

Mitigation of agricultural greenhouse gas emissions

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Outline of presentation

- Global perspective on emissions from agriculture and mitigation potential
- Relate global position to Irish situation

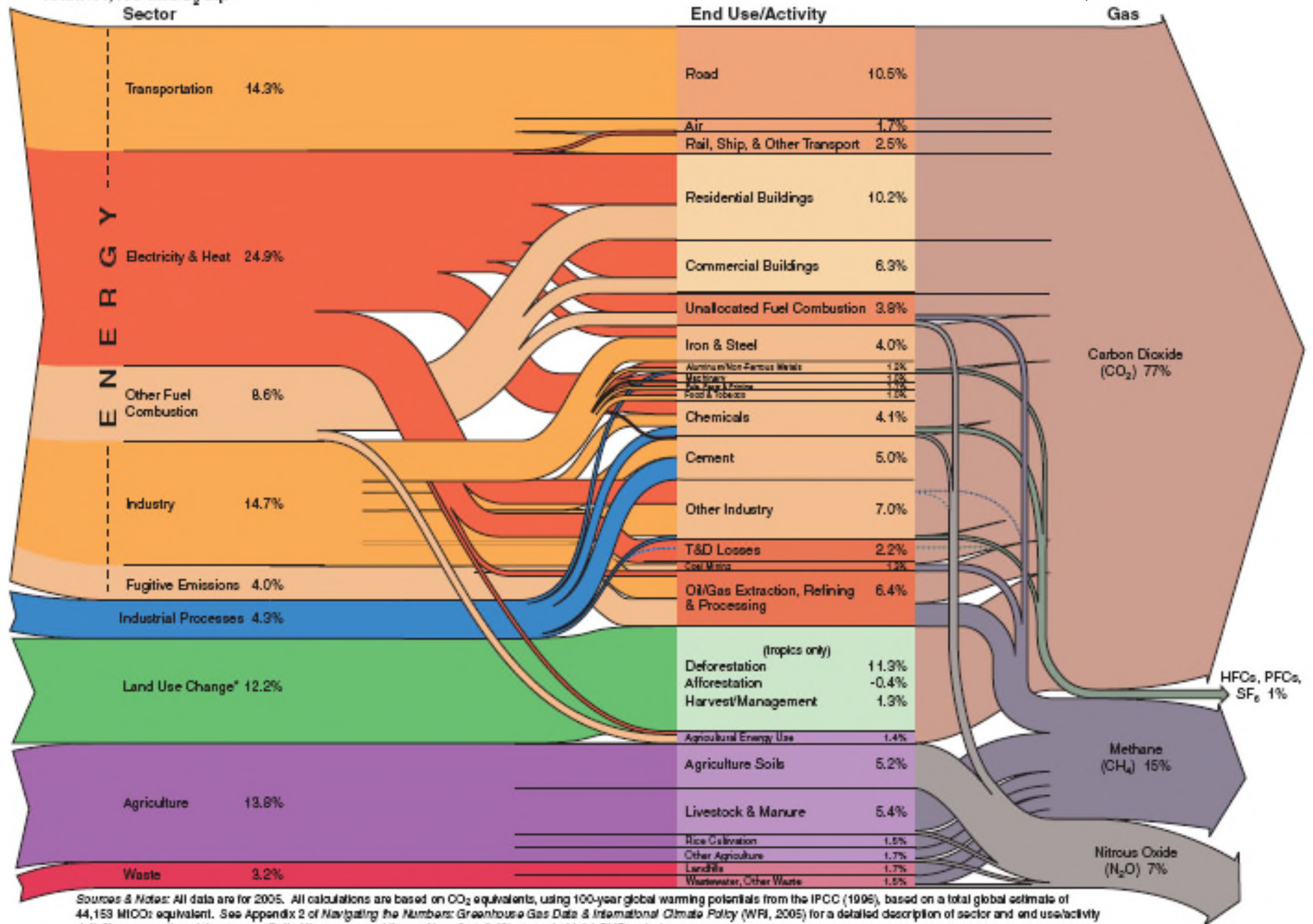


Global issue receiving huge attention from major organisations



World Greenhouse Gas Emissions in 2005
Total: 44,153 MtCO₂ eq.

