

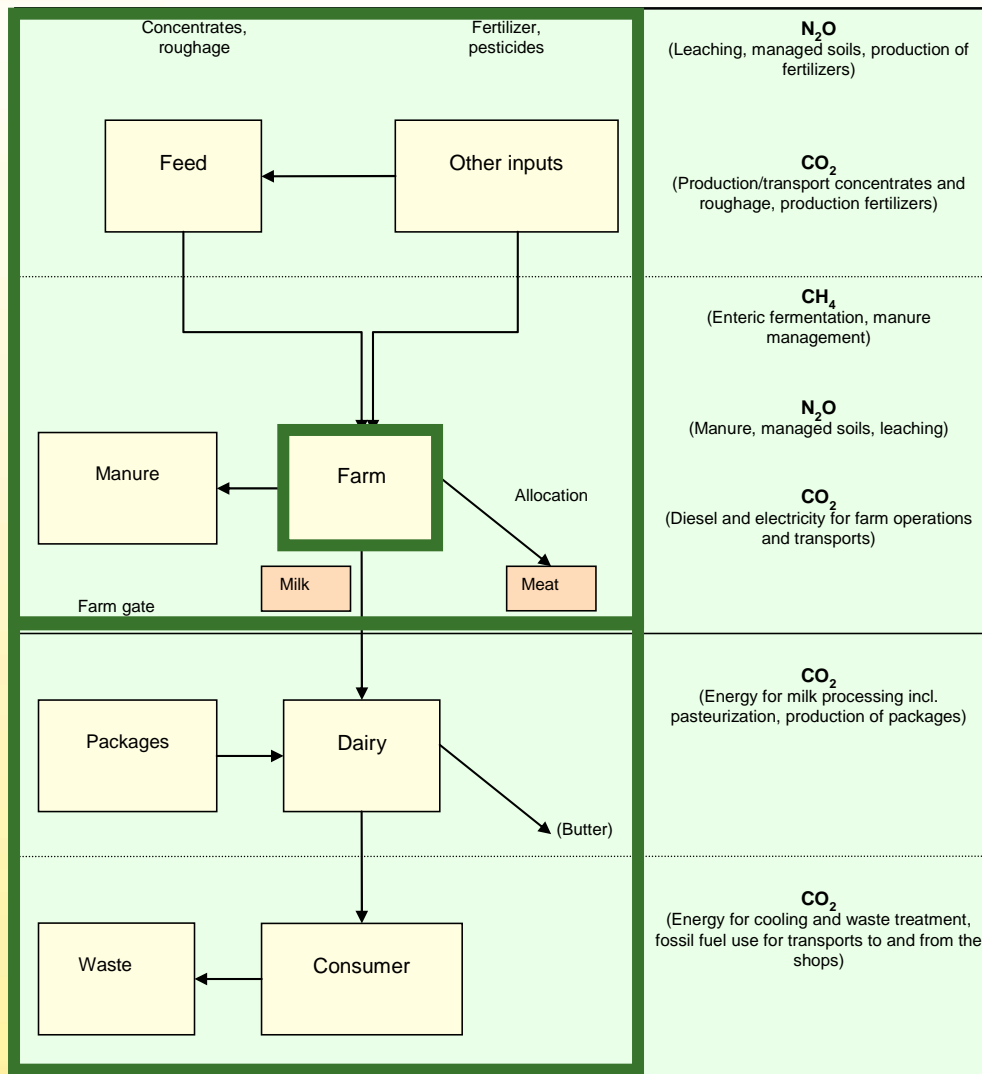


A SUSTAINABLE DAIRY SECTOR

Facts and figures on greenhouse gas emissions



The cycle of dairy



> ON-FARM

- Annex I : reporting data UNFCCC
- Global : EDGAR international data base

> CRADLE-TO-FARM-GATE

- Annex I : reporting data UNFCCC
- Global : EDGAR international data base

> CRADLE-TO-GRAVE

- Existing life cycle studies including post-farm processing and consumer

> ADDITIONAL : FAO (2006), IMPRO DAIRY & MEAT (2008)



