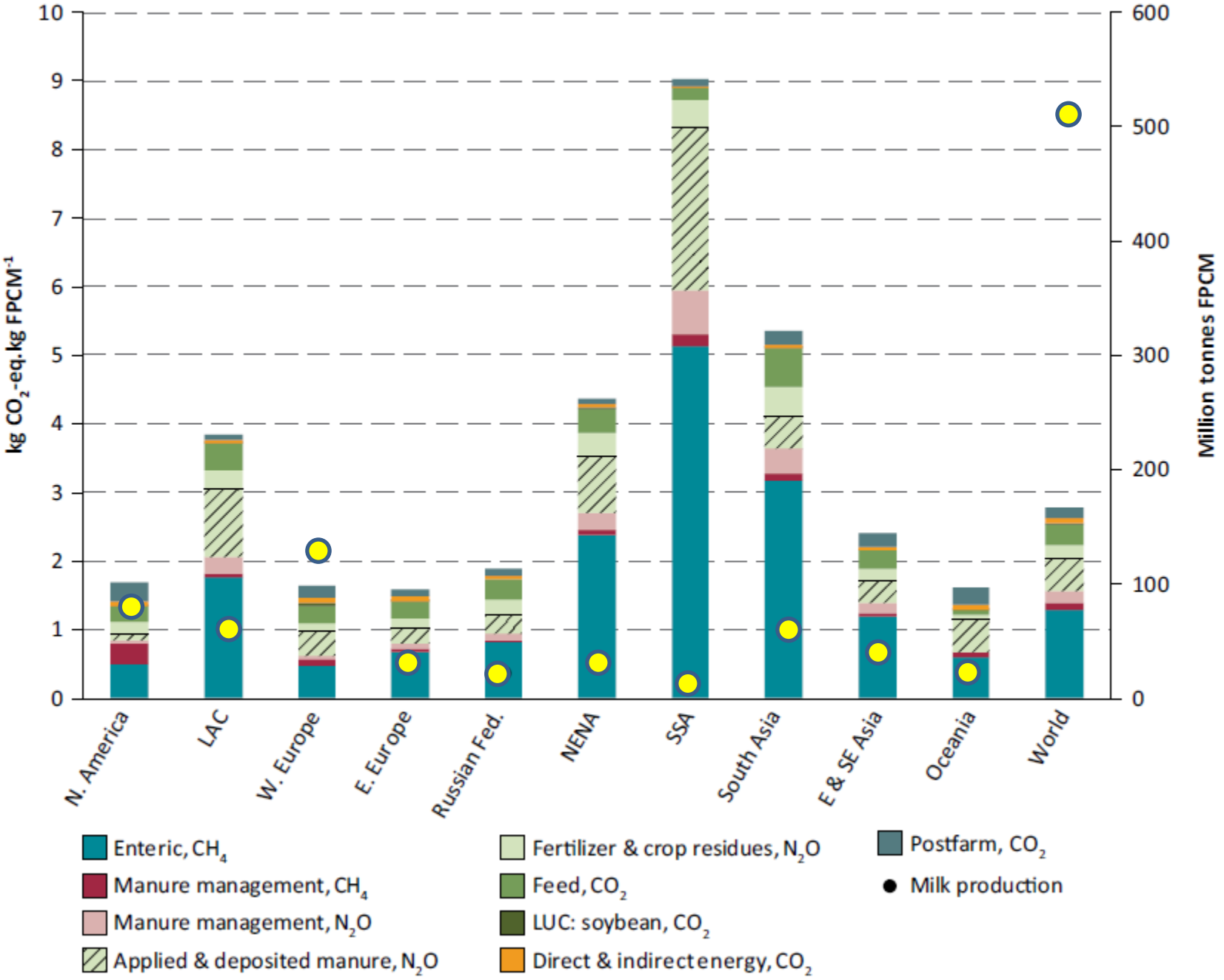
