

Mitigation strategies for livestock in a global perspective

The Bertebos Conference, Falkenberg, Sweden

Theun Vellinga, September 10, 2012





LIVESTOCK RESEARCH
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The FAO project “GHG emissions from animal food chains”

- Follow up of “Livestock’s Long Shadow”
- Specific policy and technology mitigation options
 - ↳ identify “low hanging fruit”
- Scientific underpinning to post-Kyoto negotiations

- Disaggregated estimates
 - edible and non edible animal goods and services
 - farming systems
 - climatic and country groups



GHG emissions from ruminants

- By far the largest contributors to GHG emissions
 - enteric fermentation
 - low reproduction efficiency
 - low feed quality: fibres!
- Wide range in emission intensity in ruminant systems
 - variation in milk production, growth rates and feed quality.
 - dairy systems are more efficient than pure meat systems
 - feed emissions 30 – 35 % in ruminant systems

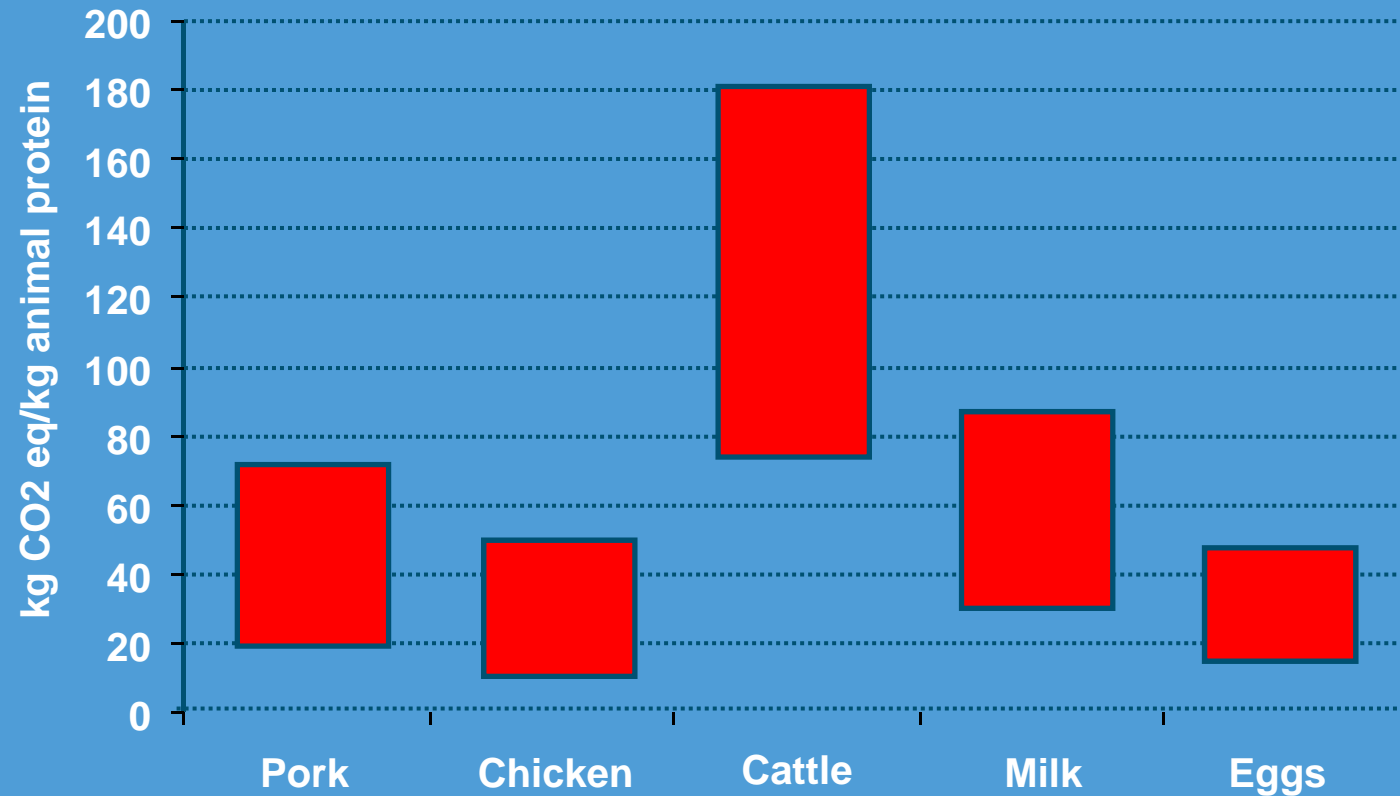


GHG emissions from monogastrics

- About one quarter to one third of total GHG
- Emission intensity
 - 25 - 50 % compared to ruminants
 - small differences between backyard and industrial
- Feed emissions 60 – 70 %
- Broken geographical link between feed production and animal nutrition.