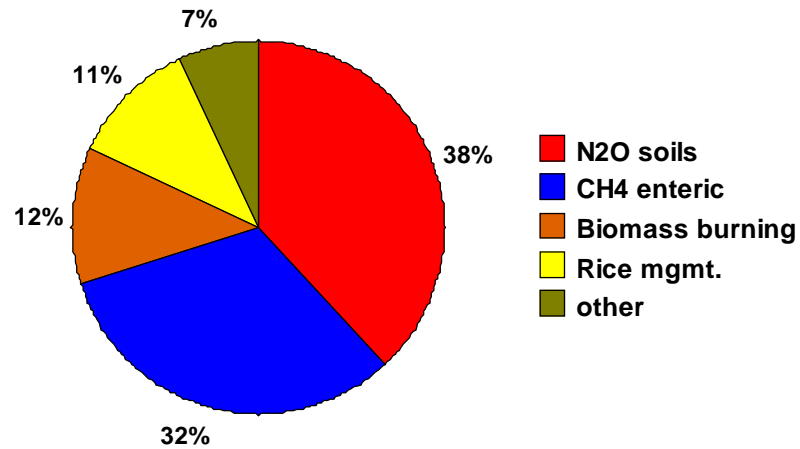
Source: CIAT, WRI



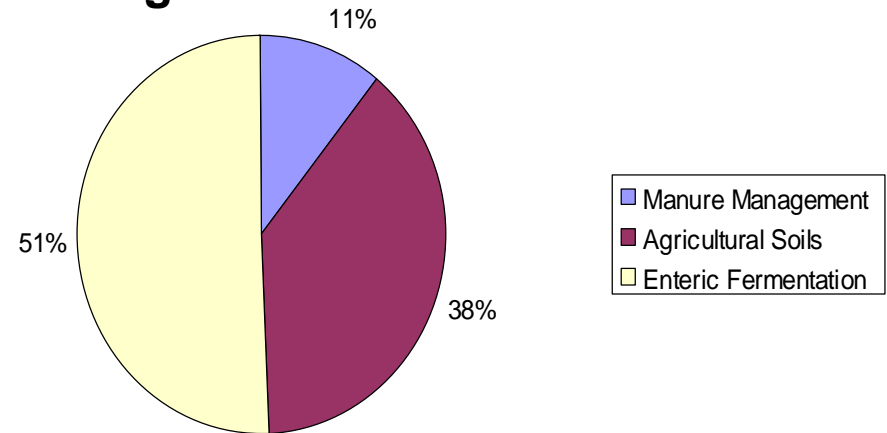
Sources & Notes: All data are for 2005. All calculations are based on CO₂ equivalents, using 100-year global warming potentials from the IPCC (1996), based on a total global estimate of 44,153 MtCO₂ eq. See Appendix 2 of *Navigating the Numbers: Greenhouse Gas Data & International Climate Policy* (WRI, 2005) for a detailed description of sector and end use/activity definitions, as well as data sources. Dotted lines represent flows of less than 0.1% percent of total GHG emissions.