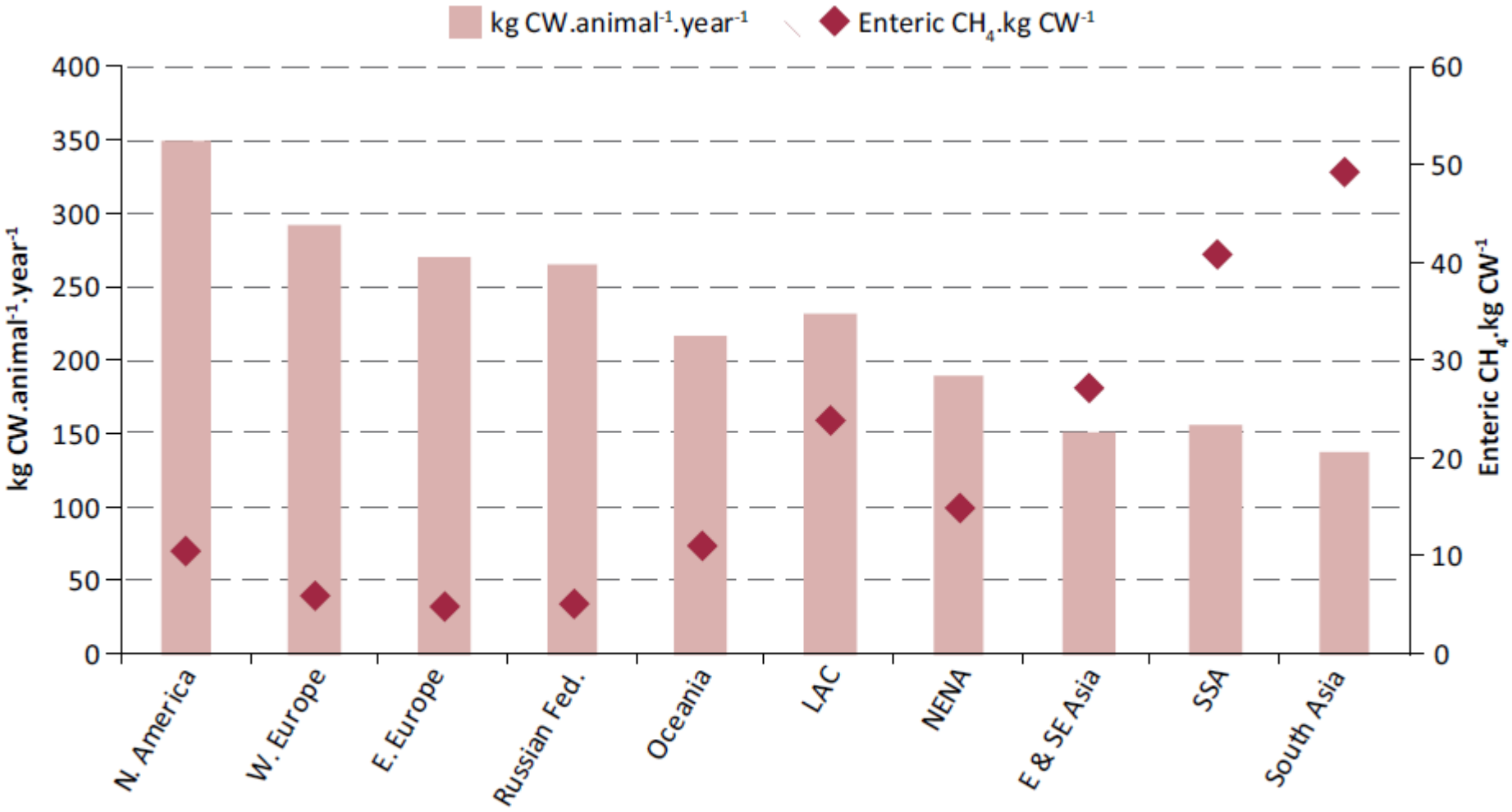


