Green House Gas Emissions from Agriculture

The story so far

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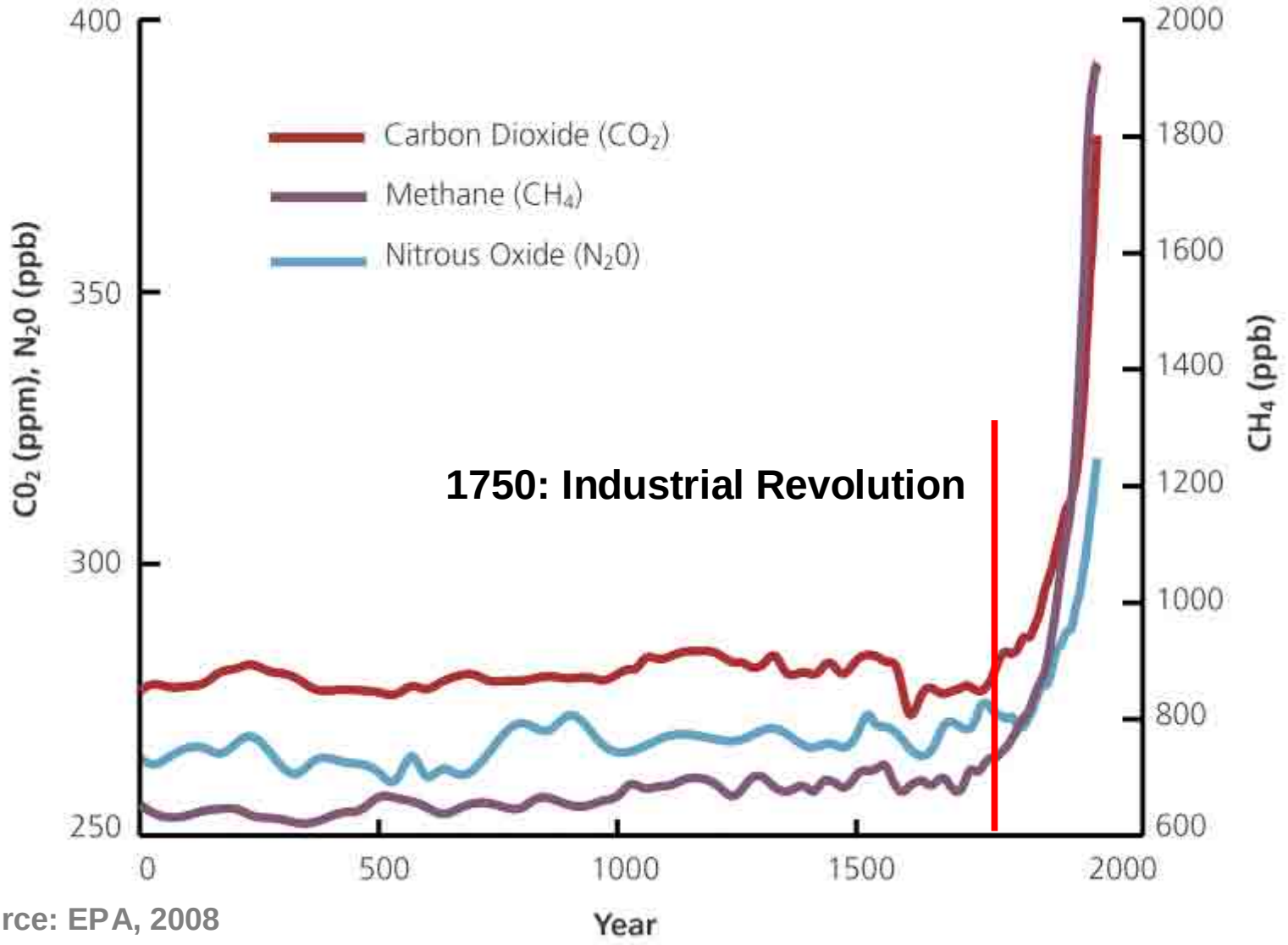
Outline of talk

- Green House Gases (GHG's)
- The challenge
- Key drivers for reducing GHG's
- GHG emissions from agriculture in Ireland
- Mitigation options
- Key issues for agriculture