Profile of agricultural emissions

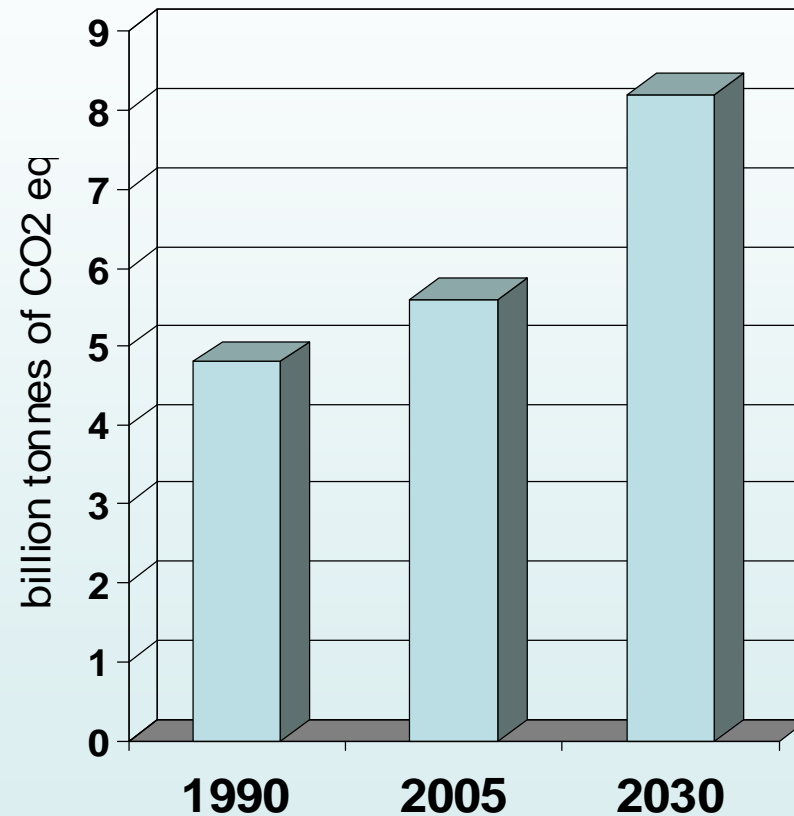
Global Agriculture Emissions 2005



Irish Agricultural Emissions 2005



Global agricultural emissions - trend and baseline



IPCC, 2007

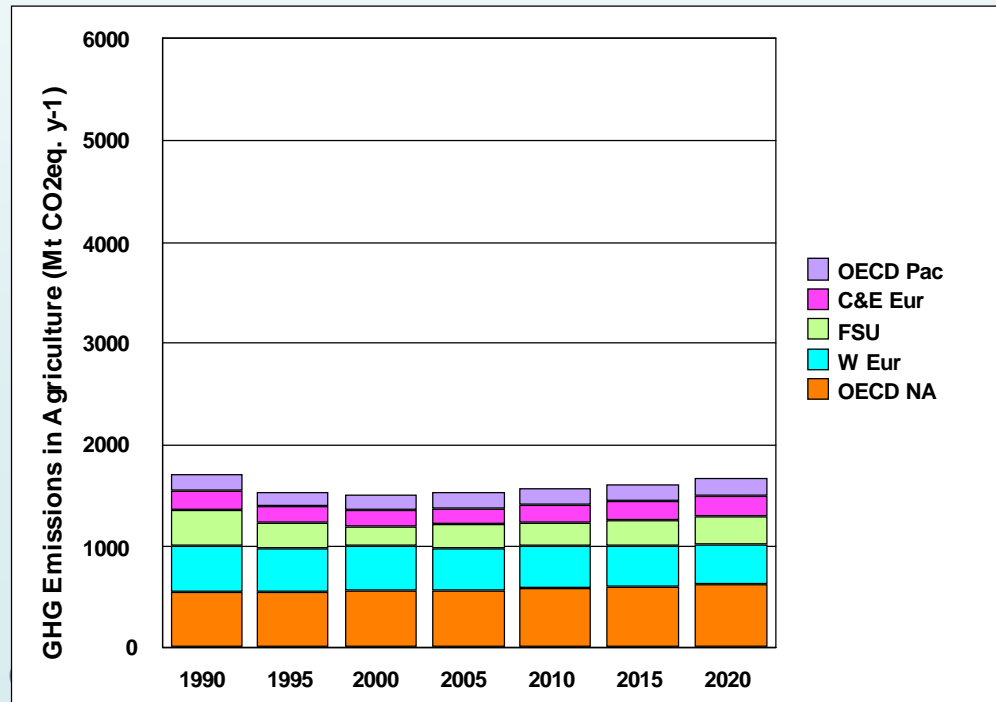
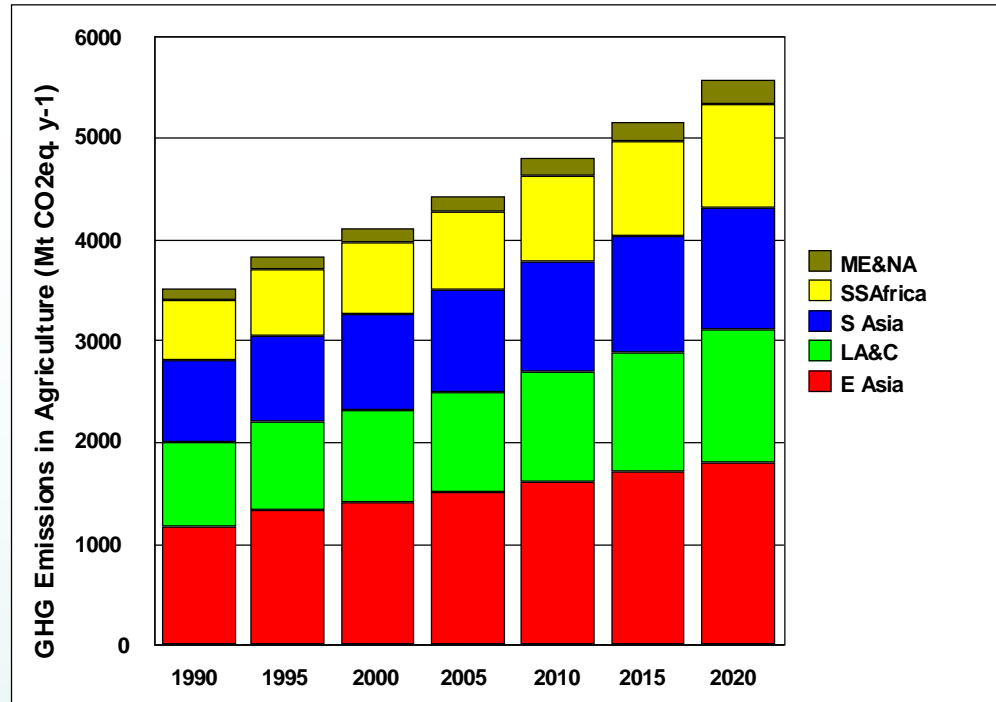
There are different trends and drivers in different regions

Developing regions

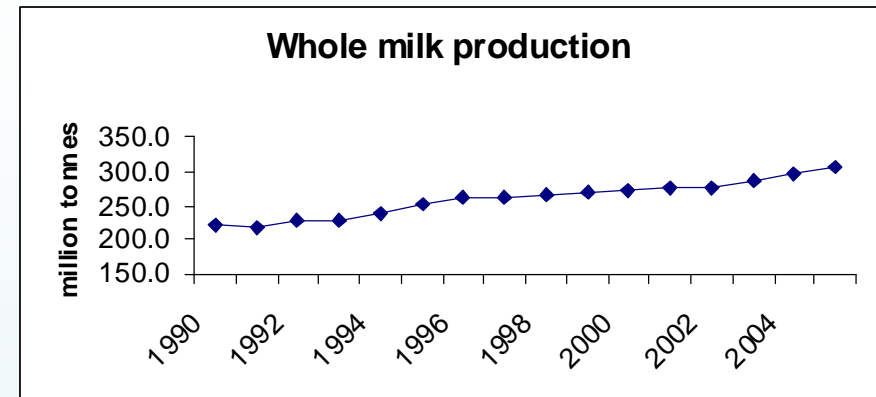
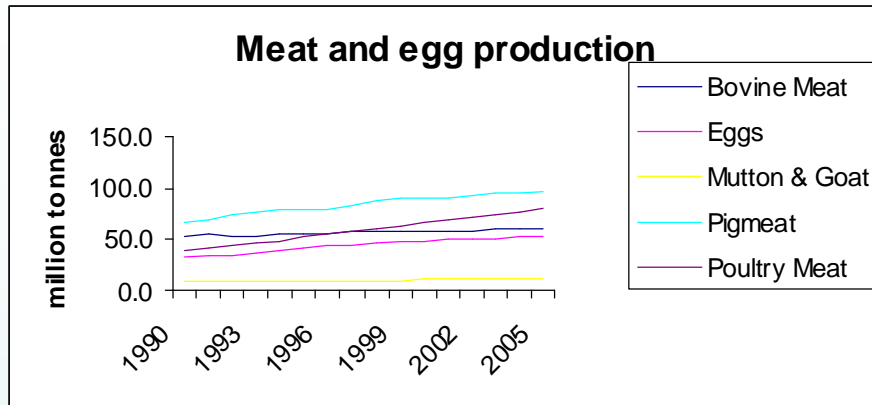
1990-2005:
 Developed countries, EIT: -12%
 Developing countries: +32%