Emission intensities per species



De Vries & De Boer, 2009

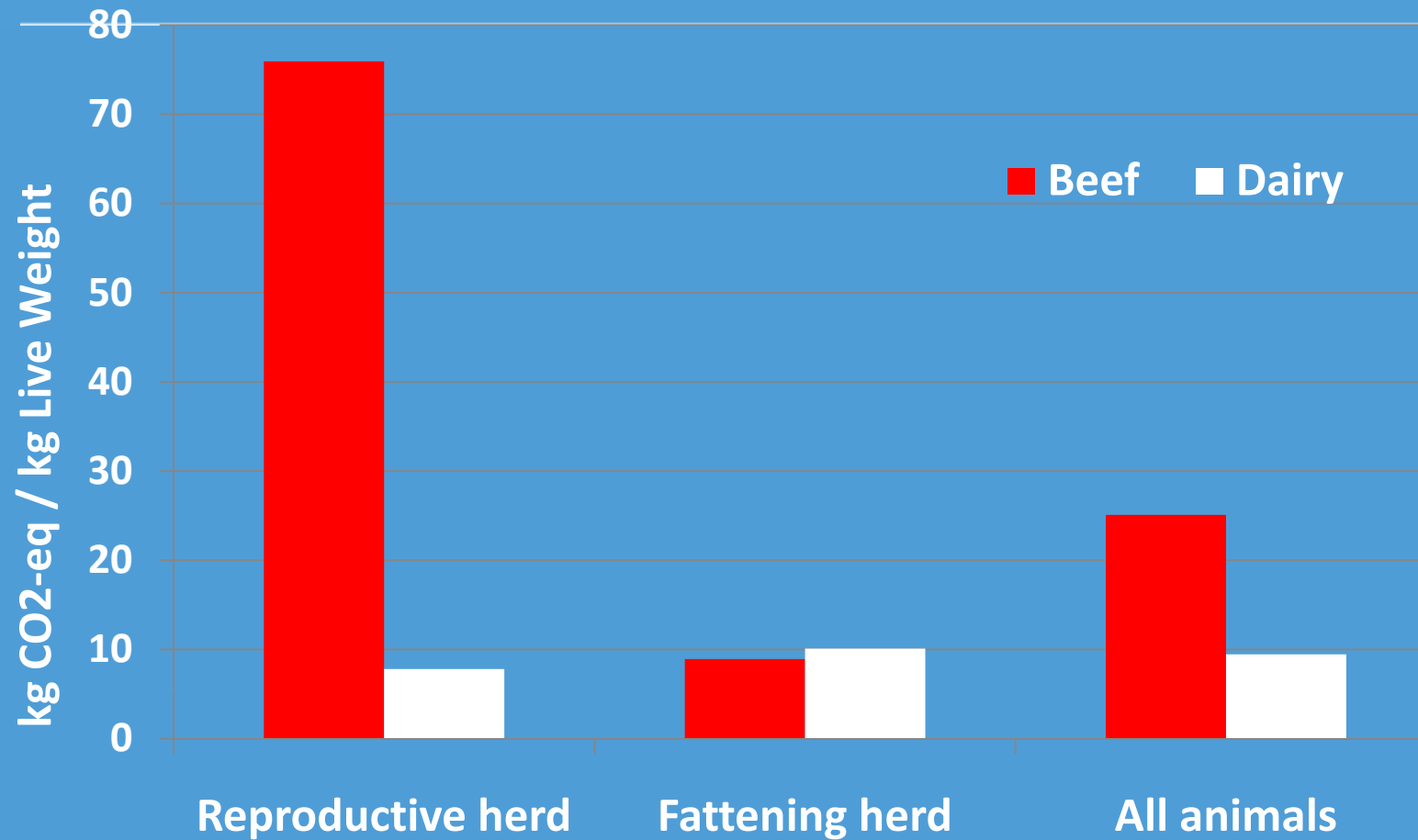


Meat production and related GHG emissions global averages

	Meat Production Mt CW	GHG emissions Kg CO2 eq. /kg CW	Total GHG Mt-CO2-eq
Beef			
Fattening animals	26.8	16	428.8
Culled animals	8.2	149	1221.8
TOTAL Beef	35	47	1650.6
Dairy			
Fattening animals	24.3	20	486
Culled animals	9.7	16	155.2
TOTAL dairy meat	34	19	641.2
Milk			1328



