Agriculture's contribution to Greenhouse Gas Emissions

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FOOD & DRINK EXPORTS

Source: Bord Bia 2017

The sector recorded the **7th** consecutive year of growth in exports during 2016

Growth of **41%** or **€3.27 billion** since 2010

MEAT & LIVESTOCK

Source: Bord Bia 2017

€3.66 billion

the value of meat and livestock exports, a decrease of **2%**

This sector represents **33%** of total food and drink exports

Irish meat and livestock is exported to **84** markets

Beef €2.38bn

Beef exports were valued at €2.38 billion, a decrease of **1%**

Ireland is the **5th largest** net exporter of beef in the world

Exports have increased by **34%** or **€900 million** since 2010

Pigmeat €615m

Pigmeat exports increased by **4%** to €615 million

Poultry €275m

Poultry exports decreased by **14%** to reach €275 million

Sheepmeat €240m

Sheepmeat exports grew by over **4%** to reach €240 million

Livestock €150m

Livestock exports declined by **23%** to €150 million

Bord Bia Export performance and Prospects , 2017

DAIRY PRODUCTS & INGREDIENTS

Source: Bord Bia 2017

50%
rise in the value of dairy exports from 2010 (€2.25bn) to 2015 (€3.38bn)

Exports to international markets are worth an estimated
€1.66 billion,
or **49%** of dairy exports

€3.38 billion
the estimated value of dairy exports, an increase of **2%**

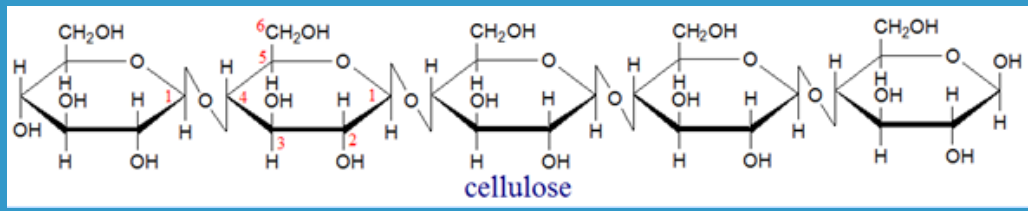
The UK accounts for
53%
of cheese exports

According to the European Commission Medium term outlook Irish milk production is expected to grow over
40%
over the next decade

Ireland exports dairy to
155
markets worldwide

The top 5 markets
are the UK, China, the Netherlands, Germany & the United States

Bord Bia Export performance and Prospects , 2017



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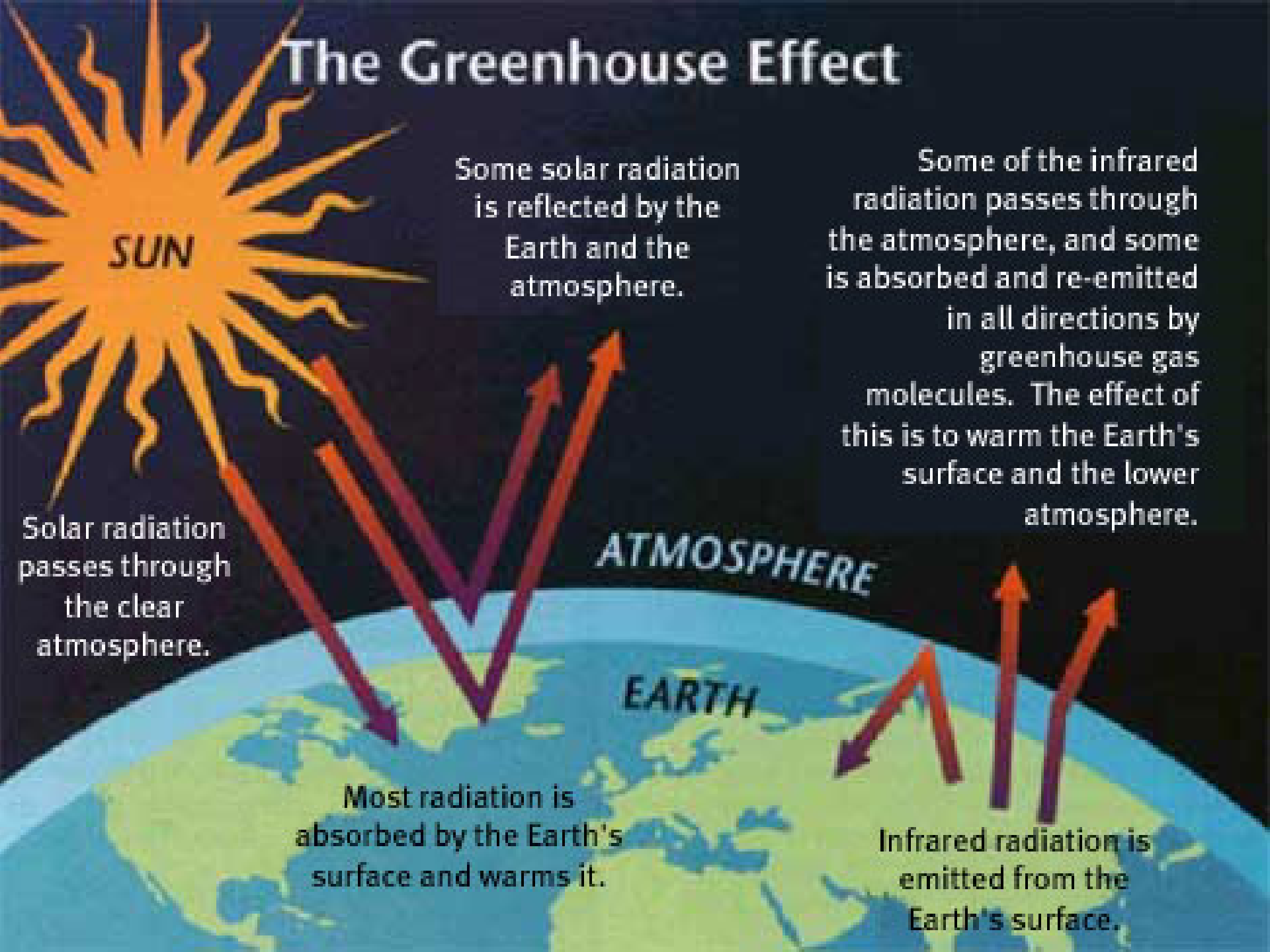
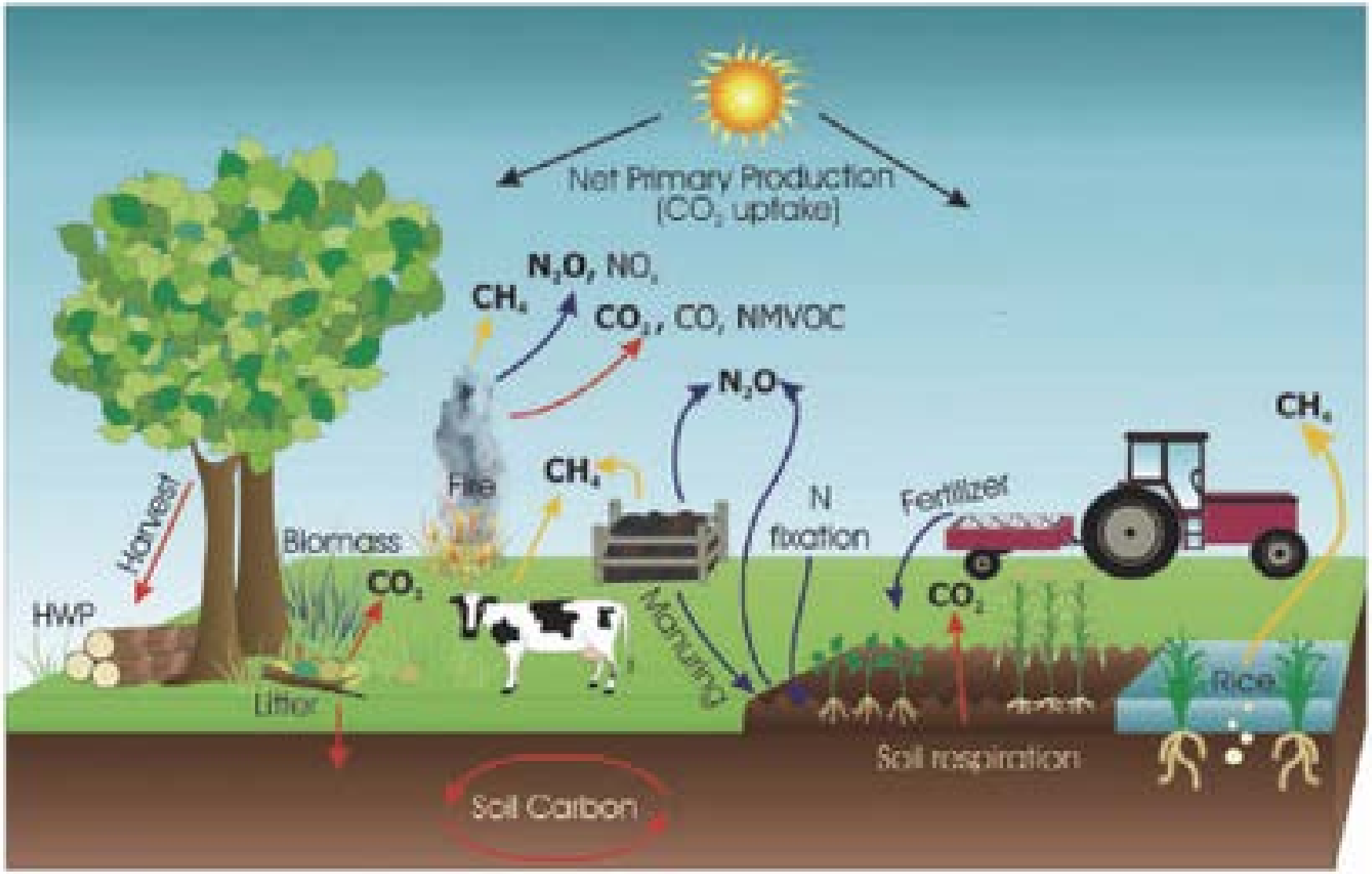

The Greenhouse Effect
SUN
Some solar radiation is reflected by the Earth and the atmosphere.
Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.
Solar radiation passes through the clear atmosphere.
ATMOSPHERE
EARTH
Most radiation is absorbed by the Earth's surface and warms it.
Infrared radiation is emitted from the Earth's surface.