Developed regions and economies in transition

US-EPA (2006)



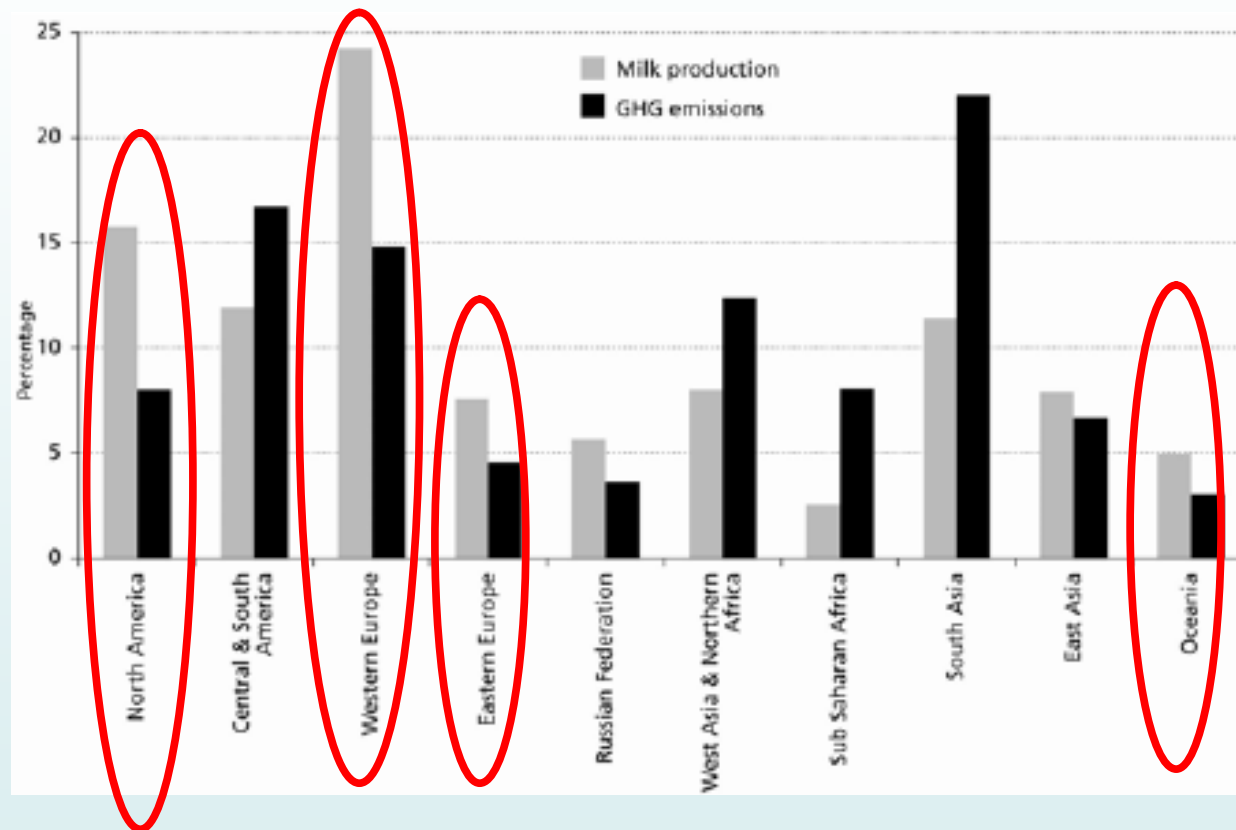
Emissions vs output – 1990 to 2005



Agric GHG emissions	+17%
Beef	+13%
Milk	+39%
Mutton/Goat	+31%
Pigmeat	+44%
Poultry meat	+102%
Eggs	+61%