GHG's linked to Climate Change

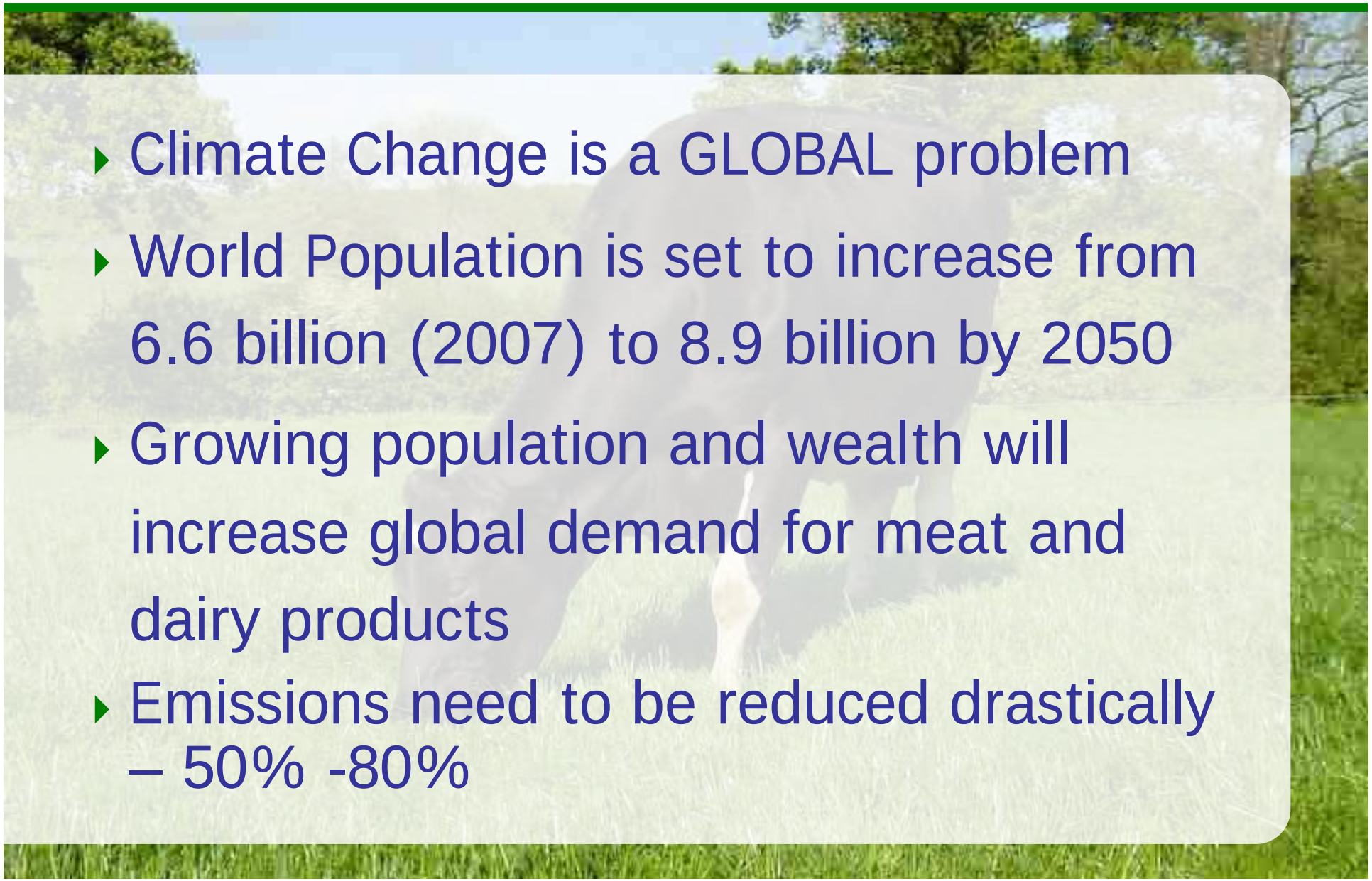


Source: EPA, 2008

Climate Change

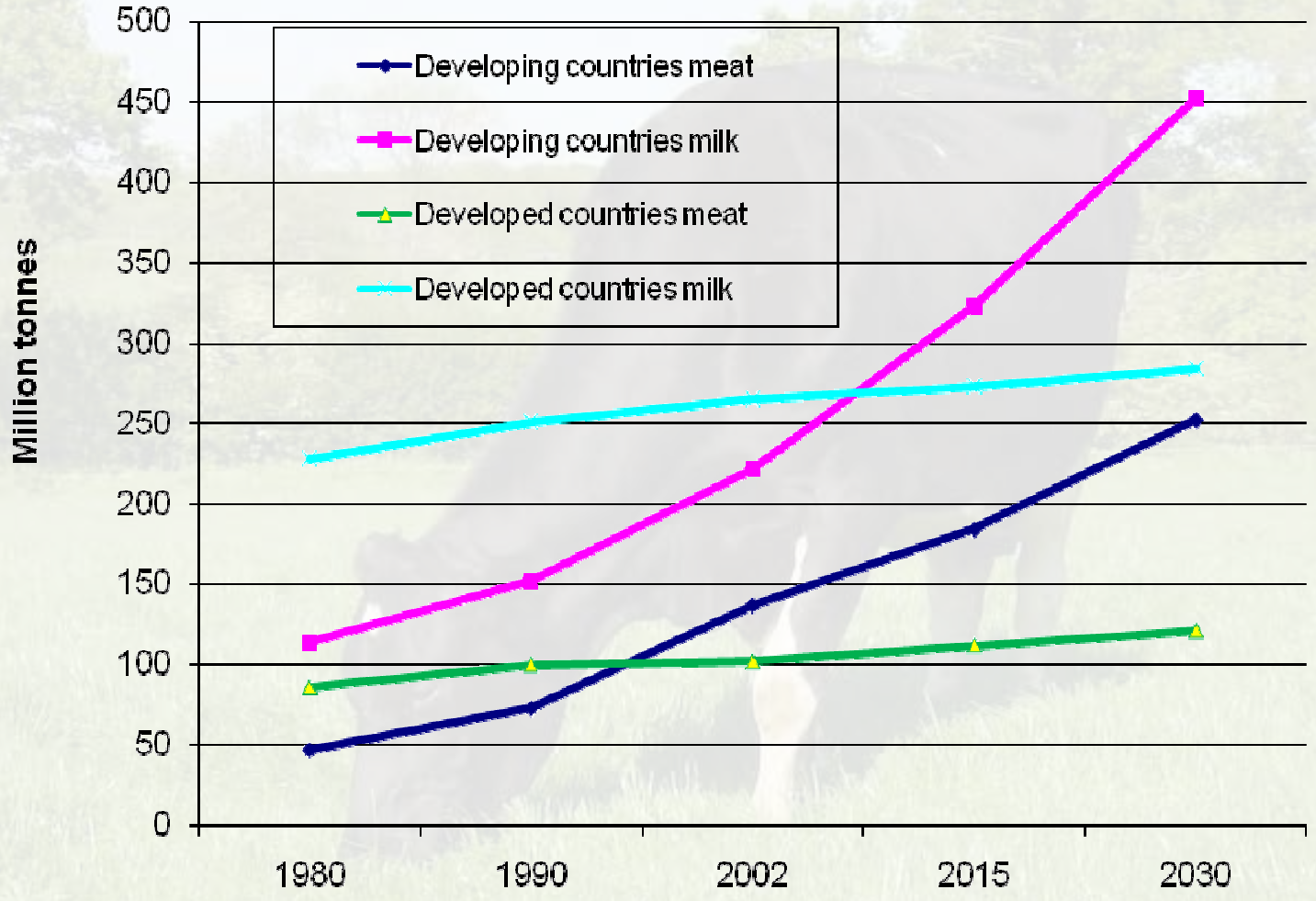
- Recognised as the greatest threat to the planet and the greatest challenge facing humanity.
- UNFCCC objective is to stabilise atmospheric GHG concentrations at a level that would avoid dangerous human interference with the climate system.