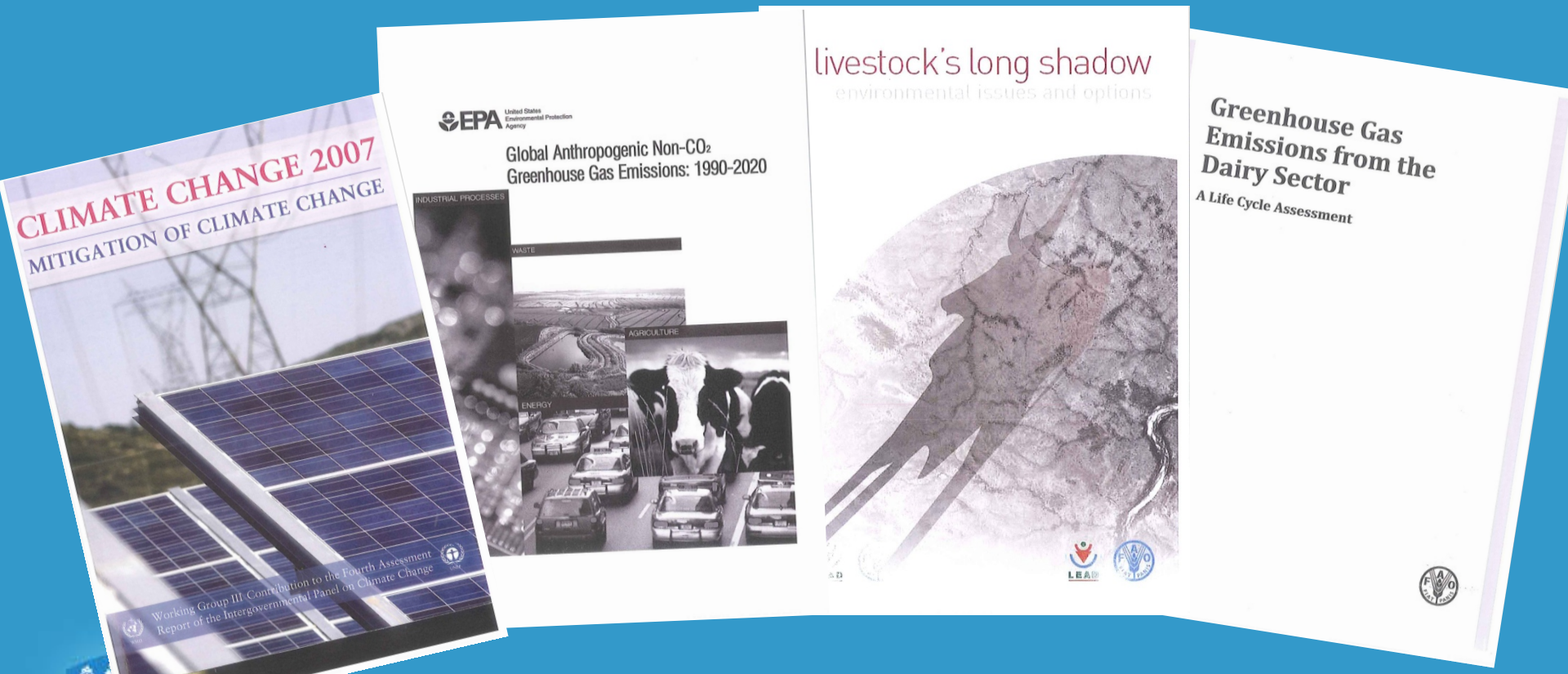
Greenhouse gas emission sources/removals and processes in managed ecosystems



NMVOC = non-methane volatile organic compounds.

Source: U.S. Department of Agriculture.

Global issue receiving huge attention from major organisations



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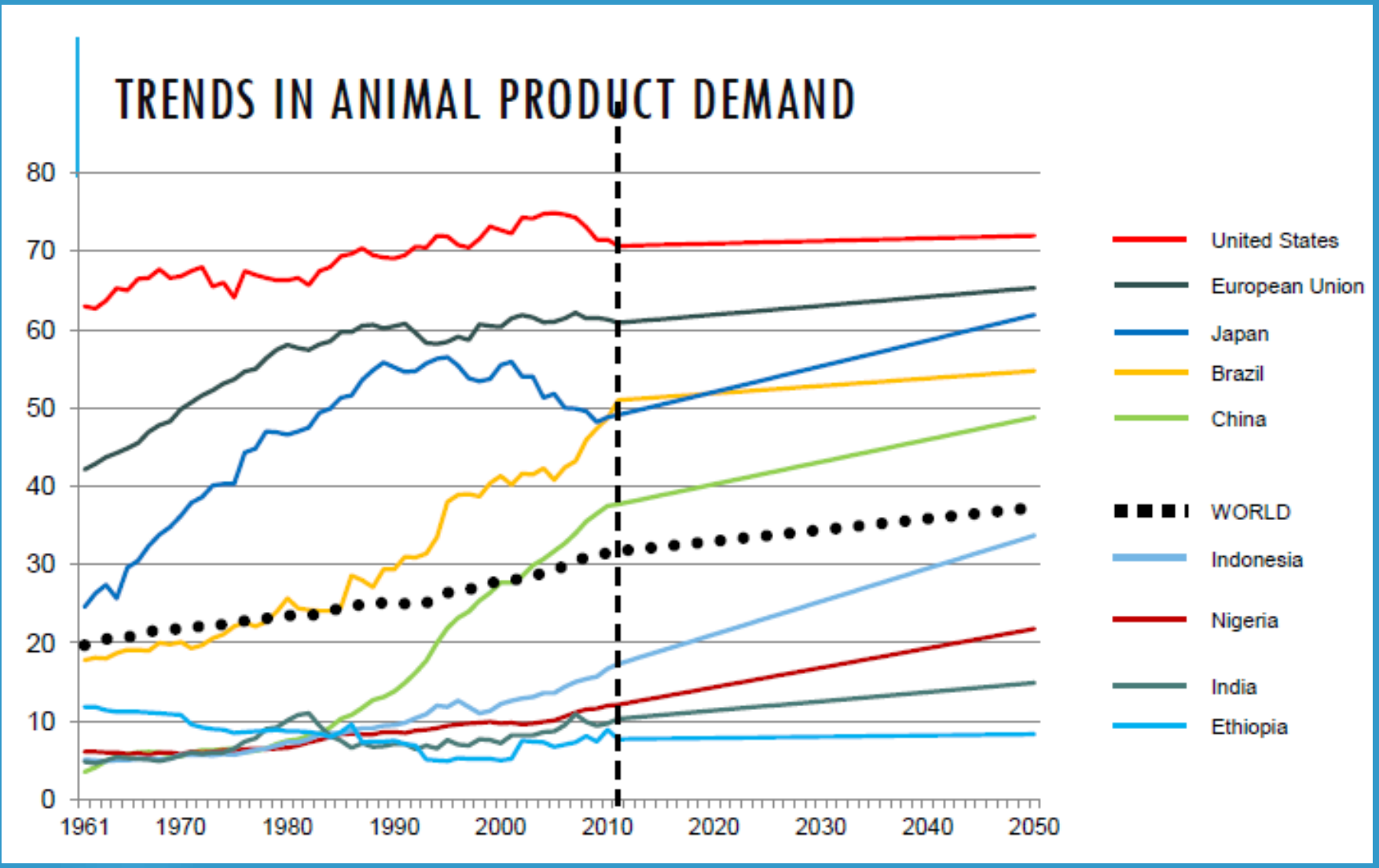
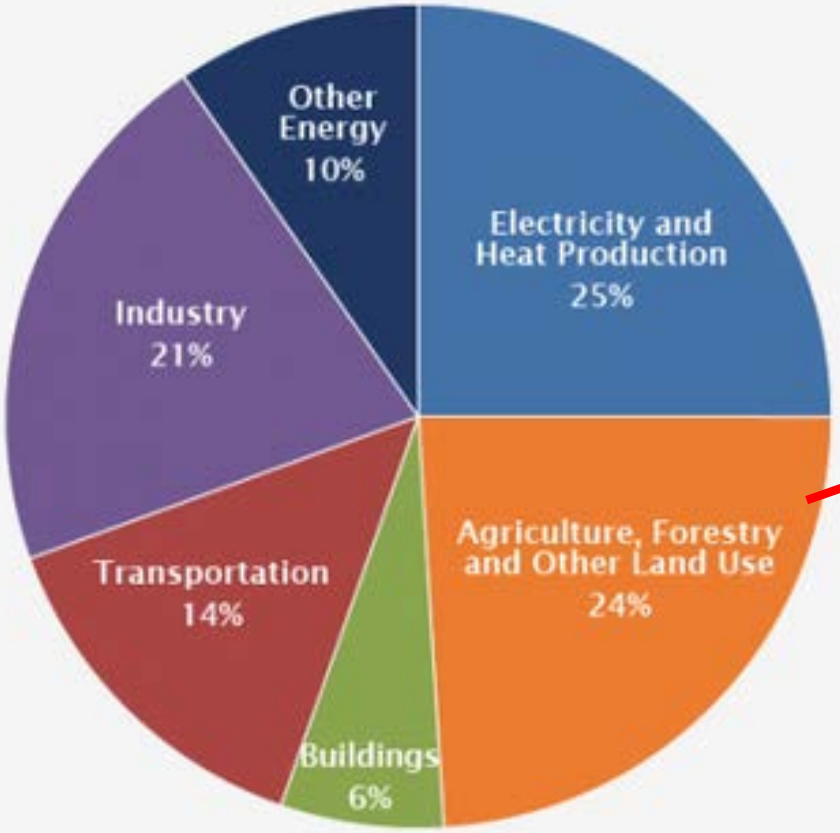


Greber et al. (2016)