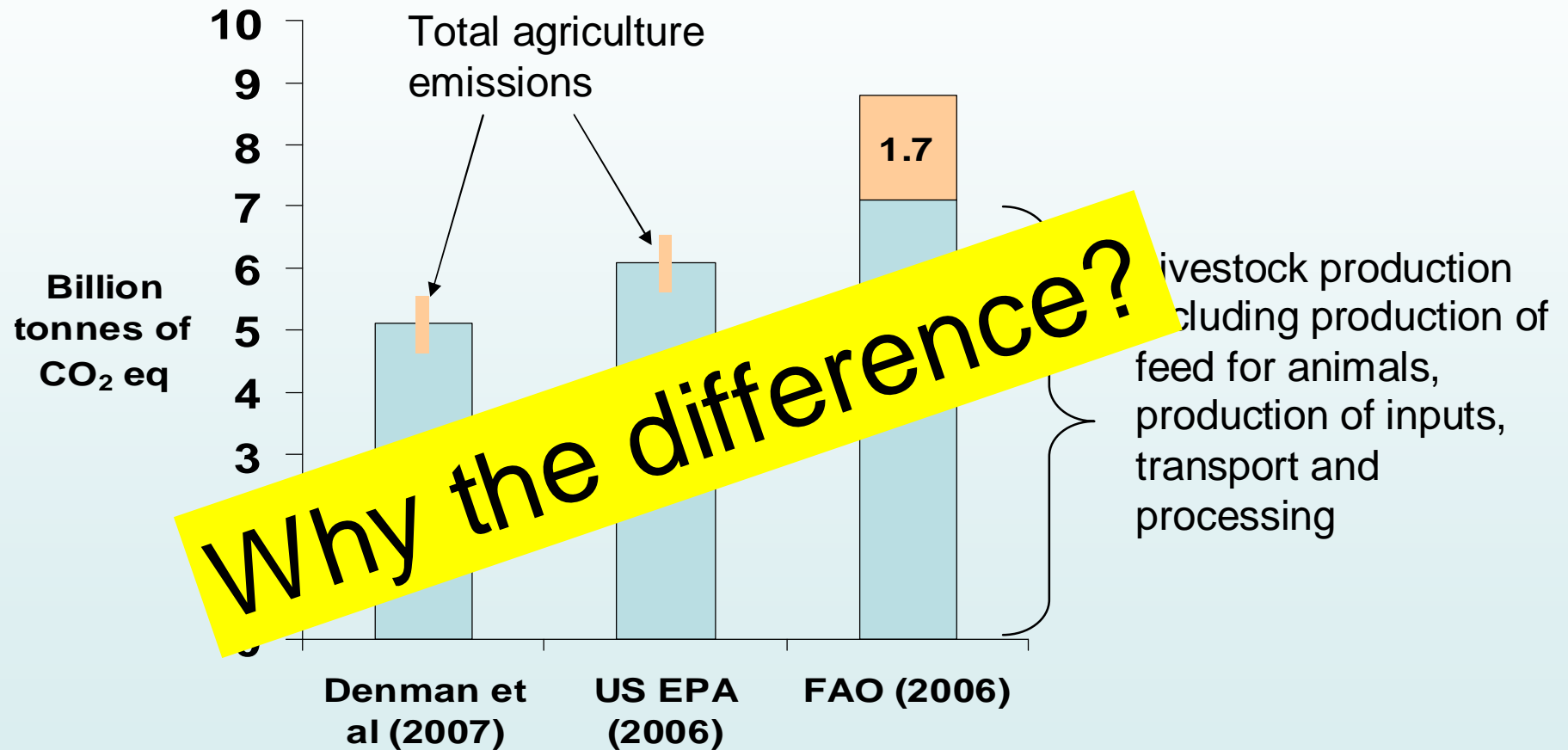
Source: FAOSTAT

Relative contribution of world regions to milk production and GHG emissions associated with milk production, processing and transport



Source: Greenhouse Gas Emissions from the Dairy Sector A Life Cycle Assessment, **FAO, April 2010**

Estimates of Global Agricultural GHG Emissions



Why the difference?

FAO (2006 - *Livestock's Long Shadow*) takes a Life Cycle approach, and includes CO₂ emissions from other sources

Main additional source is deforestation where land is cleared for new pastures or crops used as animal feed:

2.4 billion tonnes of CO₂ eq out of total of 7.1 billion total livestock emissions



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Challenges and opportunities for mitigation in the agricultural sector