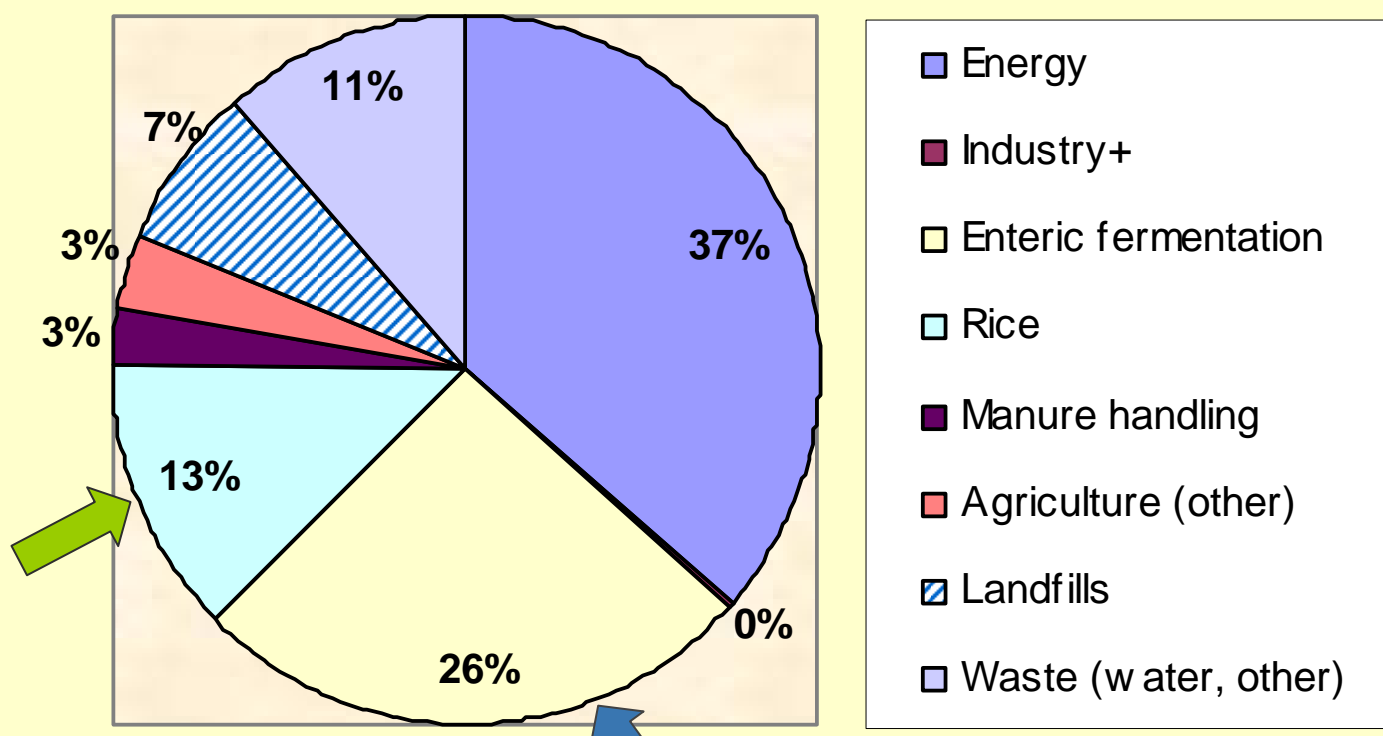
Which greenhouse gases?