Global Greenhouse Gas Emissions by Economic Sector



Source: IPCC (2014); Exit based on global emissions from 2010. Details about the sources included in these estimates can be found in the *Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Exit

60% livestock related

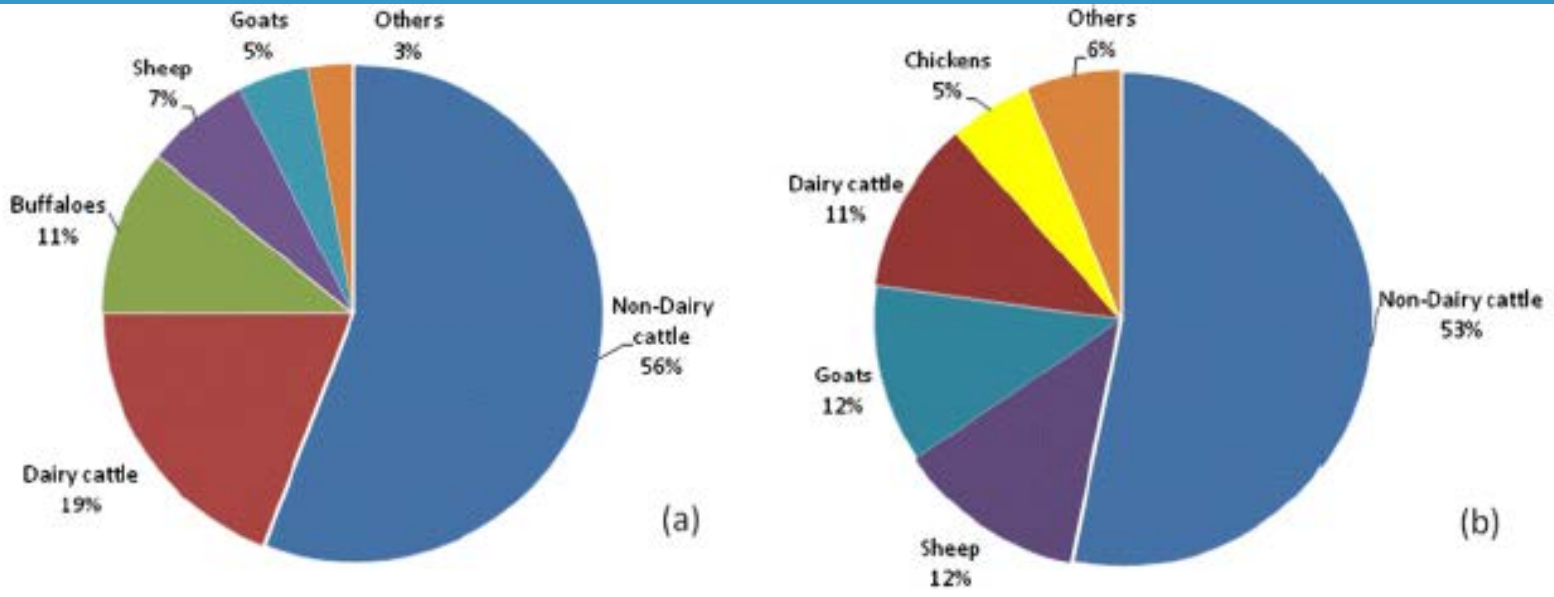


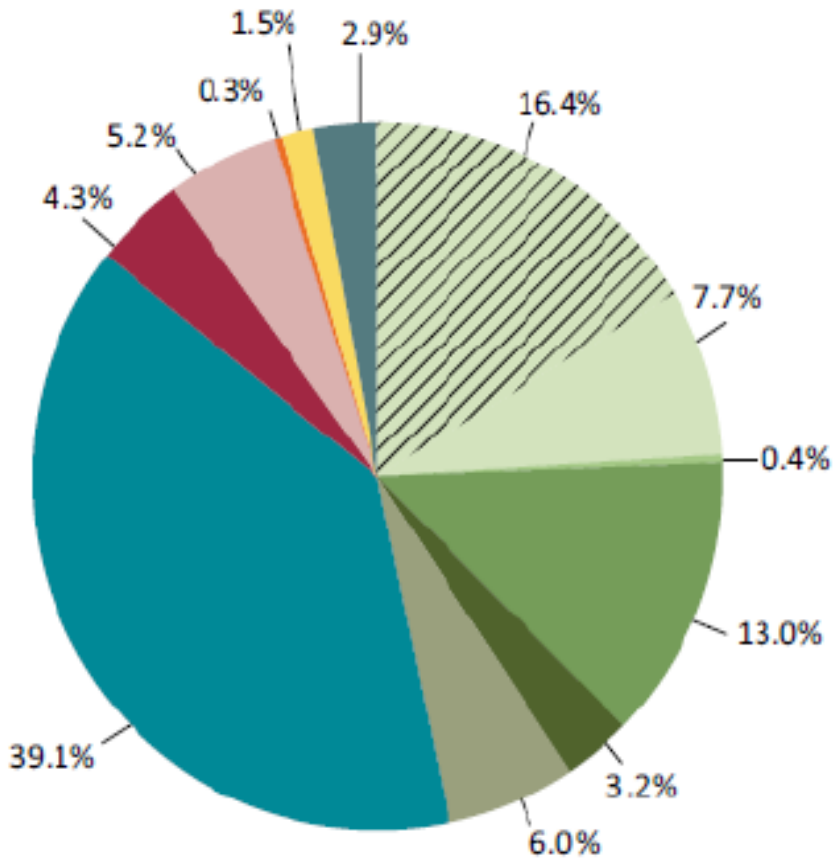
Figure 2. Break down of global emissions by animal type, averaged over the period 2000–2010, for (a) enteric fermentation; and (b) manure left on pasture.

Tubiello et al., 2013

GHG EMISSIONS FROM THE LIVESTOCK SECTOR

Relative contribution of life-cycle phases – global livestock sector

Total GHG emissions: 7.1 Gt CO_2-eq.



- Applied & deposited manure, N_2O
- Fertilizer & crop residues, N_2O
- Feed: rice, CH_4
- Feed, CO_2
- LUC: soy, CO_2
- LUC: pasture expansion, CO_2
- Enteric, CH_4
- Manure MMS, CH_4
- Manure MMS, N_2O
- Indirect energy, CO_2
- Direct energy, CO_2
- Postfarm, CO_2