Technical paper

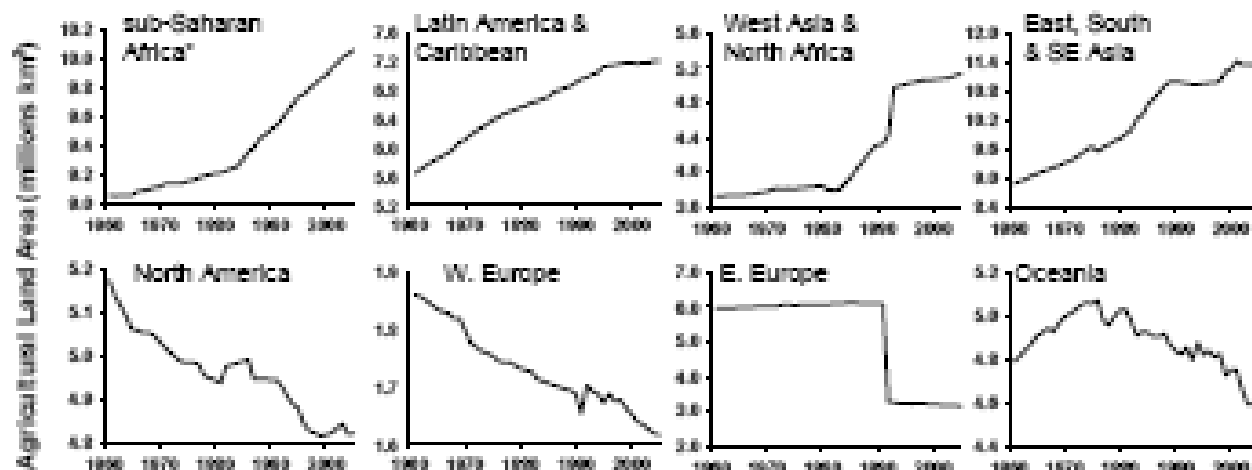
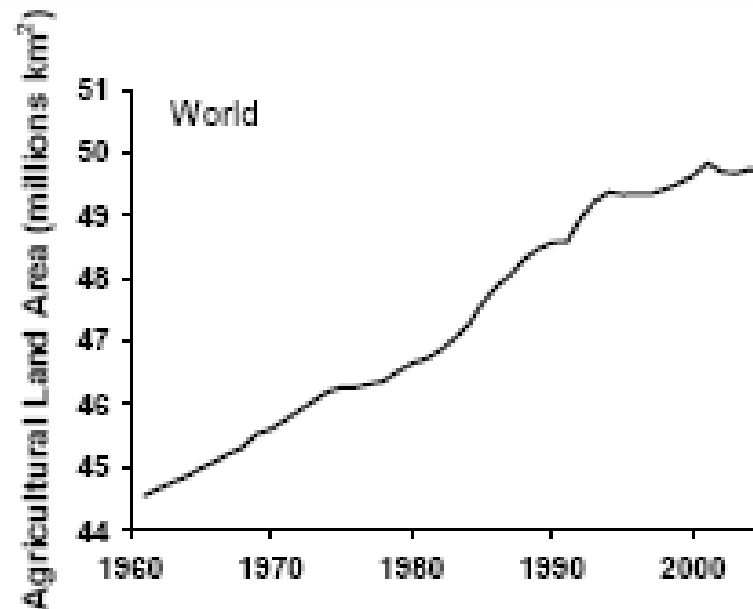
Paragraph 70 -
GHG emissions from land-use change in tropical countries (about 7.6 Gt CO₂ eq) exceed emissions from all other agricultural sources combined and continue to grow as areas of cropland and pasture land increase.