Figure 25a.

Regional variation in productivity and CH_4 emissions from enteric fermentation for beef herds



Source: GLEAM.

Figure 27a.

Regional variation in the relative contribution of animal cohorts to enteric CH_4 – dairy herds

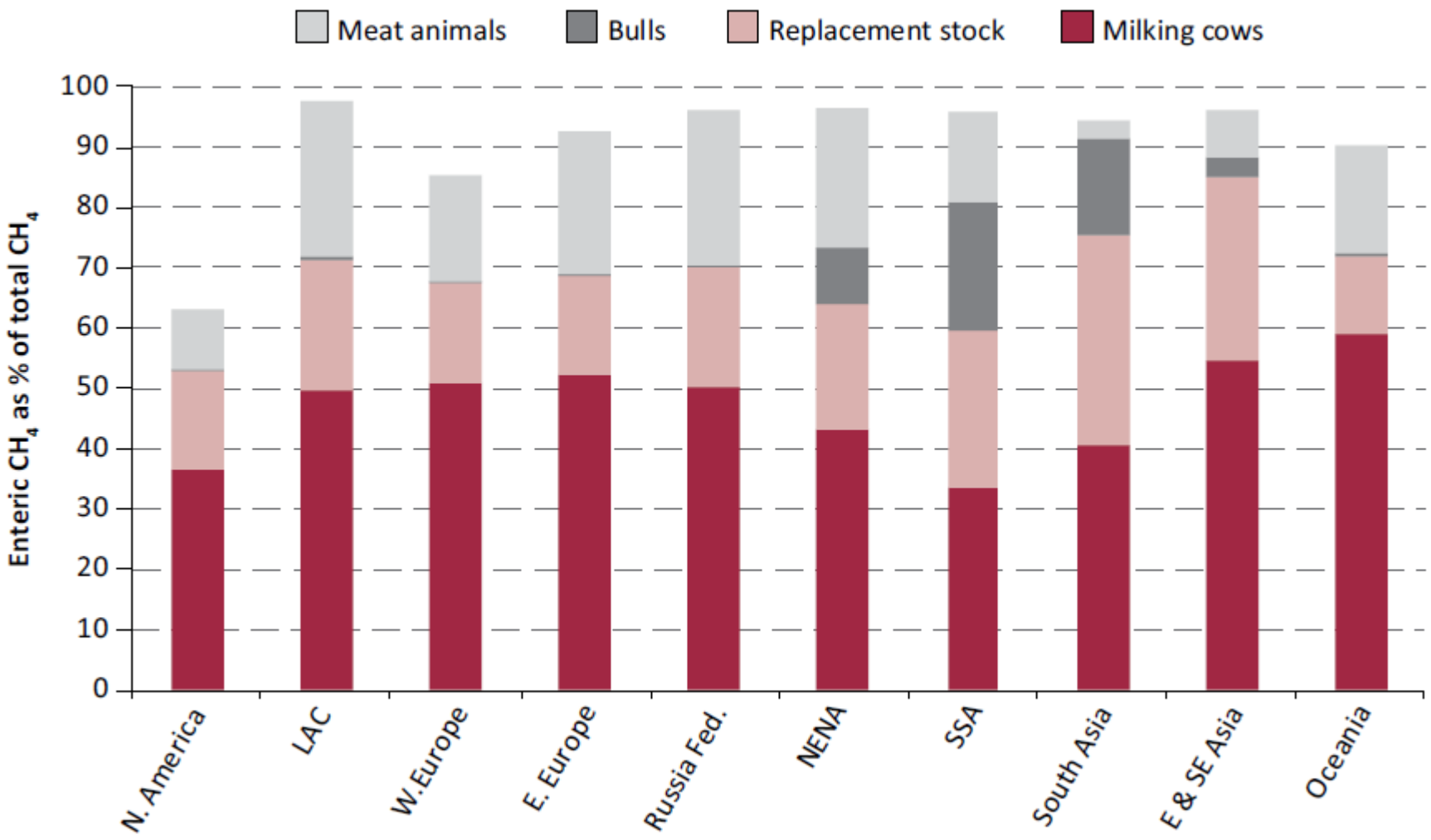


Table 7. Variation of cattle emission intensities within regions, systems and agro-ecological zone[1]

