

Carbon footprint

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Carbon footprint

- Content
 - General background and some developments since 2009 (GDF China)
 - Climate change related to dairy (FAO-report 2010)
 - GHG emissions of GDF – farms and mitigation strategies

Carbon footprint: climate change?

- Climate change or climate gate?
 (concentrations green house gasses ppm, ppb, ppb and global warming potential)

	Pre industrial	Current	GWP
CO ₂	277	382	1
CH ₄	600	1728	23
N ₂ O	280	318	296

Carbon footprint: climate change?

- Climate change or climate gate?

Period	Rate
Year	°C per decade
25	0.177±0.052
50	0.128±0.026
100	0.074±0.018
150	0.045±0.012

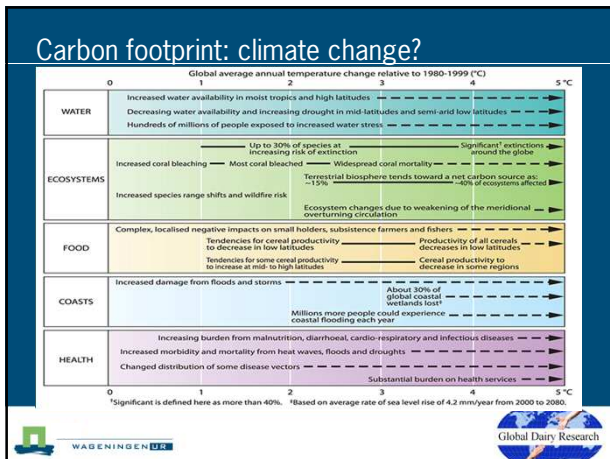
Carbon footprint: climate change?

- Climate change or climate gate?

Carbon footprint: climate change?

Positive proof of global warming.

18th Century 1900 1950 1970 1980 1990



Carbon footprint: climate change?

- Climate policy is not just about emissions
 - Pressure on water supplies (quality and quantity)
 - Pressure on food availability
 - Pressure on energy
 - Pressure on diseases
 - Risks for disasters
 - Risks for ecosystem degradation
 - Mass migrations

Carbon footprint: climate change?

- Should the focus be on mitigation or on adaption?
 - The necessity of adaptation arises because of the failure to mitigate
 - So both strategies will have to be implemented within the context of other sustainability issues.

Carbon footprint and agriculture

- Is climate change relevant for dairy farmers and the dairy industry?
 - Climate gate and failure of Copenhagen has supported the skeptics.
 - A new carbon economy is in development
 - Agriculture will be at the center of the adaptation economy.
 - Role of business, government and civil society is changing

Carbon footprint and agriculture

- Role government, industry and civil society is changing

Year	Government	Civil Society	Business
1960s	Solution	Monitor	Problem
1990s	Catalyst	Solution	Problem
2000s	Partner	Partner	Partner
Future	Problem	Catalyst	Solution

Carbon footprint and agriculture

- Developments in food industry show climate change is high on the agenda.
- Example of changing roles: SAI-platform

Active Members: Nestlé, Unilever, Mars, CIO, Coca-Cola, Danone, etc.

Affiliate Members: CIAA, etc.



Carbon footprint and agriculture

- SAI platform working group dairy:
 - FrieslandCampina, Cayuga Marketing, Fonterra, General Mills, Groupe Danone, Kraft, McDonald's, Nestlé and Unilever
 - Working on two major issues:
 - Climate Change / Green House Gas emissions: development of cool farm tool
 - Indicators of Sustainable Dairy Production.



Climate change and livestock


- FAO report livestock's long shadow (2006)
 - Big impact of livestock and especially dairy and beef on climate change
 - 2010 update on livestock's report with focus on dairy.

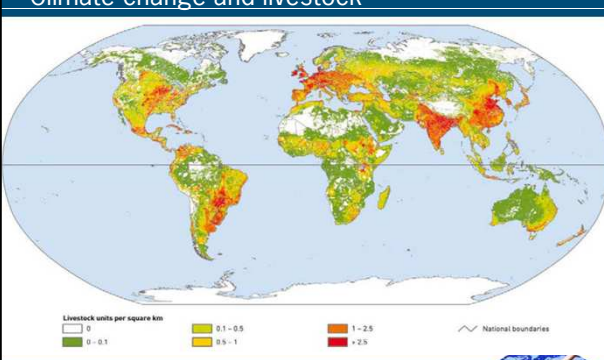

Climate change and livestock

- Livestock related GHG emissions:
 - extensive systems main contributor

	Livestock related emission (10 ⁹ ton CO ₂ eq.)	Percentage of total emission	Main contribution
CO ₂	2.70	9	Deforestation
CH ₄	2.20	35-40	Enteric fermentation
N ₂ O	2.20	65	Manure