- > CO₂, METHANE (CH₄) AND NITROUS OXIDE (N₂O)
- > IN AGRICULTURAL SECTORS, METHANE AND NITROUS OXIDE ARE VERY IMPORTANT CONTRIBUTORS
- > N₂O FROM MANURE HANDLING AND FERTILIZER USE FOR CROPS
- > ANIMAL HUSBANDRY : METHANE FROM ENTERIC FERMENTATION, DAIRY CATTLE HAVE HIGH EMISSIONS PER ANIMAL)

Sources of methane emissions

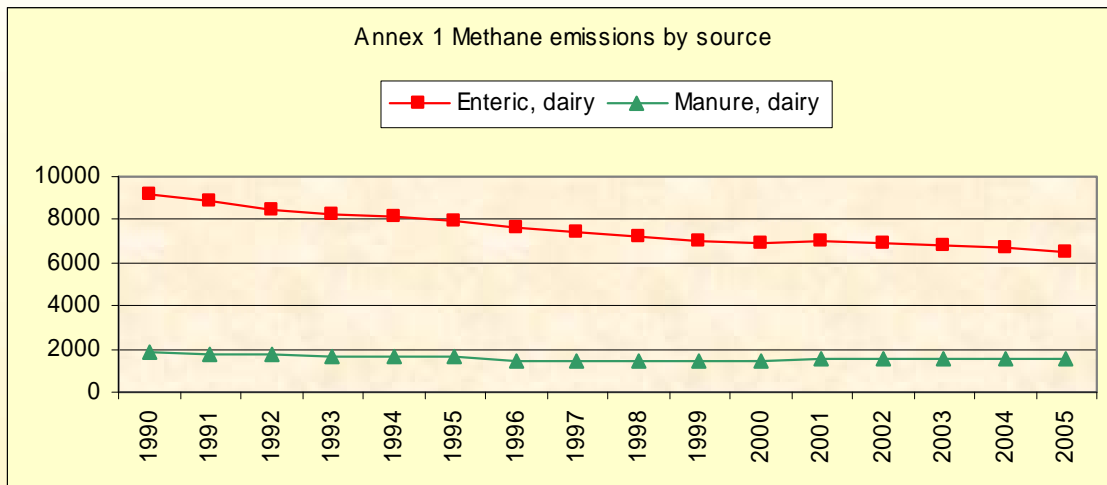


Global CH4 emissions by source (anthropogenic)



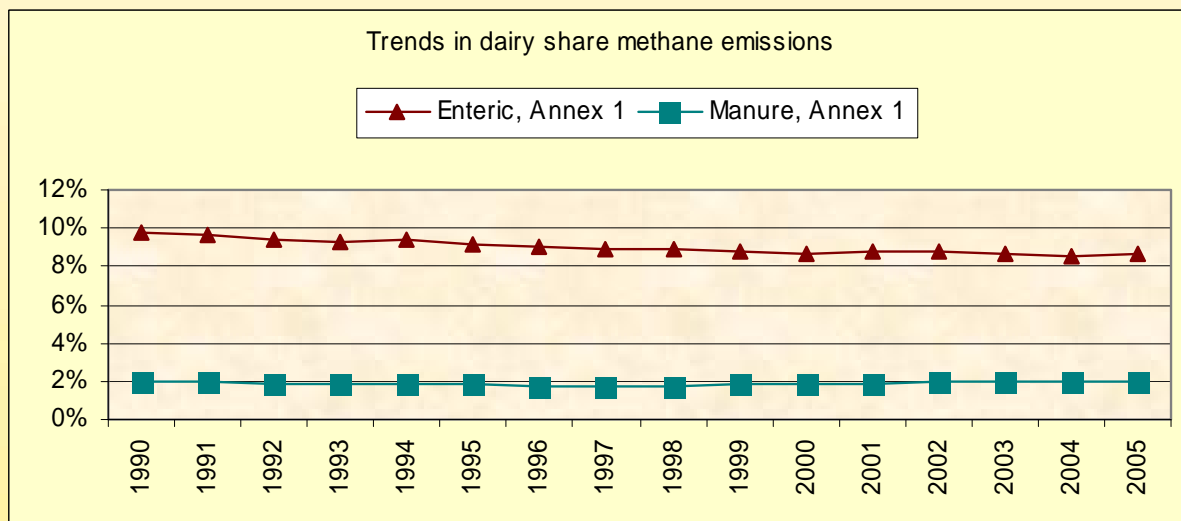
Dairy 5%, other 21 %

On-farm emissions of methane decreased in Annex I...