	Arid			Temperate			Humid		
	10% lowest	Average	10% highest	10% lowest	Average	10% highest	10% lowest	Average	10% highest
Mixed dairy									
N. America	1.7	1.9	2.0	1.3	1.5	1.7	1.5	1.7	1.9
Russian Fed	1.7	1.8	1.9	1.8	1.9	2.0	1.7	1.8	2.0
W. Europe	1.5	1.6	1.8	1.5	1.6	1.7	1.5	1.7	1.8
E. Europe	1.8	1.8	2.0	1.4	1.6	1.8	1.8	1.9	1.9
NENA	1.9	4.3	9.7	2.6	3.7	5.3	2.3	3.5	9.4
E & SE Asia	2.1	2.7	3.7	1.4	2.3	2.9	1.5	2.6	3.4
Oceania	1.7	1.8	1.9	1.0	1.0	1.8	NA	NA	NA
South Asia	4.0	5.2	6.8	3.4	4.5	6.5	4.1	6.8	8.0
LAC	1.4	3.1	4.9	1.4	3.0	5.0	1.7	4.0	5.4
SSA	1.7	10.0	17.2	1.7	7.6	13.3	5.5	9.7	17.3
Mixed beef									
N. America	28.4	32.0	36.1	26.0	28.5	30.3	26.9	28.6	30.5
W. Europe	13.6	19.9	23.0	12.9	17.3	21.9	20.2	24.1	25.7
E. Europe	11.1	12.0	12.7	12.3	13.9	16.3	11.2	11.9	12.6
NENA	17.5	28.4	35.7	16.7	20.4	25.5	18.1	24.4	34.0
E & SE Asia	36.9	46.9	61.3	33.1	43.0	54.0	40.1	54.5	81.0
Oceania	29.1	31.1	33.8	11.7	20.5	31.6	11.0	18.9	31.9
South Asia	25.3	73.0	110.5	20.4	46.8	77.6	58.8	103.0	168.1
LAC	36.5	42.9	48.5	37.4	46.6	59.0	38.2	46.8	53.9
SSA	44.2	75.0	106.6	27.4	56.0	73.0	32.9	59.7	95.3

	Arid			Temperate		
	10% lowest	Average	10% highest	10% lowest	Average	10% highest
Mixed dairy						
N. America	1.7	1.9	2.0	1.3	1.5	1.7
Russian Fed	1.7	1.8	1.9	1.8	1.9	2.0
W. Europe	1.5	1.6	1.8	1.5	1.6	1.7
E. Europe	1.8	1.8	2.0	1.4	1.6	1.8
NENA	1.9	4.3	9.7	2.6	3.7	5.3
E & SE Asia	2.1	2.7	3.7	1.4	2.3	2.9
Oceania	1.7	1.8	1.9	1.0	1.0	1.8
South Asia	4.0	5.2	6.8	3.4	4.5	6.5
LAC	1.4	3.1	4.9	1.4	3.0	5.0
SSA	1.7	10.0	17.2	1.7	7.6	13.3

	Arid			Temperate		
	10% lowest	Average	10% highest	10% lowest	Average	10% highest
Mixed beef						
N. America	28.4	32.0	36.1	26.0	28.5	30.3
W. Europe	13.6	19.9	23.0	12.9	17.3	21.9
E. Europe	11.1	12.0	12.7	12.3	13.9	16.3
NENA	17.5	28.4	35.7	16.7	20.4	25.5
E & SE Asia	36.9	46.9	61.3	33.1	43.0	54.0
Oceania	29.1	31.1	33.8	11.7	20.5	31.6
South Asia	25.3	73.0	110.5	20.4	46.8	77.6
LAC	36.5	42.9	48.5	37.4	46.6	59.0
SSA	44.2	75.0	106.6	27.4	56.0	73.0


It's becoming hot
How can we help ?


Representatives of the 400 Italian cows
thank you for your attention