The Challenge



- Climate Change is a GLOBAL problem
- World Population is set to increase from 6.6 billion (2007) to 8.9 billion by 2050
- Growing population and wealth will increase global demand for meat and dairy products
- Emissions need to be reduced drastically – 50% -80%

Projected global demand – milk & meat



Source: FAO, 2006

Key Drivers in reducing Emissions

- Kyoto Protocol: Limits the production of anthropogenic (manmade) GHG's
- Gothenburg Protocol: Limits the production of transboundary and acidifying gases
- 8% reduction for EU as a whole (Decision 2002/358/EC)
- 20% reduction for Ireland by 2020
- Consumer

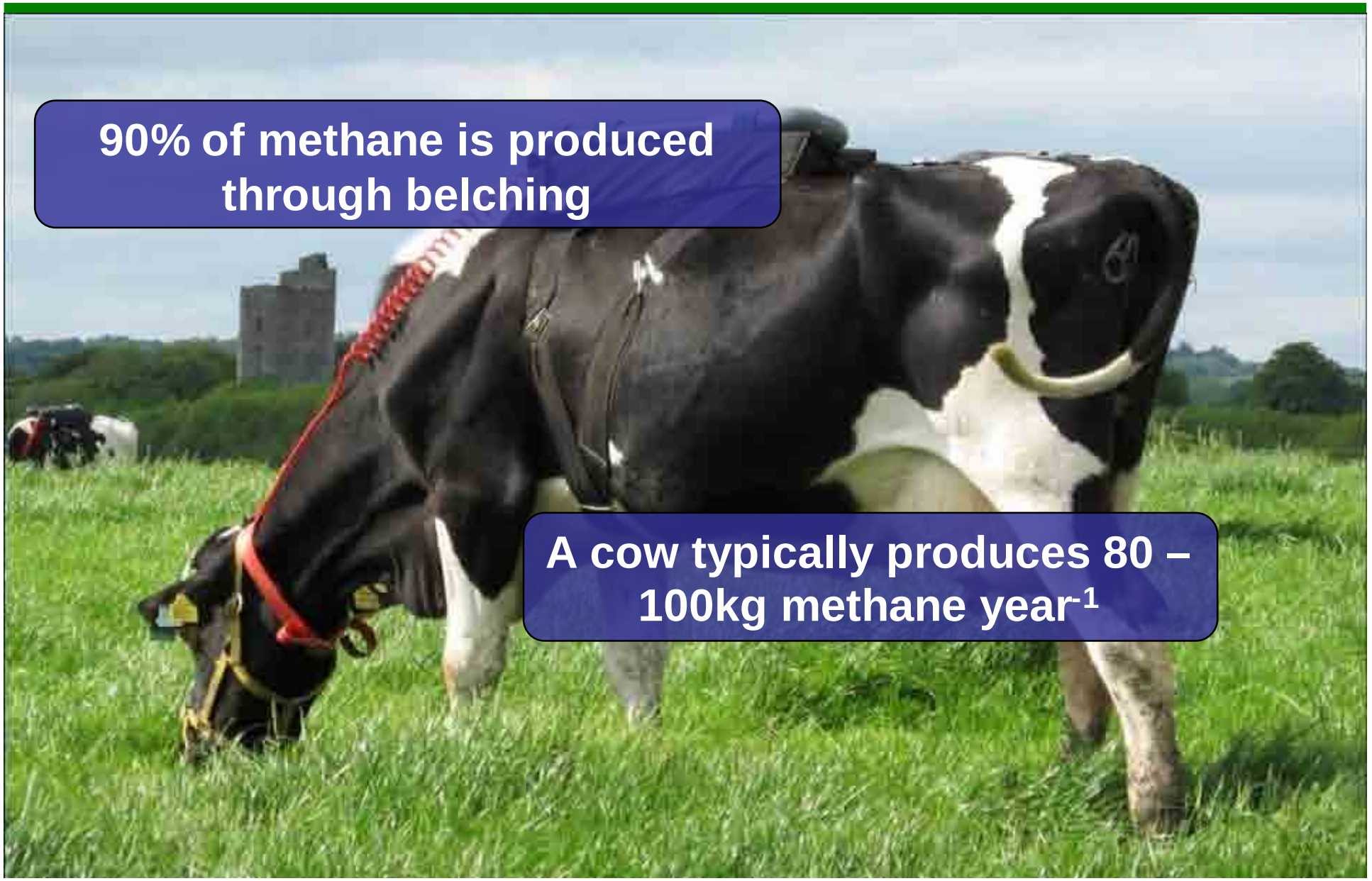
GHG Emissions – The Basics

- CO_2 equivalents
  - Agreed metric for Global Warming Potential

Primary GHG's in agriculture

- Methane (CH_4) ≈ CO_2 x 21
  - Enteric Fermentation, Manure Management
- Nitrous Oxide (N_2O) ≈ CO_2 x 310
  - Agricultural Soils

Methane Emissions from Cows



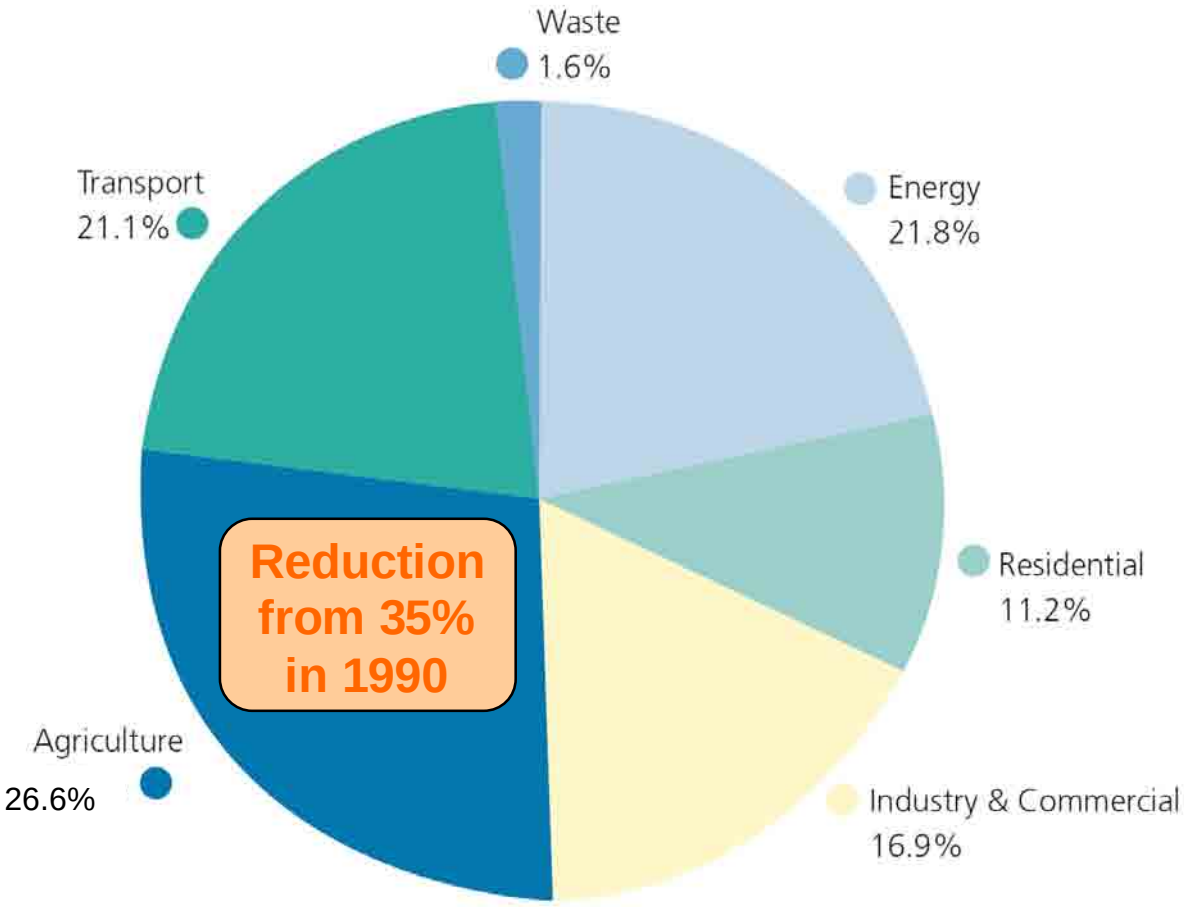
ETS vs non-ETS

- ETS - Emissions Trading Scheme
  - Managed at EU level
- Non-ETS
  - Agriculture, Residential, Transport
  - Managed at national level
- Agriculture ≈ 40% of non-ETS in Ireland