A Climate for Change: opportunities for carbon-efficient farming

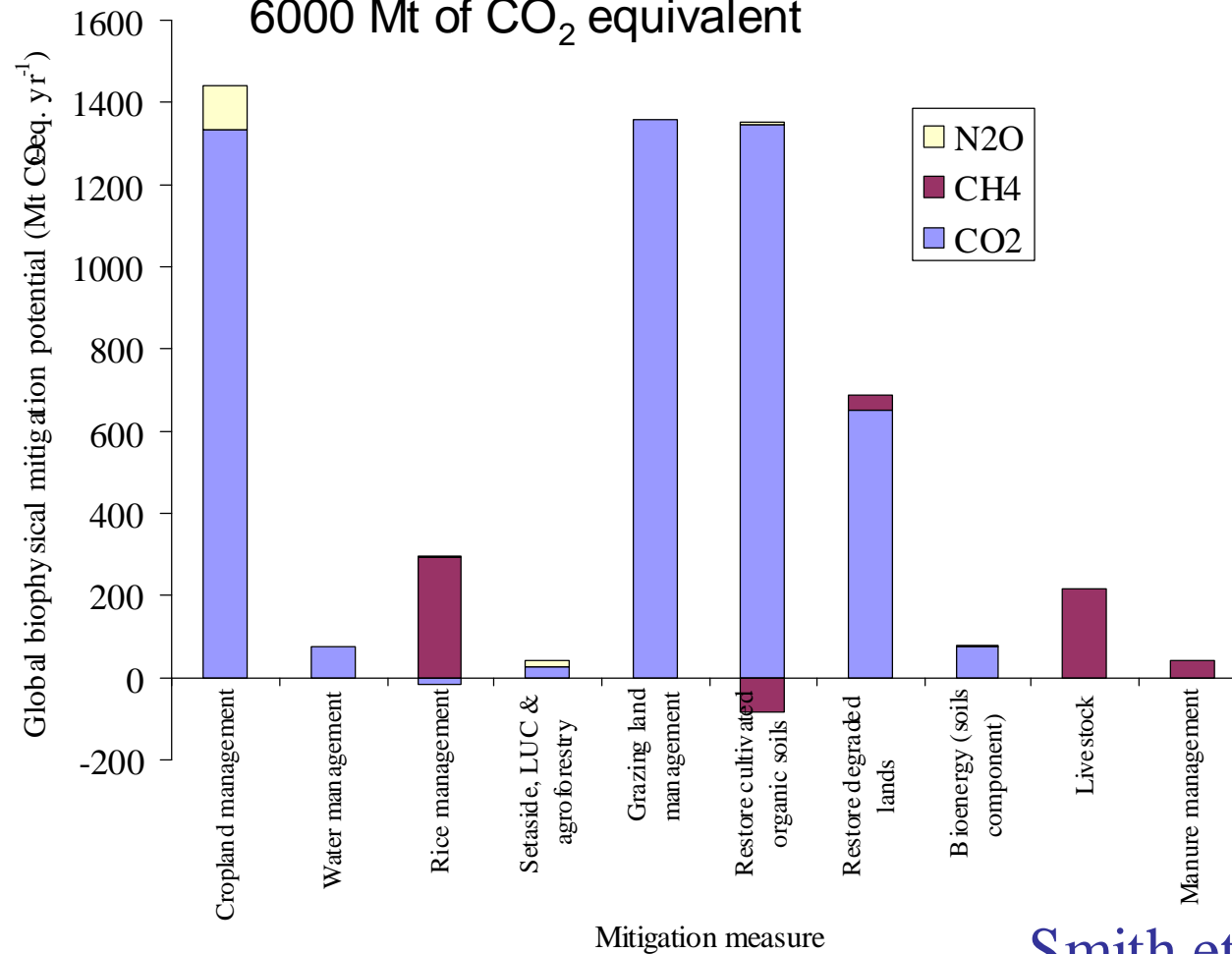


Agricultural land area



Global biophysical mitigation potential in agriculture

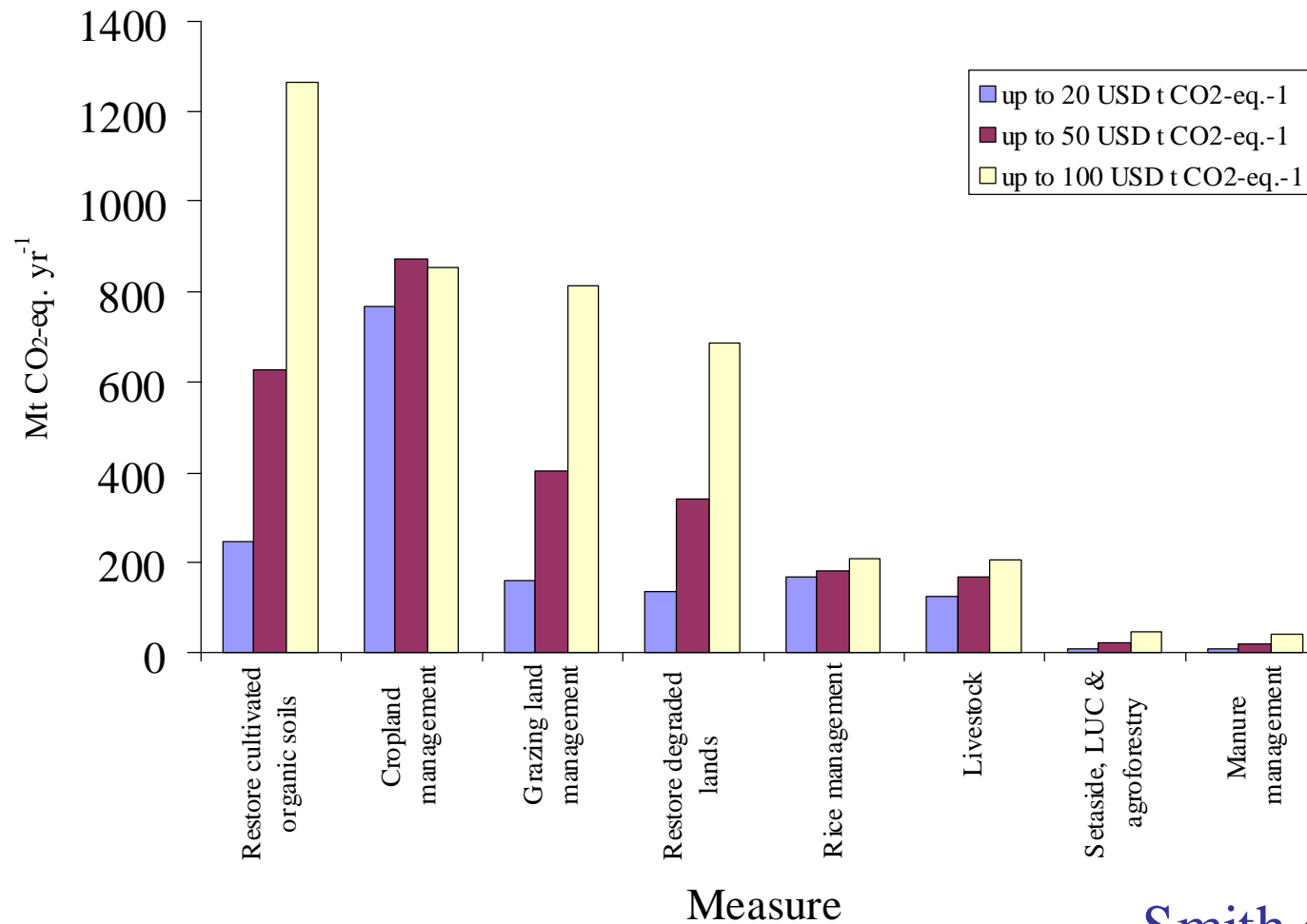
Total biophysical mitigation potential is 5500 – 6000 Mt of CO₂ equivalent



Smith et al. (2007)



Effect of C price on implementation



Smith et al. (2007)