FAO, 2013

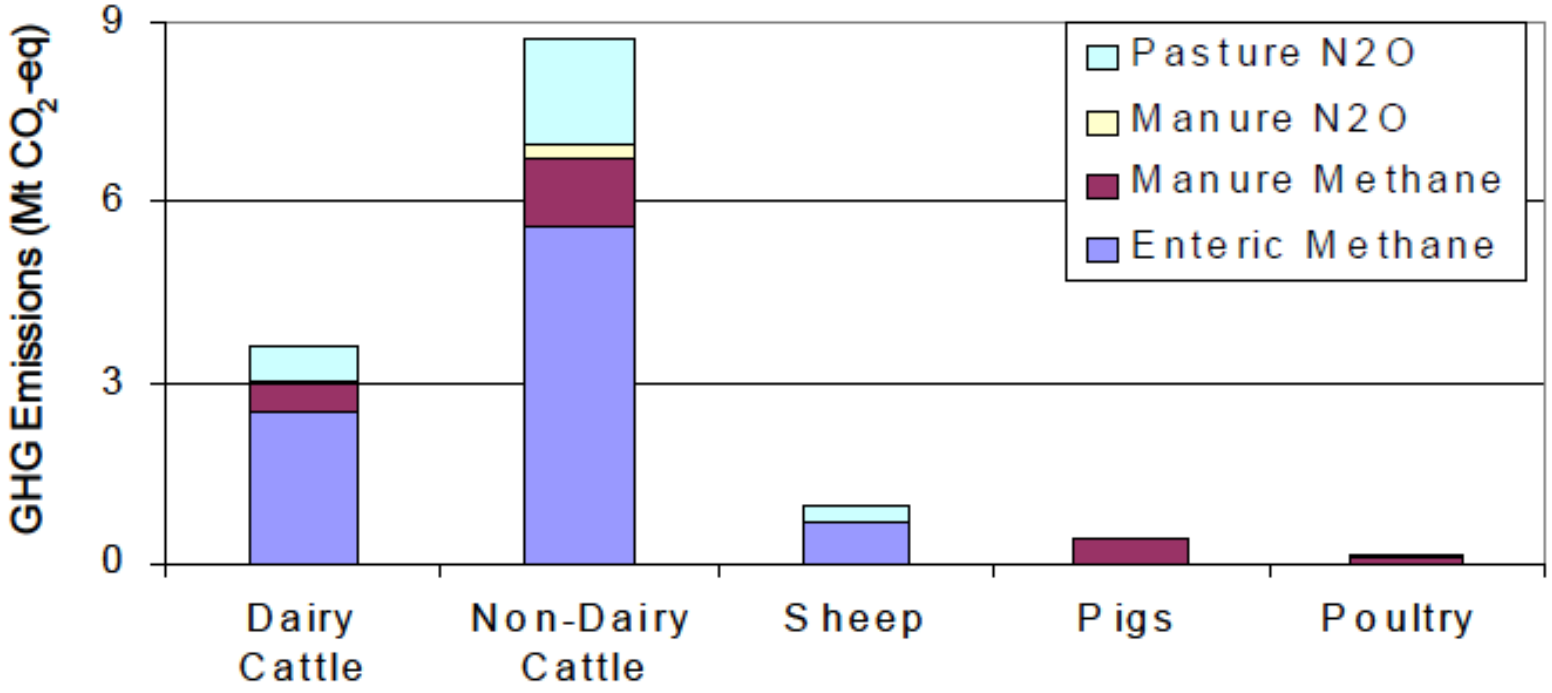
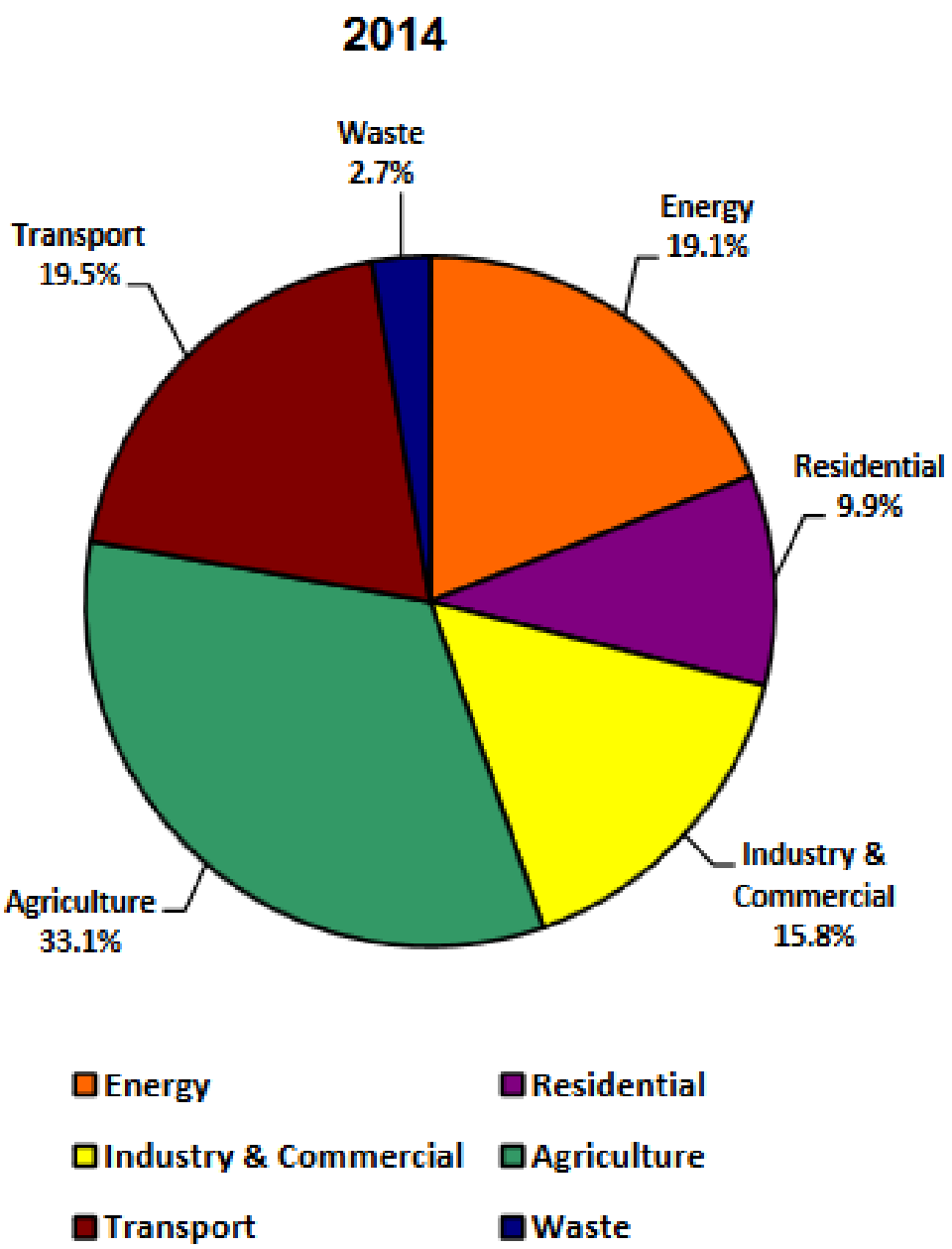
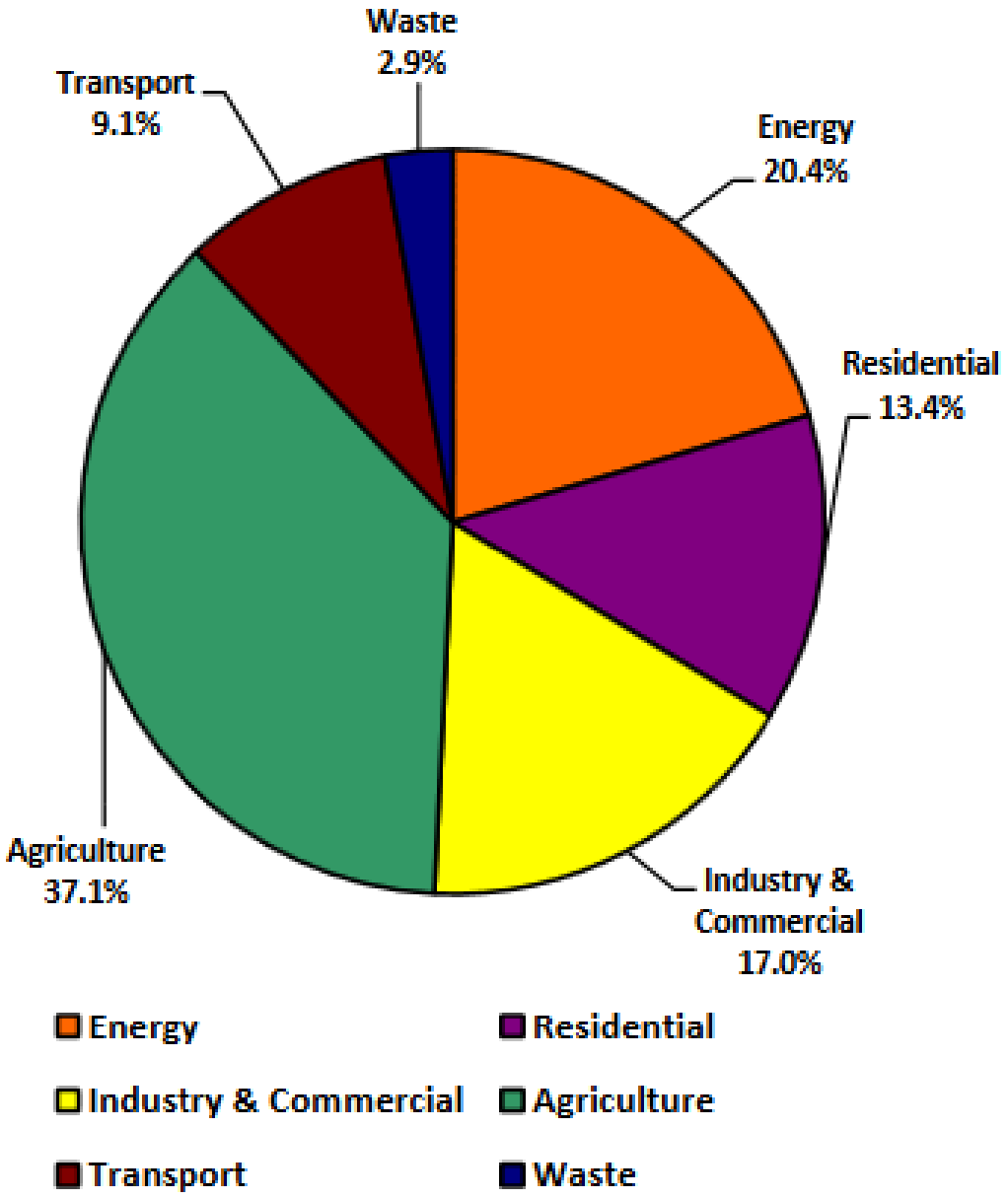


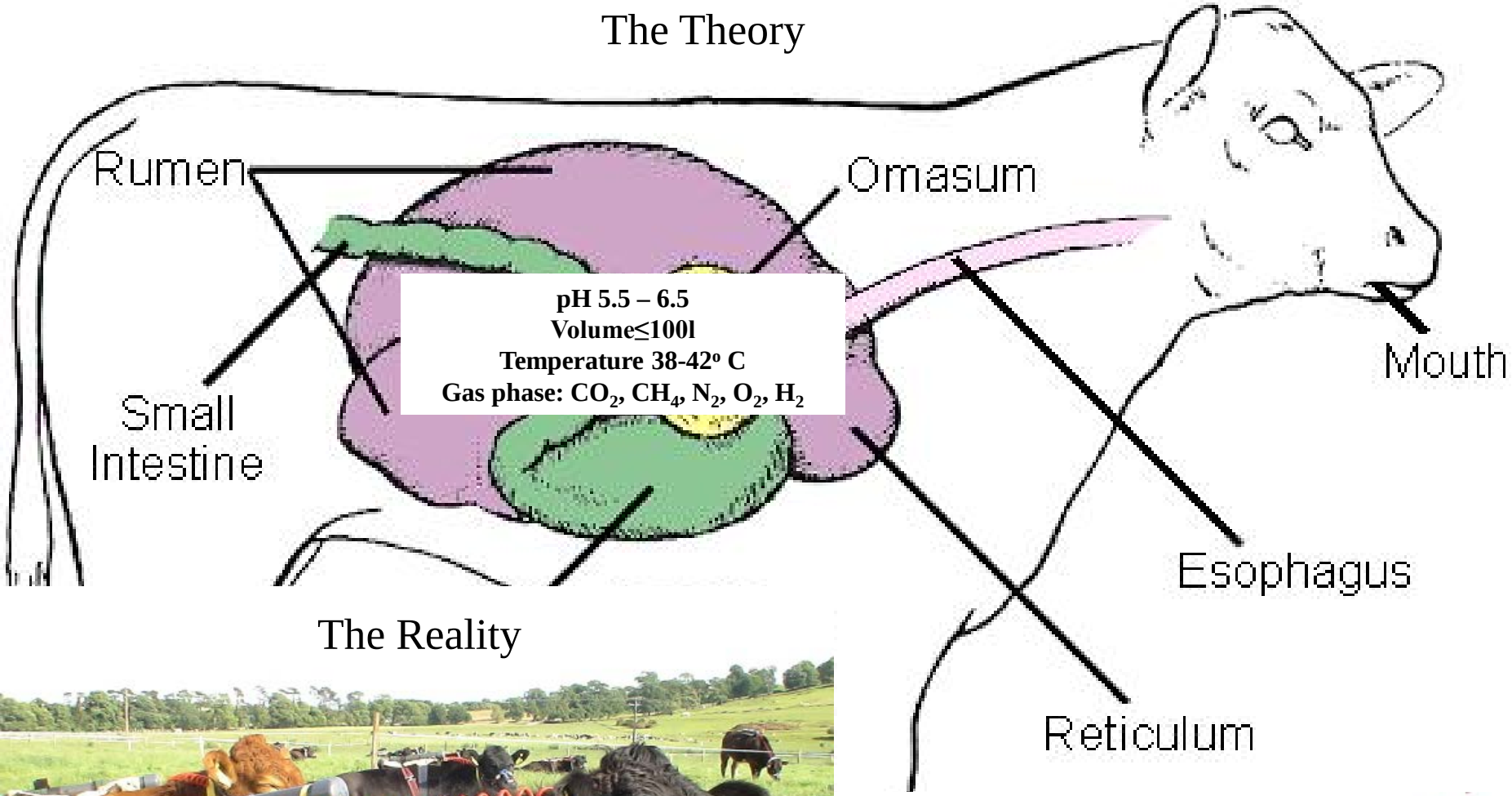
Figure 1: Sources of greenhouse gas emissions arising from livestock production in 2008 (McGettingan et al., 2010b).