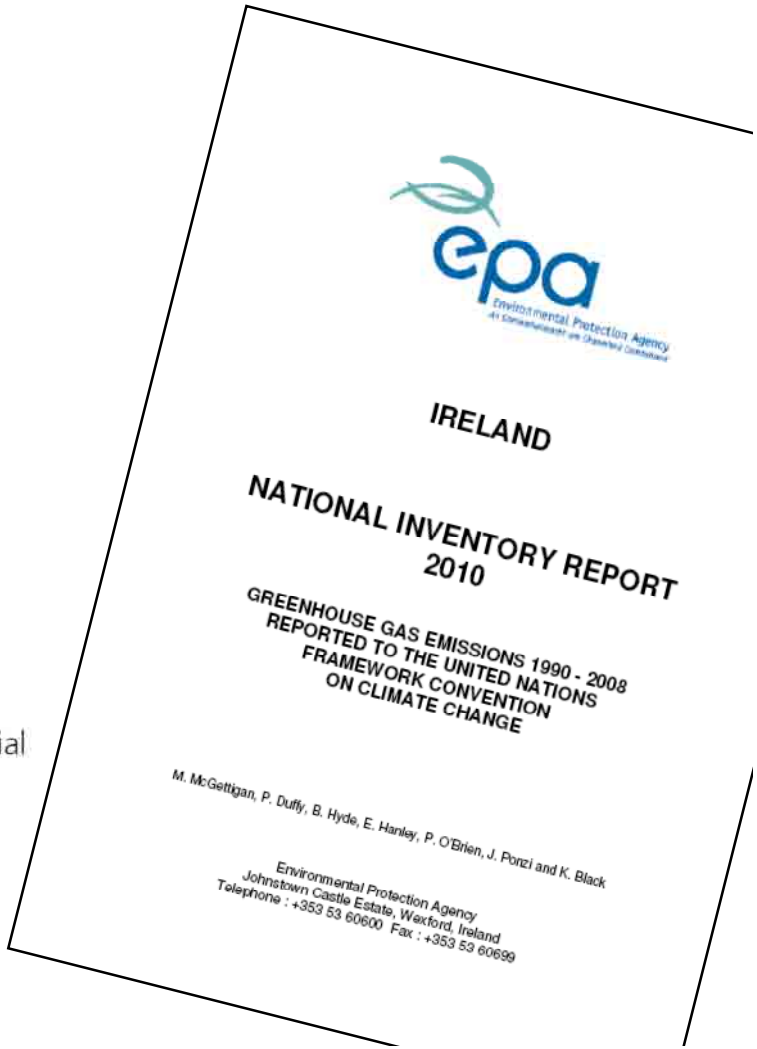
Carbon Leakage

- Agricultural production moves to less carbon efficient countries that are outside of binding agreements
- Replaced with production in countries with higher GHG emissions per unit product