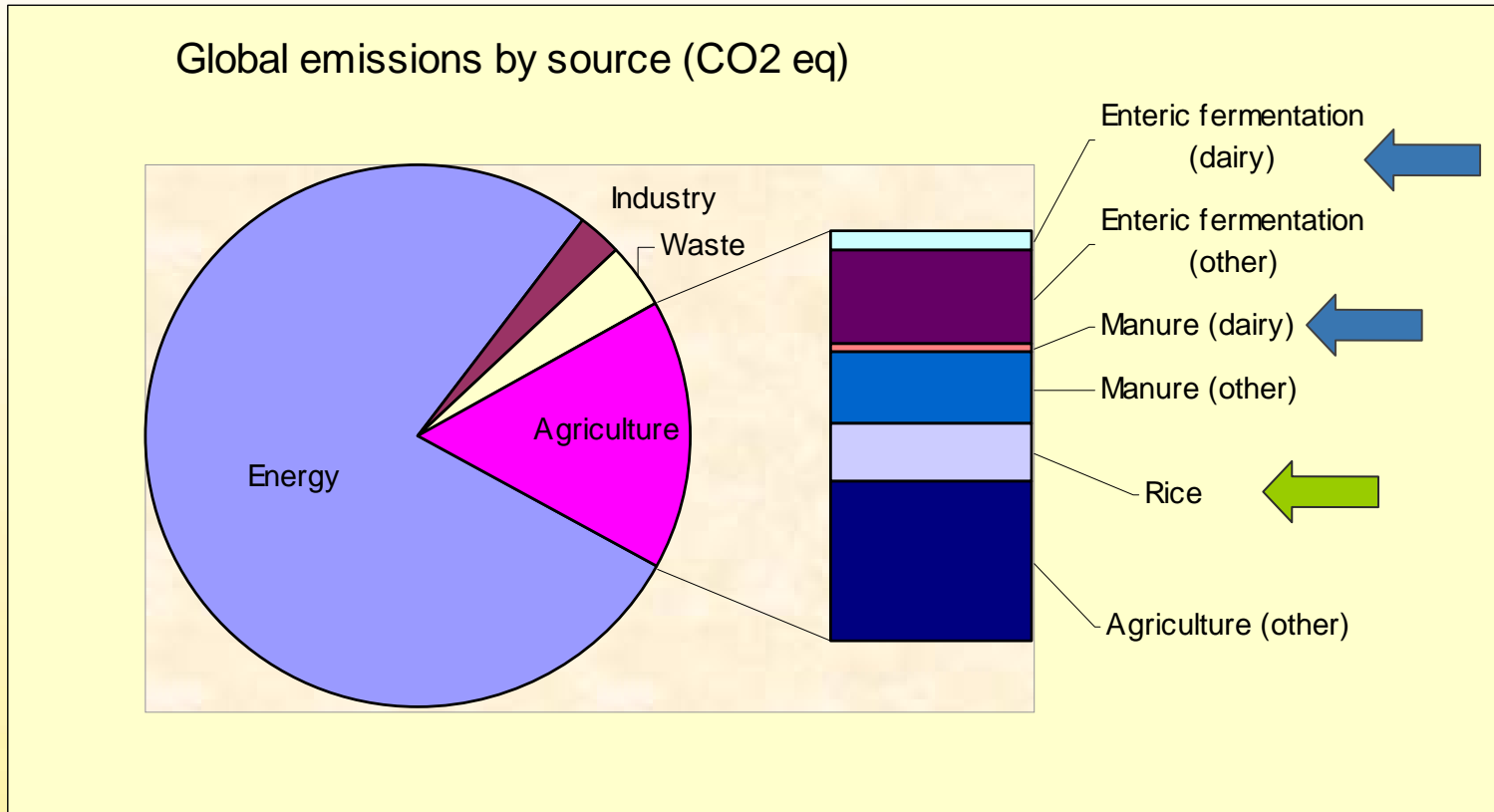


-30%

-20%



Dairy livestock emissions contribute 1.2% to total global GHG emissions



Cradle-to-farm-gate emissions contribute 3% to total global GHG

Combination of life-cycle studies and global data : enteric fermentation is 28% of life cycle and 0.8% of global GHG