2014
Waste
2.7%
Energy
19.1%
Transport
19.5%
Residential
9.9%
Industry &
Commercial
15.8%
Agriculture
33.1%
Energy
Residential
Industry & Commercial
Agriculture
Transport
Waste

1990


Waste
2.9%
Transport
9.1%
Energy
20.4%
Residential
13.4%
Agriculture
37.1%
Industry &
Commercial
17.0%
Energy
Residential
Industry & Commercial
Agriculture
Transport
Waste

The Theory



pH 5.5 – 6.5
Volume≤100l
Temperature 38-42° C
Gas phase: CO_2, CH_4, N_2, O_2, H_2

The Reality

The Mis-conception

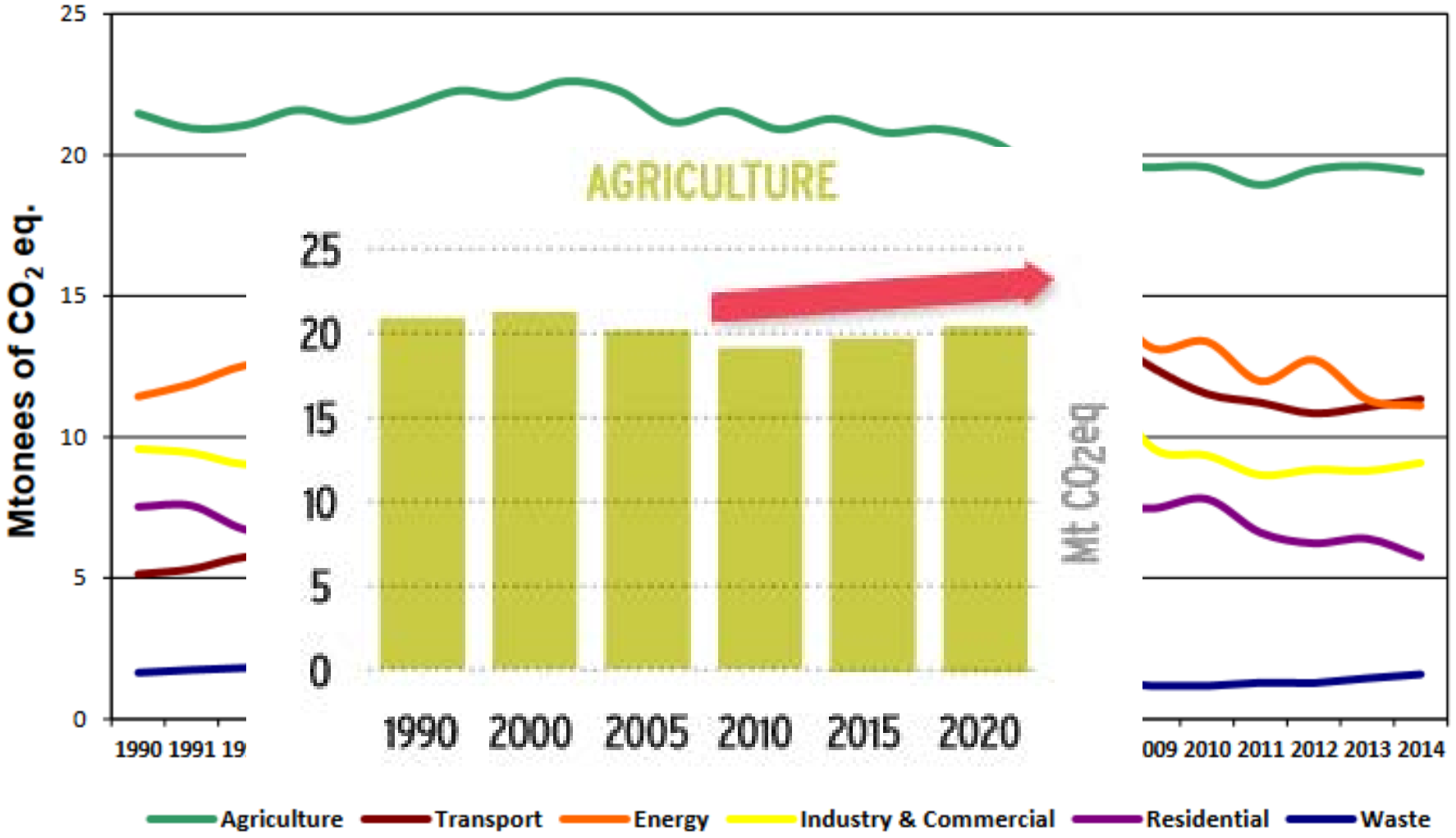
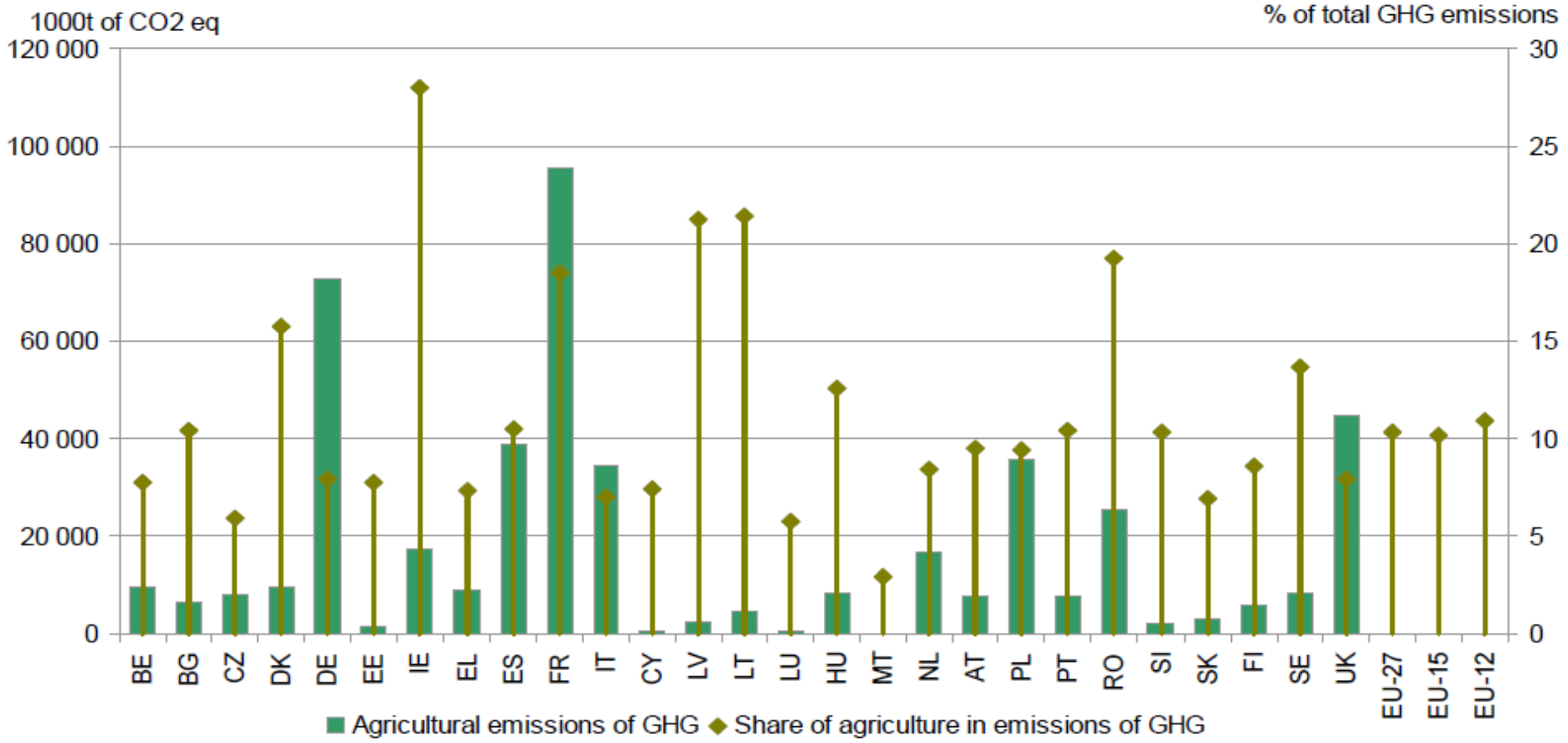