Economic Mitigation Potential

	Economic Potential 2030 (GtCO ₂ -eq/yr)	
Carbon price (US\$/tCO ₂ -eq)	Agriculture	
20	1.6 (0.3-2.4)	
50	2.7 (1.5-3.9)	
100	4.4 (2.3-6.4)	
Emissions 2030	8.2	

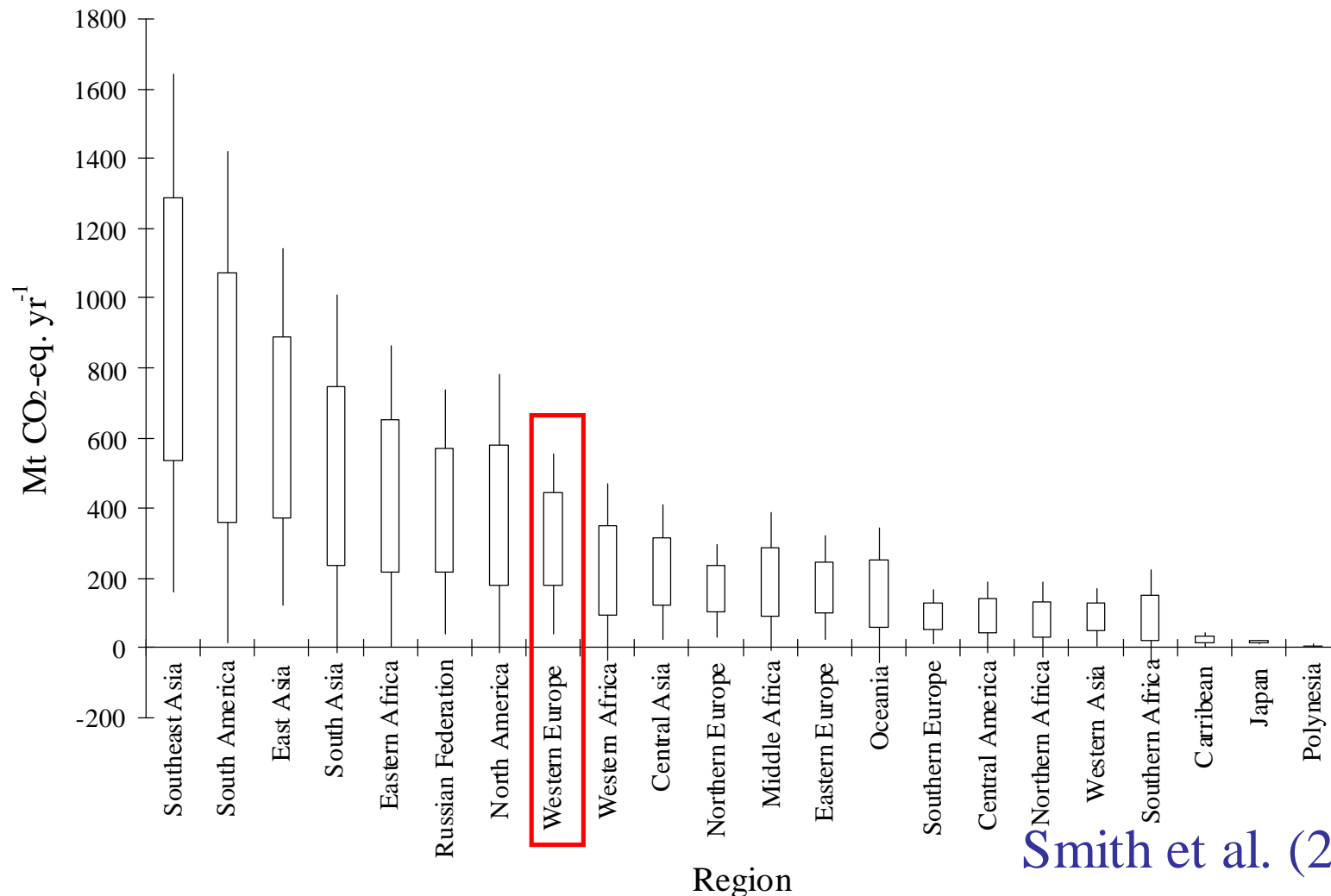
Mitigation practices in Agriculture

Cropland management; Restoration of organic soils; Restoration of degraded lands; Rice management; Grazing land management – **90% of potential is carbon sequestration**

IPCC (2007)



High and low estimates of the mitigation potential in each region



Smith et al. (2007)



Land degradation - % of dry areas degraded

Continent	Total area million km ²	Percentage degraded
Africa	14,326	73
Asia	18,814	71
Australia & Pacific	7,012	54
Europe	1,456	65
North America	5,782	74
South America	4,207	73
Total	51,597	70

FAO (2006)



A Climate for Change: opportunities for carbon-efficient farming



Messages for Ireland

- Mix of GHG is different in Ireland
- Big global mitigation potential in relation to C sequestration but mitigation options around this are limited in Ireland
 - Little degraded land
 - Cropland and pastures generally well managed
- Important to limit need for deforestation for food production
- Ireland is an efficient food producer
- Mitigation possibilities in Ireland around efficiency
- Role of forestry and energy crops
- Ireland part of major global research effort to find new solutions