Derived from FAO report “Livestock’s long shadow” : dairy contributes 16% of all livestock, livestock contributes 18% of global total

3%



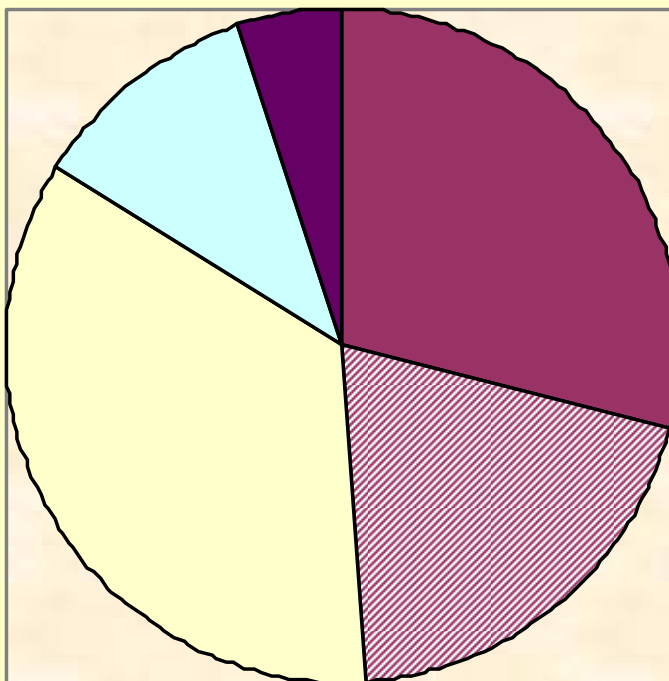
Contribution full life cycle: ~3.5%



- > EXTRA ~10% FOR FACTORY, TRANSPORTS, PACKAGING
- > ENERGY USE CONSUMER FOR COOLED STORAGE ADDS
~3.5%-4% (IMPRO STUDY)
- > FROM FUNCTIONAL PERSPECTIVE : ~10% PRODUCT LOSS