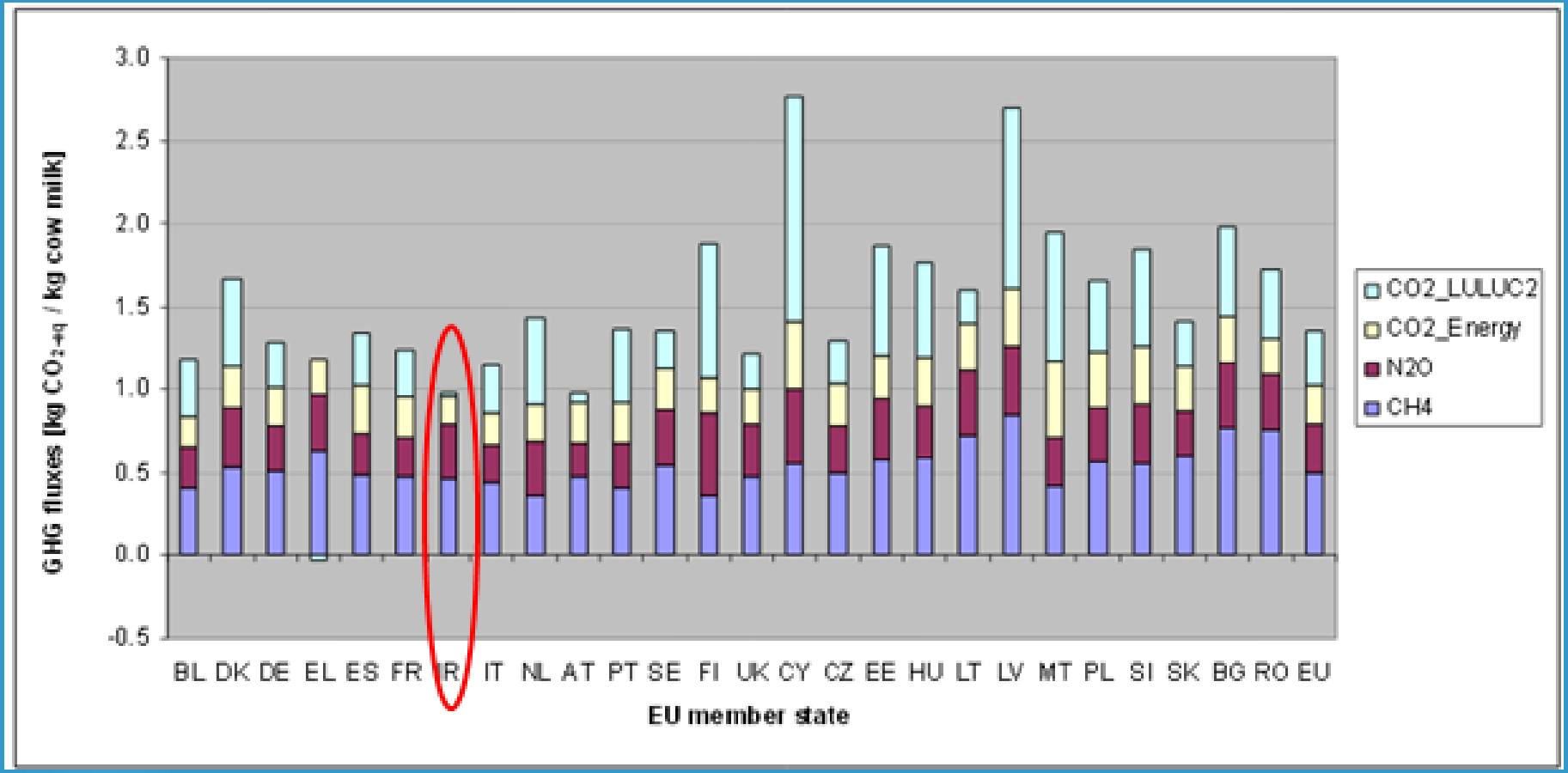
Figure 4 Trends in Greenhouse Gas Emissions 1990-2014

GHG emissions from agriculture, 2009

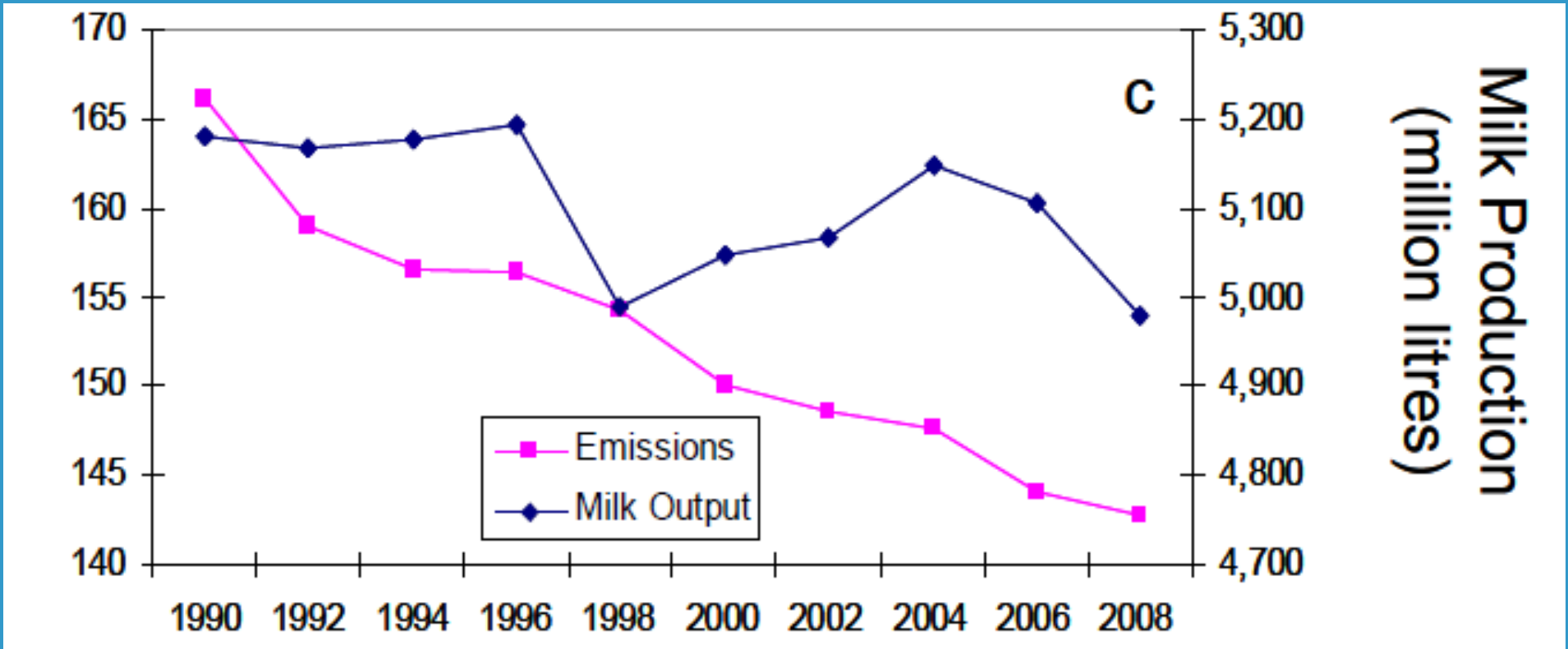


Source: EU DG:ARD Statistical and Economic Information 2011

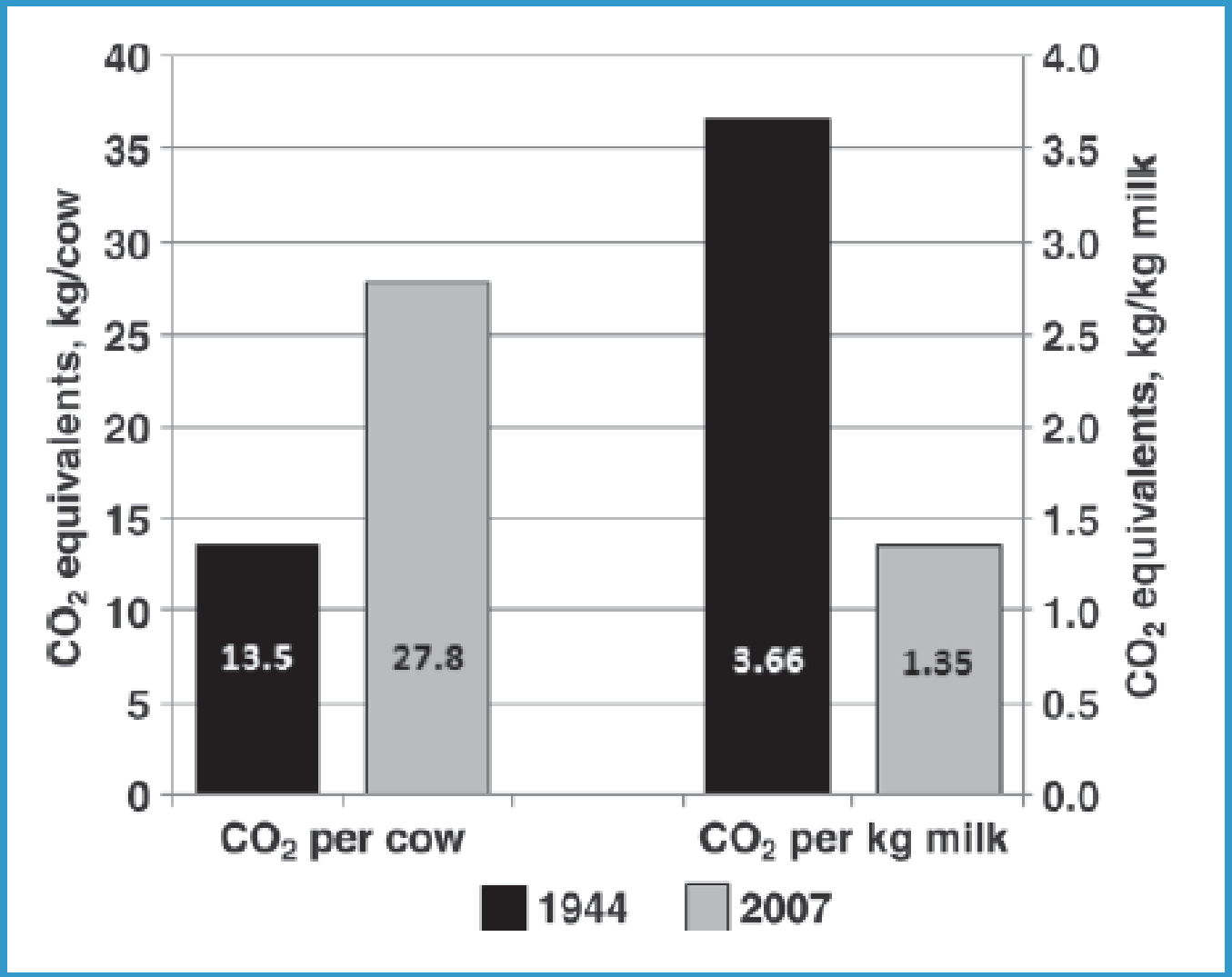
CO_2 equivalents per kg of milk within the EU