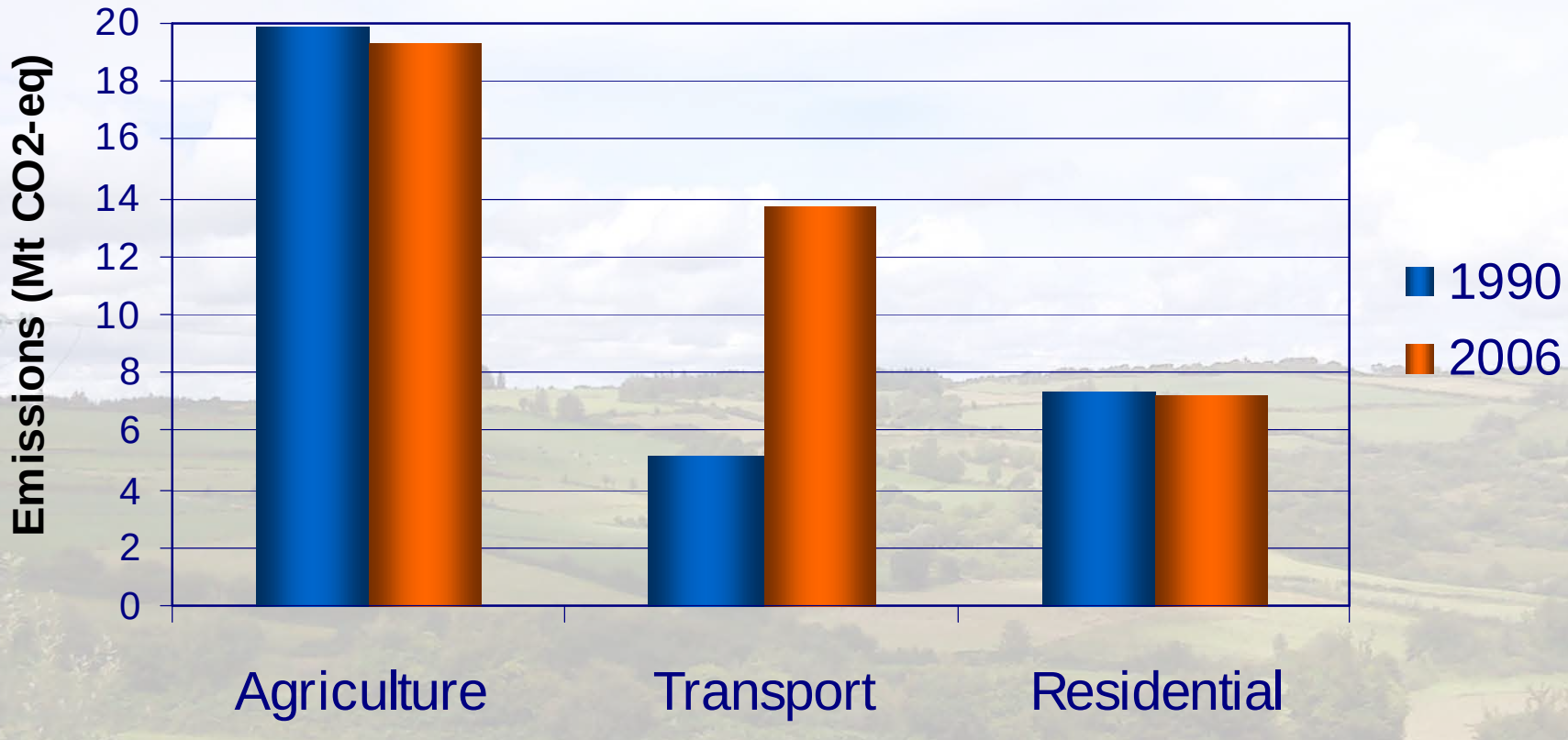
Total Emissions by Sector



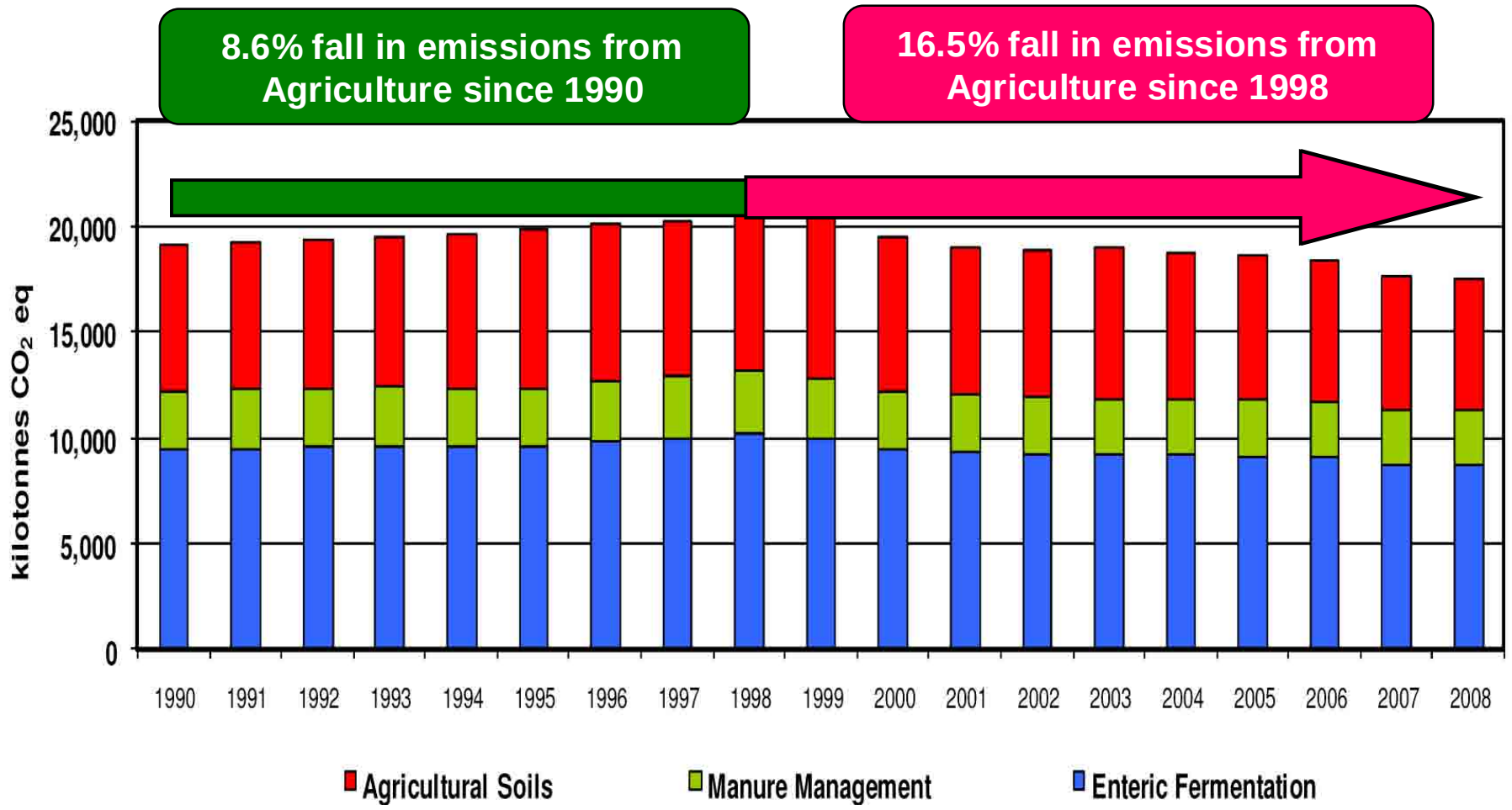
Source: EPA, 2010



Non-ETS – 1990 vs 2006

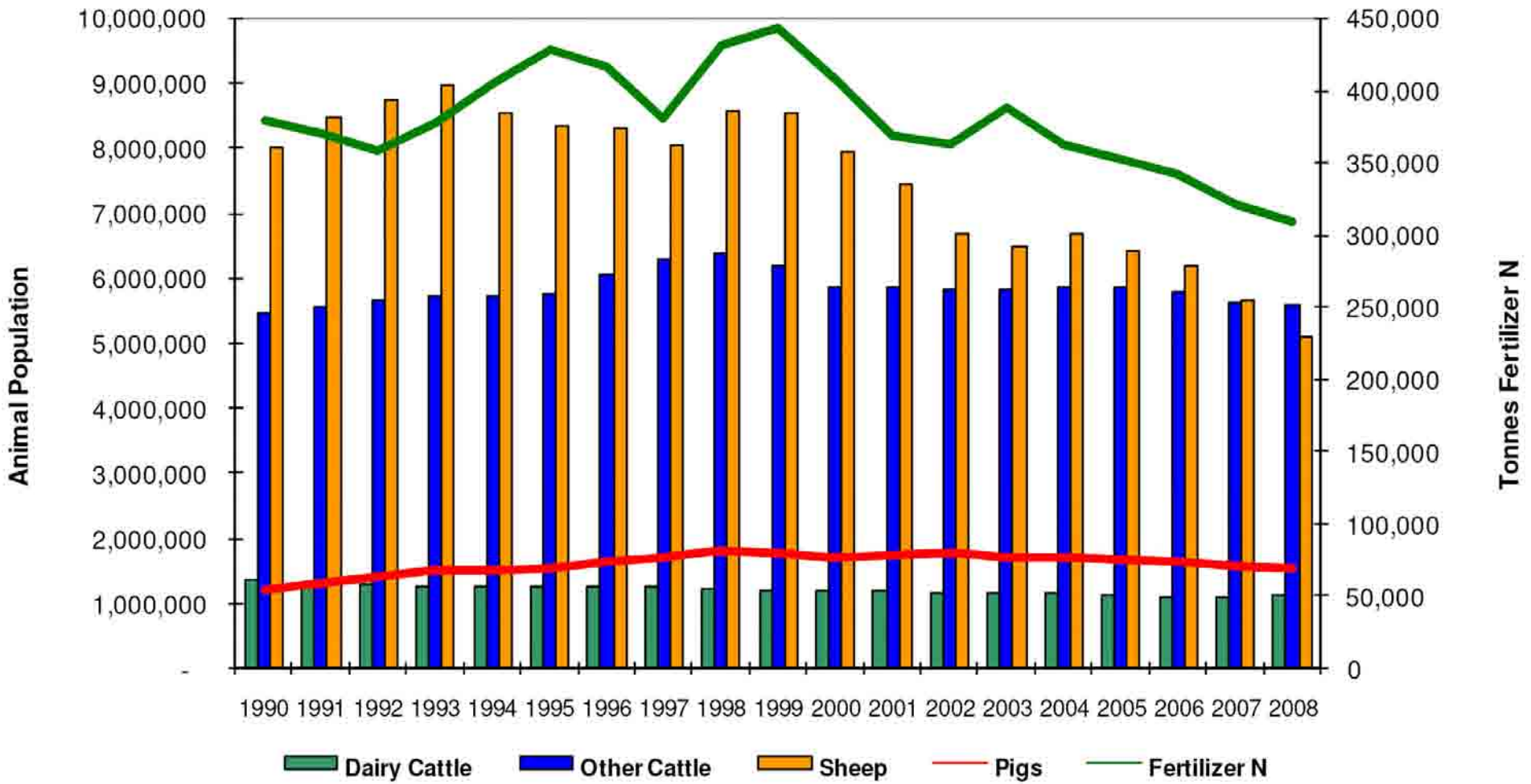


Trends in Agricultural Emissions

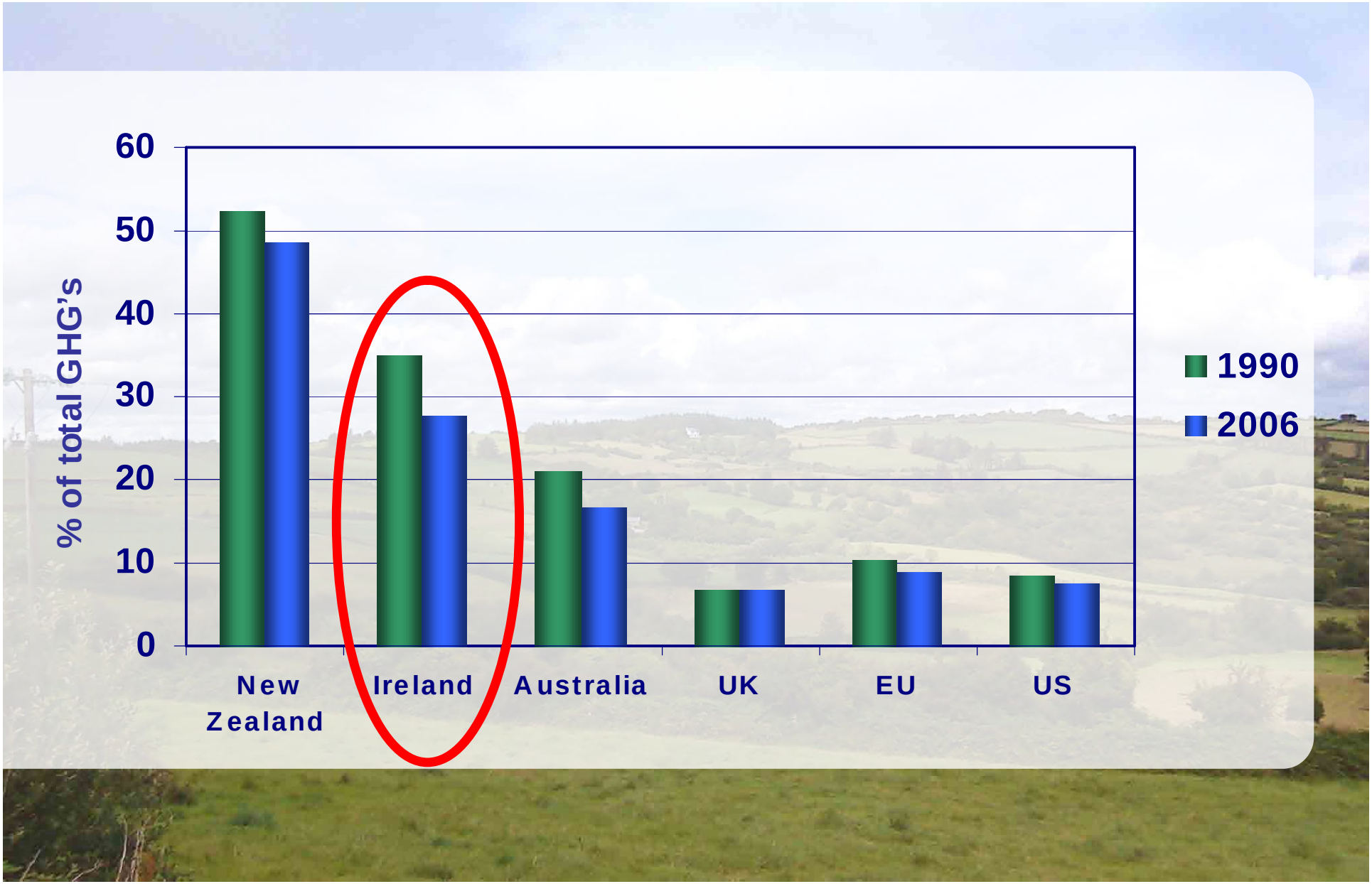


Source: EPA, 2010

Principle Drivers for reduction



Agricultural GHG's by Country



Mitigation options

Three main categories:

- Strategies for reducing enteric CH_4 production
- Mitigation of N_2O production from agricultural soils
- Carbon sequestration via land management or land-use change.

Reducing Enteric Fermentation

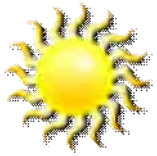
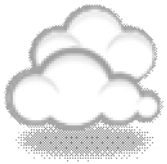
- Increasing genetic merit
- Extending the grazing season
- Reducing finishing times
- Replacing roughage with concentrates
- Improving pasture quality
- Supplementing diets with oils

Reducing Nitrous Oxide Emissions

- Diet manipulation
- Nitrification inhibitors
- Increasing clover in swards
- Altering timing of fertilizer application
- Altering fertiliser spreading techniques

Key focus of Knowledge Transfer programmes

Knowledge Transfer

Optimal application timing & weather = Low Cost		Splashplate 	Trailing Shoe/ Bandspreader 
Summer (sunshine)		3 units N / 1000 gallons	6 units N / 1000 gallons
Spring (overcast)		9 units N / 1000 gallons	12 units N / 1000 gallons

Key Questions

- Does least cost approach = best approach?
- Will local approaches address a global problem?
- What are the moral implications of Climate Change policies?
- Do current methodologies for calculating carbon footprints reflect true impact?
- What role for forestry and renewable energy crops?

Key Messages

- Clear relationship between practices that increase farming efficiency and reducing emissions
- Standardization of measurement globally
- Research and advice are critical component of achieving targets
- Teagasc is committed to working collaboratively with others

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That's the story so far

Teagasc
Agriculture and Food Development Authority

Thank you