Life cycle : enteric fermentation is the main source of climate impact

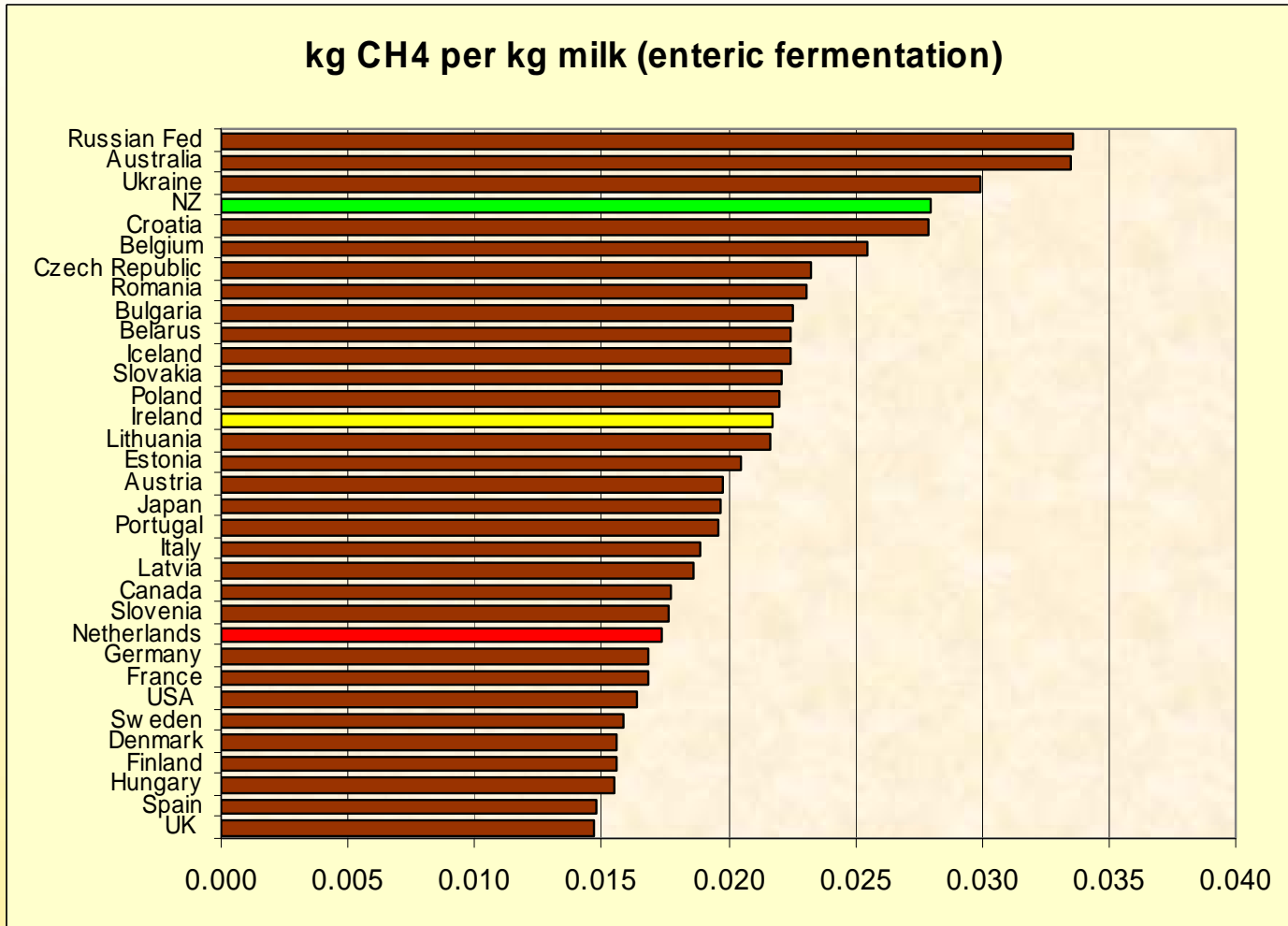
Contributions to the cradle-to-farm life cycle (Casey & Holden 2005)



- enteric fermentation dairy cow s
- ▨ enteric fermentation other cattle
- feed production incl fertilizer
- manure handling
- diesel

..but emissions and yield may be coupled...