Climate change and livestock

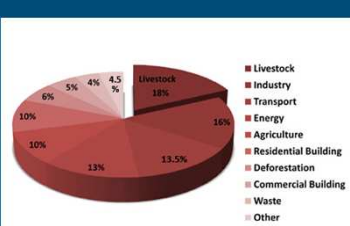

Climate change and livestock

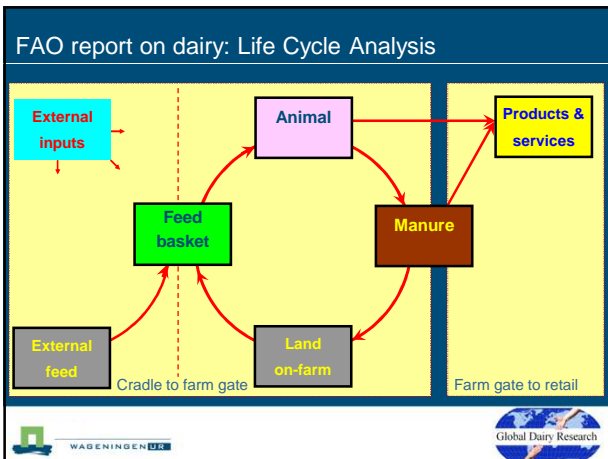
- Sources for emissions of GHG related to livestock
 - Fossil fuel (fertilizer, on farm, transport)
 - Methane (from manure\fermentation)
 - Land use change
 - Land degradation
 - N₂O from manure



Climate change and livestock

- Livestock major contributor to GHG emissions
 - 2010 FAO report on dairy
 - LCA

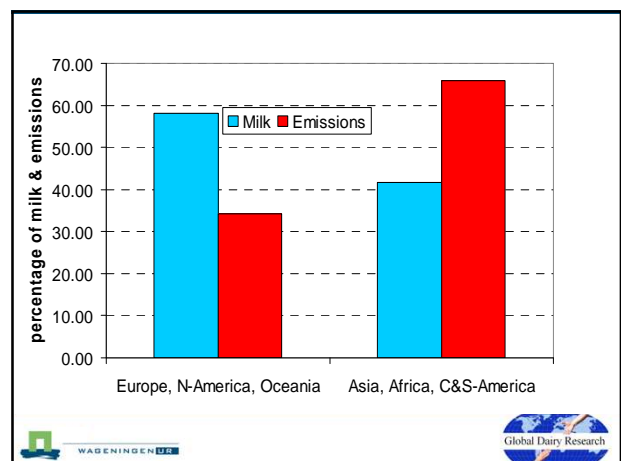
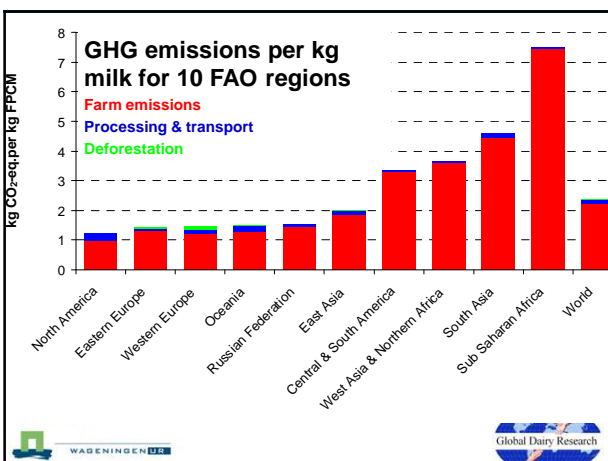
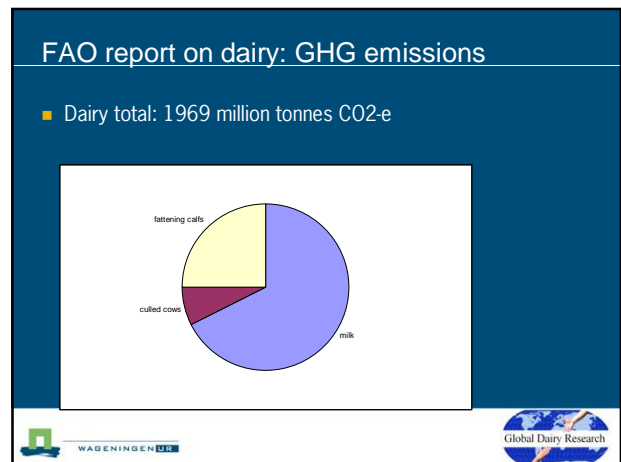





FAO report on dairy: system borders

- Cradle to retail
- Not incorporated:
 - buildings and equipment (b&e);
 - infrastructure and services (i&s);
 - Carbon stocks of land use & land use change except for soy.