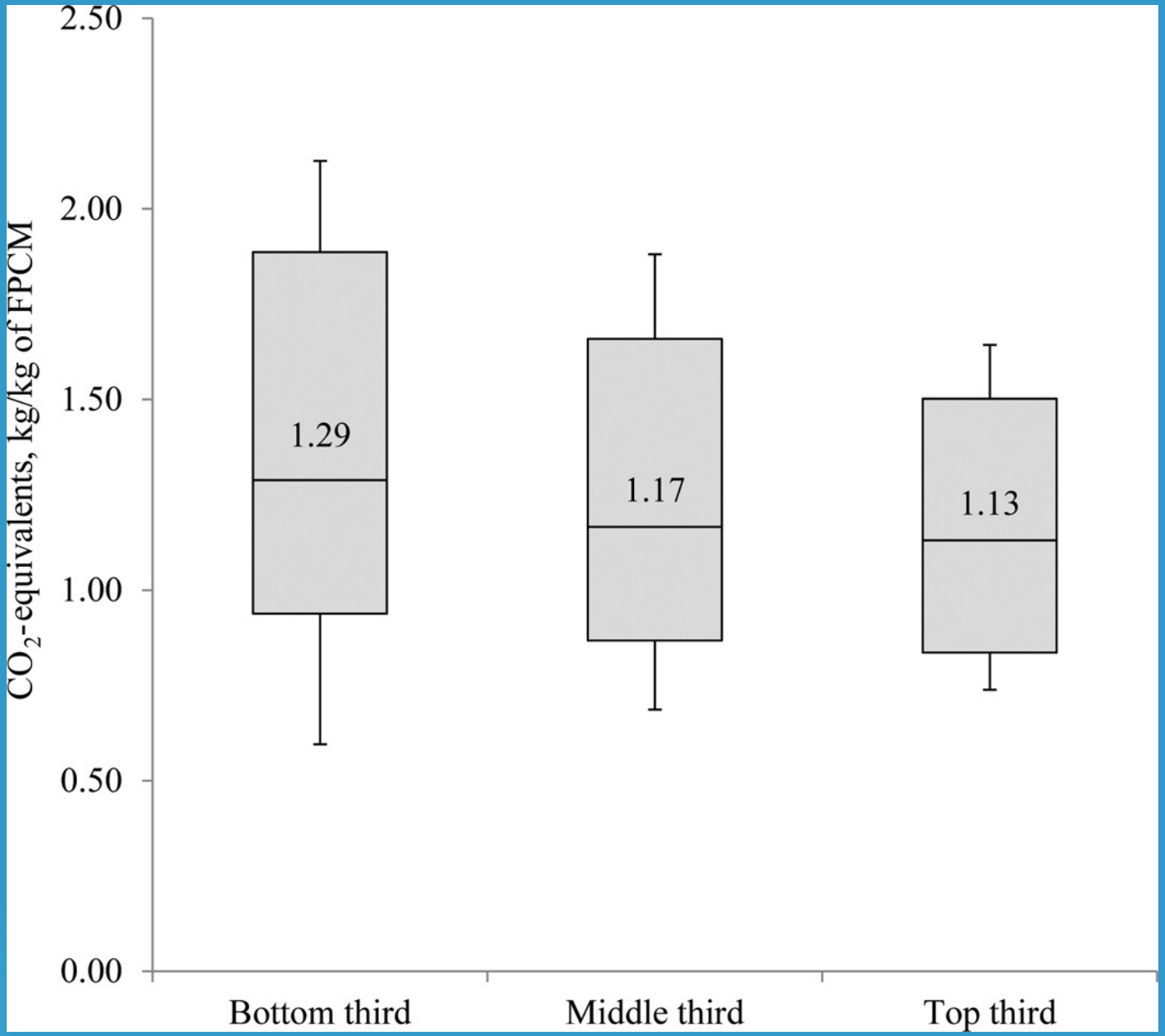
Output per unit product improving



Increasing efficiency over time

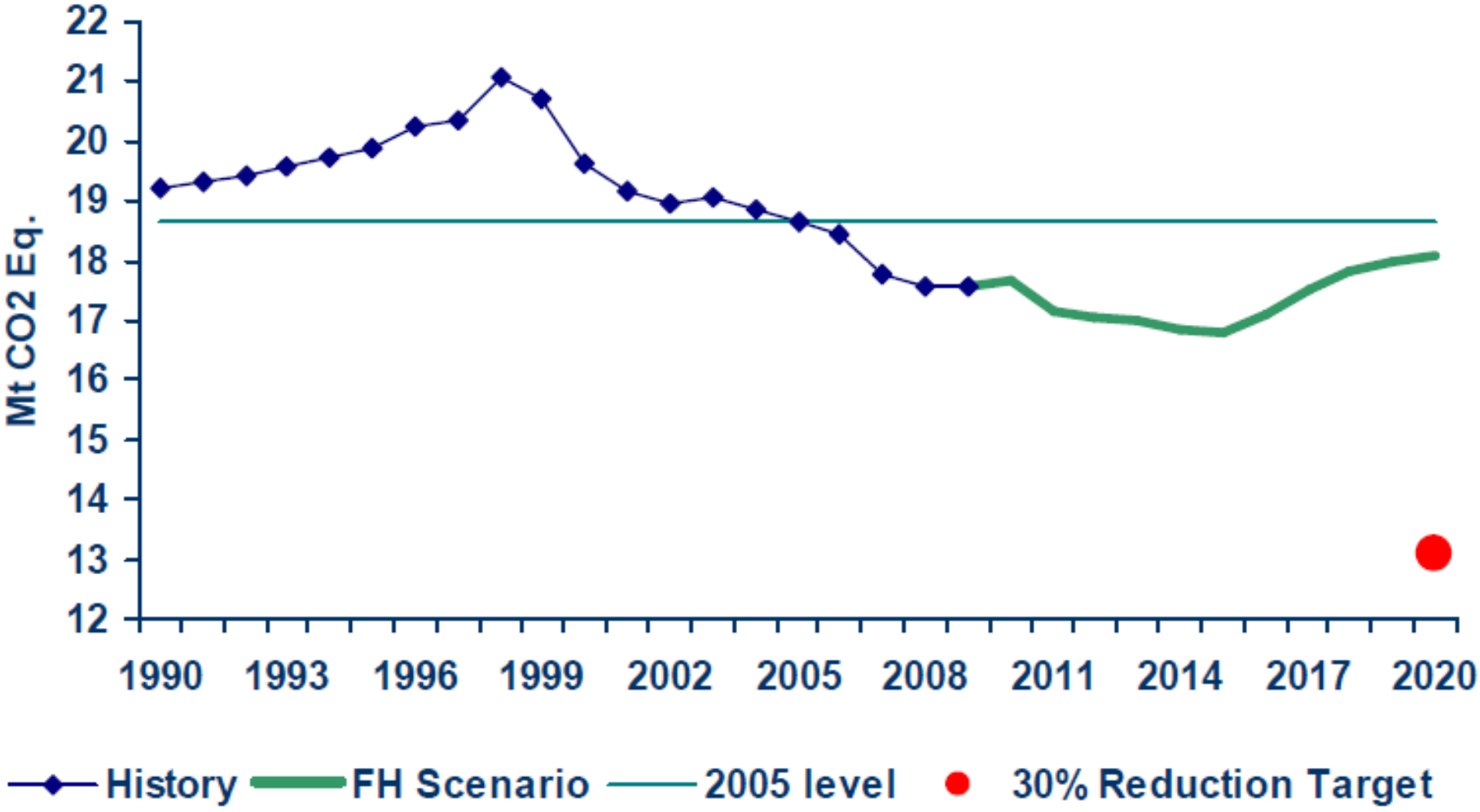


Capper et al. (2009)



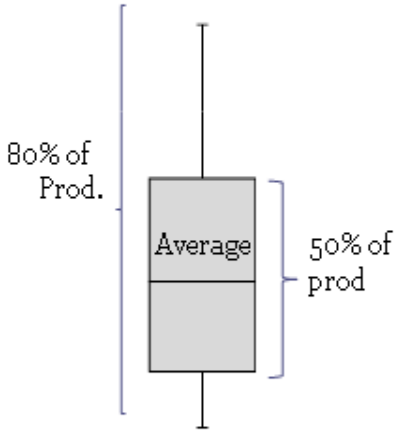
O'Brien et al. (2015)