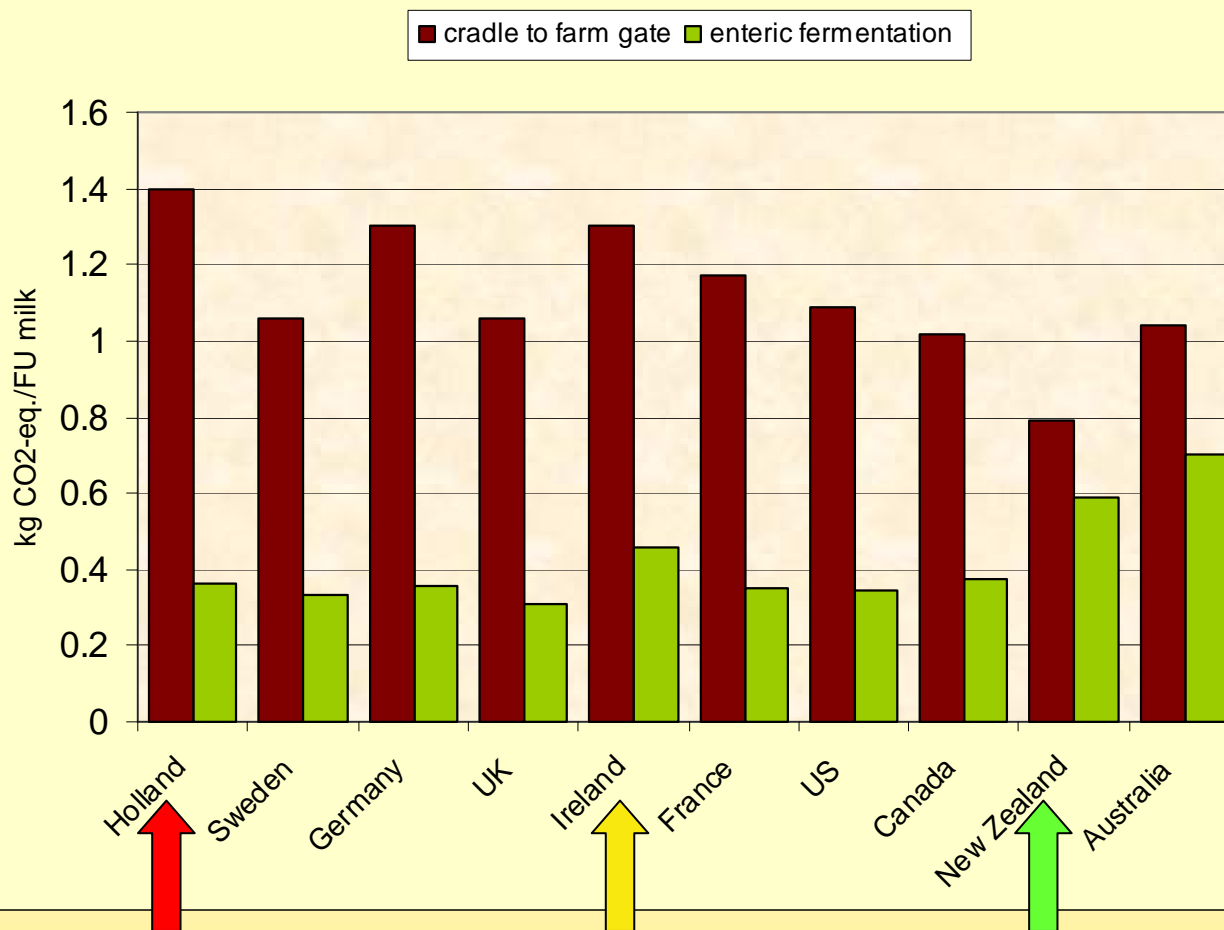
kg CH₄ per kg milk (enteric fermentation)





..and reduction may lead to trade-off

Greenhouse-gas emissions per liter of milk



Reduction enteric fermentation ?

- > YIELD MAXIMIZATION NOT NECESSARILY BE EFFECTIVE FROM LIFE CYCLE PERSPECTIVE
- > OPTIONS OF CHANGING DIET BY INCLUDING INGREDIENTS THAT LEAD TO LOWER EMISSIONS
- > DIFFERENT BREEDS OF CATTLE
- > LOWER REPLACEMENT RATE OF DAIRY COWS, WHICH LEADS TO LOWER CONTRIBUTION FROM YOUNG ANIMALS

- > DAIRY LIVESTOCK EMISSIONS CONTRIBUTE 1.2% TO TOTAL GLOBAL GHG EMISSIONS
- > CRADLE-TO-FARM-GATE EMISSIONS CONTRIBUTE 3% TO TOTAL GLOBAL GHG
- > POST-FARM EMISSIONS ADD 10% TO 20% TO LIFE CYCLE; CONSUMER IS IMPORTANT FACTOR
- > ON-FARM EMISSIONS OF METHANE DECREASED IN ANNEX I, BUT SHARE REMAINS STABLE
- > ENTERIC FERMENTATION IS THE MAIN SOURCE OF CLIMATE IMPACT, REDUCTION MAY LEAD TO TRADE-OFFS : LIFE-CYCLE PERSPECTIVE IS ESSENTIAL