- ### FAO report on dairy: GHG sources
- Producing grass and feed
 - Production of fertilizer
 - Application of manure and fertilizer
 - Direct use of energy
 - Processing crops in e.g. concentrates
 - Land use change: deforestation → soy bean
 - Enteric fermentation
 - Manure storage
 - Farm gate to retail
 - Transport milk and animals
 - Processing raw milk
 - Production of packaging
 - Refrigeration
 - Transport to retail



FAO report dairy: contribution of the dairy sector to global GHG anthropogenic emissions


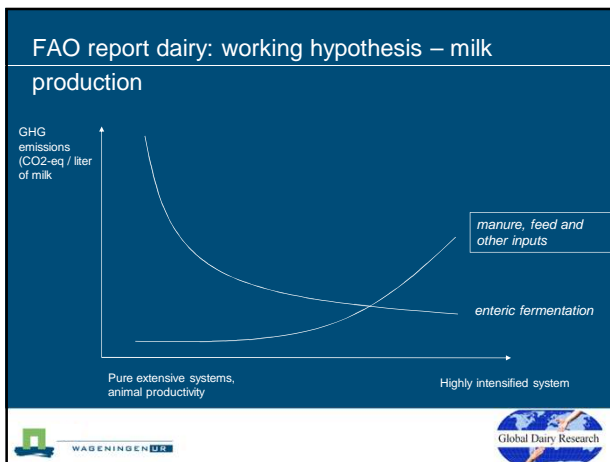
	Mton	%
■ Milk, including processing	1 328	2.7
■ Meat from culled cattle	151	0.3
■ Meat from surplus young stock	490	1.0
■ Total	1969	4.0

■ Average emission milk: 2.4 kg CO₂-eq/kg milk




FAO report dairy: effects of intensity on emissions of milk and meat

Country	Milk yield (kg/yr)	Digestibility of feed (%)	Dairy herd		Beef herd
			Emissions related to milk (kg CO ₂ eq./kg)	Emissions to meat (kg CO ₂ eq./kg)	Emissions to meat (kg CO ₂ eq./kg)
The Netherlands	7,400	75	1.48	9.68	36.9
India	1,000	49	5.34	30.44	103.22
India – urban dairy	2,500	55	2.36	14.46	n.a.
Brazil	1,200	60	4.48	24.28	86.54


FAO report dairy: compared performances of dairy and beef herds

Country	Emissions to proteins (kg CO ₂ eq./kg protein)		Biological efficiency (kg of protein per /kg live weight)	
	Dairy herd	Beef herd	Dairy herd	Beef herd
The Netherlands	46	176	0.32	0.04
India	160	543	0.07	0.02
Brazil	128	455	0.06	0.02




FAO report dairy: lower replacement rate as a mitigation option?

		RR= 33% (3 lactations)	RR= 12.5% (8 lactations)
Meat, carcass weights	t/year	280,428	206,081
Milk	t/year	10,585,000	10,585,000
Emission per kg animal protein	kg CO ₂ eq/kg protein	45.70	42.25
Emission per kg milk	kg CO ₂ eq/kg milk	1.55	1.44
Emission per kg meat	kg CO ₂ eq/kg meat	8.68	8.02



FAO report on dairy: lower replacement rate as a mitigation option?

		RR= 33% (3 lactations)	RR= 12.5% (8 lactations)	RR= 12.5% (8 lactations) + Beef production
Meat, carcass weights	t/year	280,428	206,081	280,428
Milk	t/year	10,585,000	10,585,000	10,585,000
Emission per kg animal protein	kg CO ₂ eq/kg protein	45.70	42.25	47.52
Emission per kg milk	kg CO ₂ eq/kg milk	1.55	1.44	1.44
Emission per kg meat	kg CO ₂ eq/kg meat	8.68	8.02	15.66



FAO-report: conclusions

- Milk & the related meat contributes 4 % to anthropogenic GHG emissions
- Protein from meat and milk is more efficient than from meat alone
 - emissions from young fattened stock are similar
 - most difference come from cows and replacement females
- Emissions from milk and beef production need to be addressed in an integrated approach
- Feed digestibility and milk yield are key factors influencing emission level
- System improvement needs systems analysis, no allocation



End

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