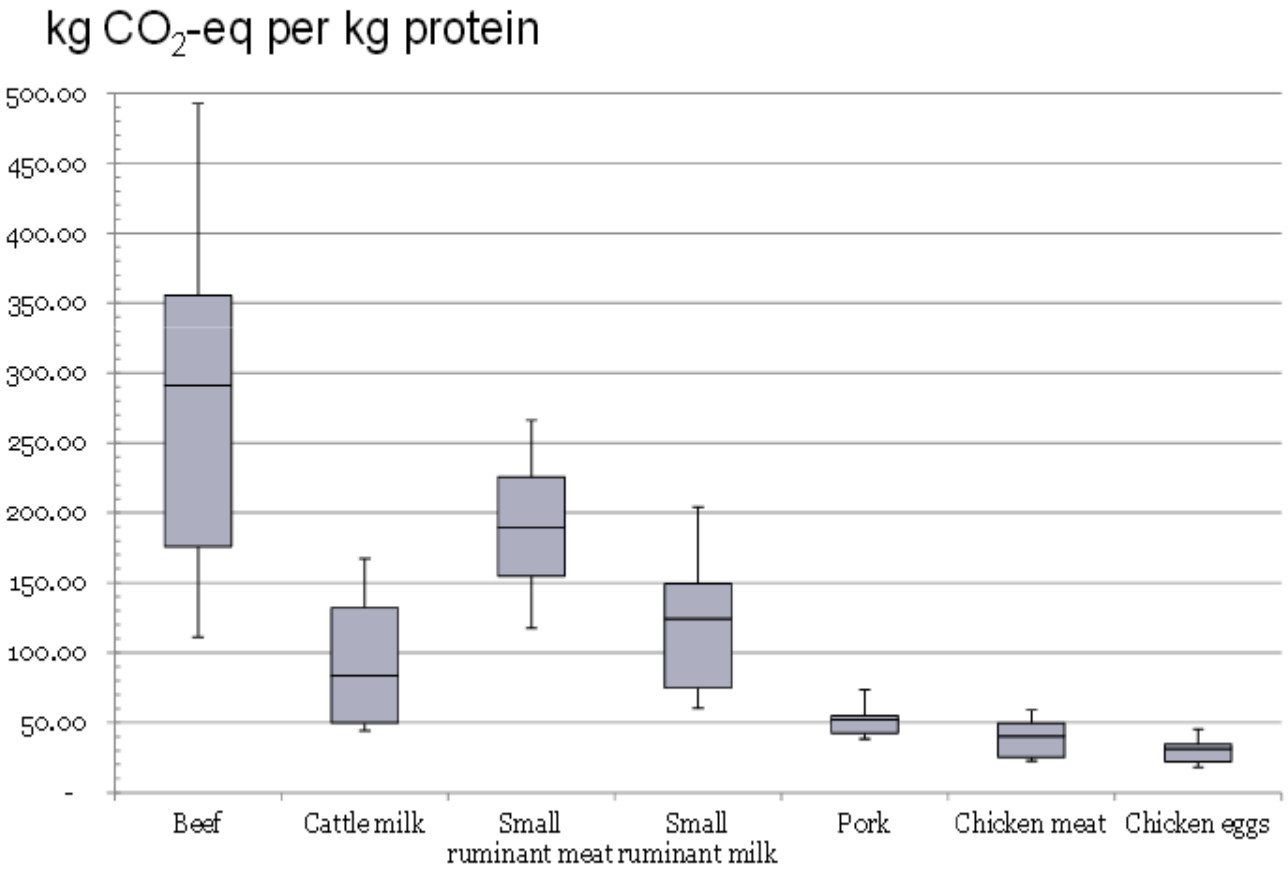
Future projections



Schulte et al., 2011

Estimated global emission intensities (Ei)



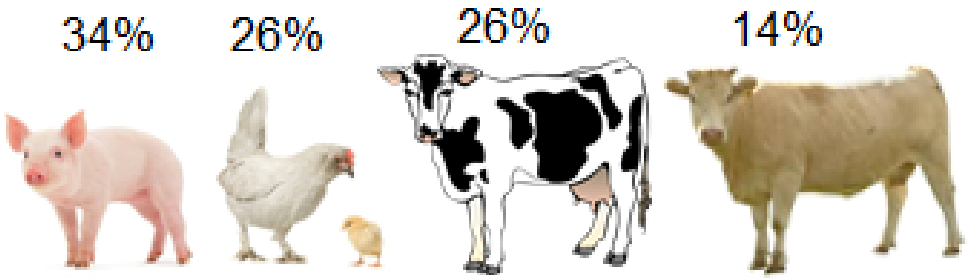


FAO 2013

Food-feed competition

2012–2013: 795 million tonnes cereals (1/3 total cereal) - animal feed

Of the total cereal use in livestock sector

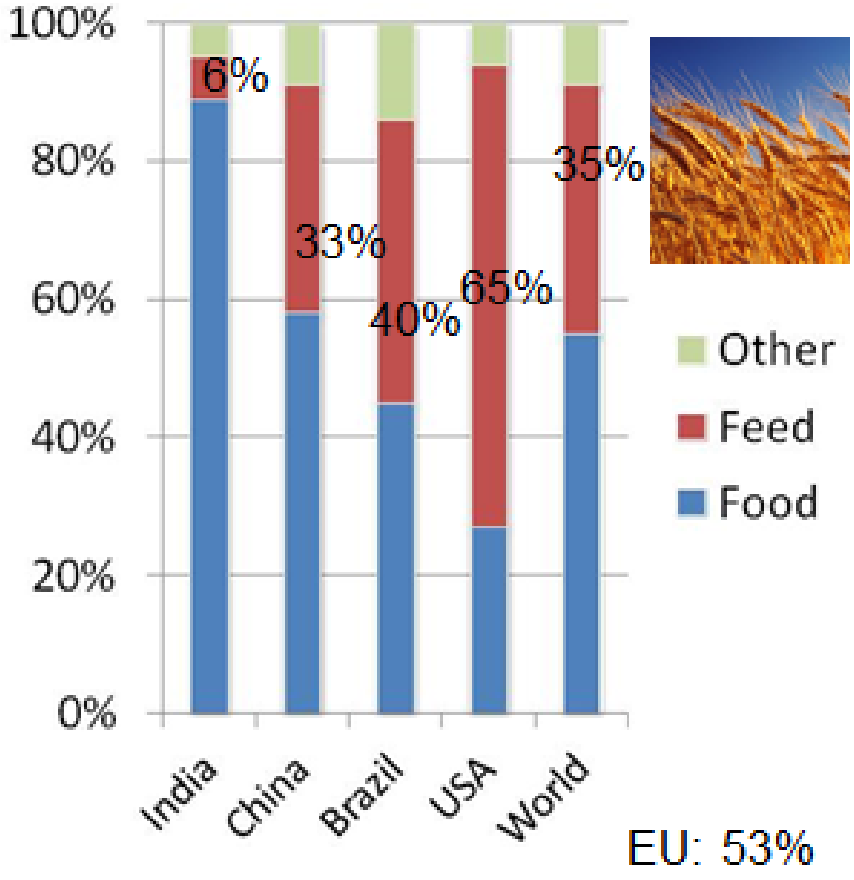


Cereal energy used for meat production, if fed directly

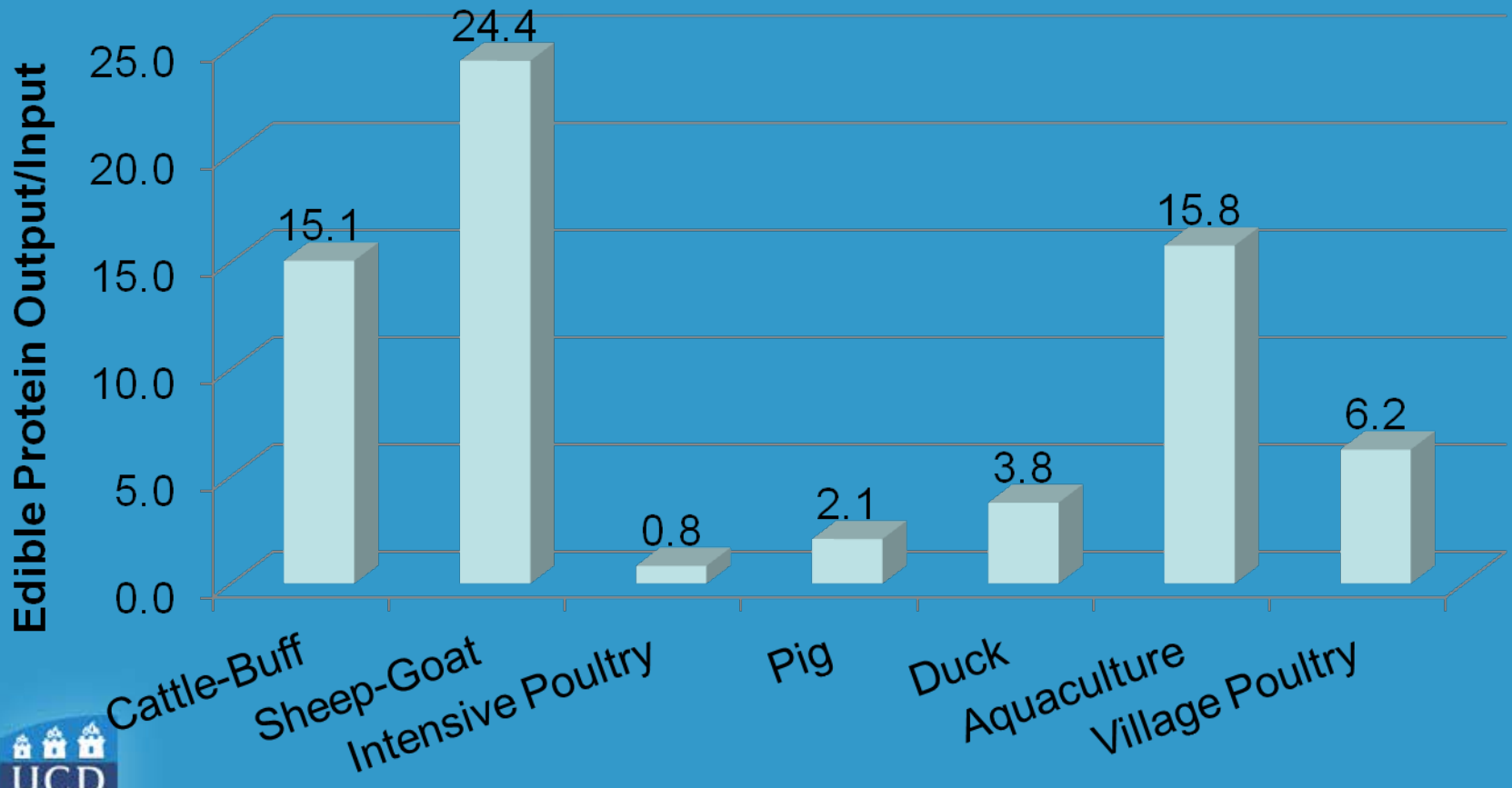
meet

Annual calorie need of 3.5 billion people

Nellemann et al. (2009), UNEP



Human edible protein output-input ratio



Mean based on data from India, Pakistan, Bangladesh, Thailand, Bhutan, Mongolia from Makkar (2016).


Image Courtesy of William Morrison @Morrison Farming

Image courtesy @kylebroughlaunbeltie

Emissions reduction

- The animal
- The paddock
- The farm
- The system
- The chain


Thank you