GHG per animal type –beef versus dairy herds



Effect of replacement rate in milked cows in the Netherlands

		rr of 33% (3 lact)	rr 12.5% (8 lact)
Meat, carcass weights	t/year	280,428	206,081
Milk	t/year	10,585,000	10,585,000
Emission/kg milk	kg CO ₂ eq / kg milk	1.55	1.44
Emission/kg meat	kg CO ₂ eq /kg meat	8.68	8.02

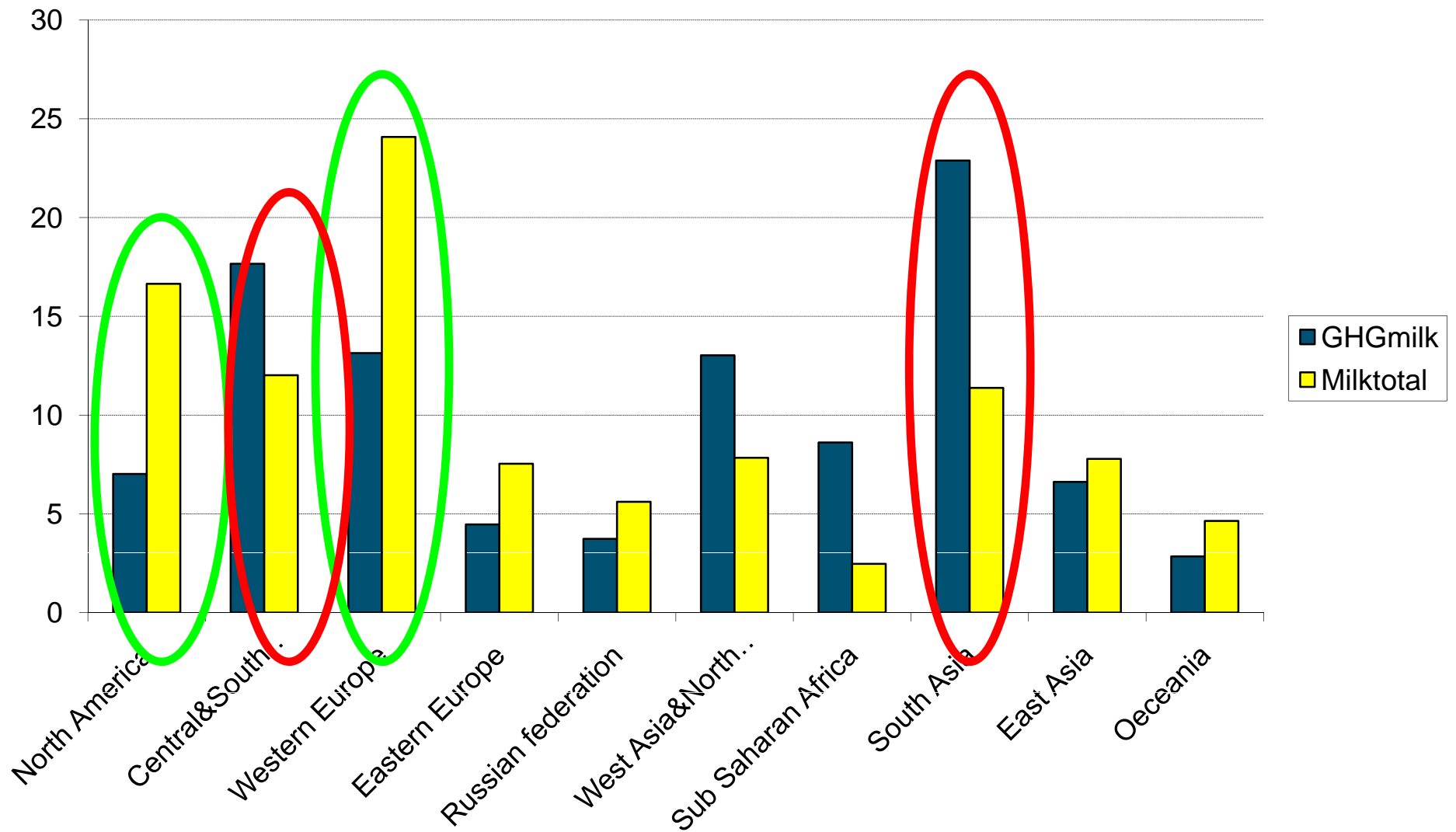


Effect of replacement rate in milked cows in the Netherlands

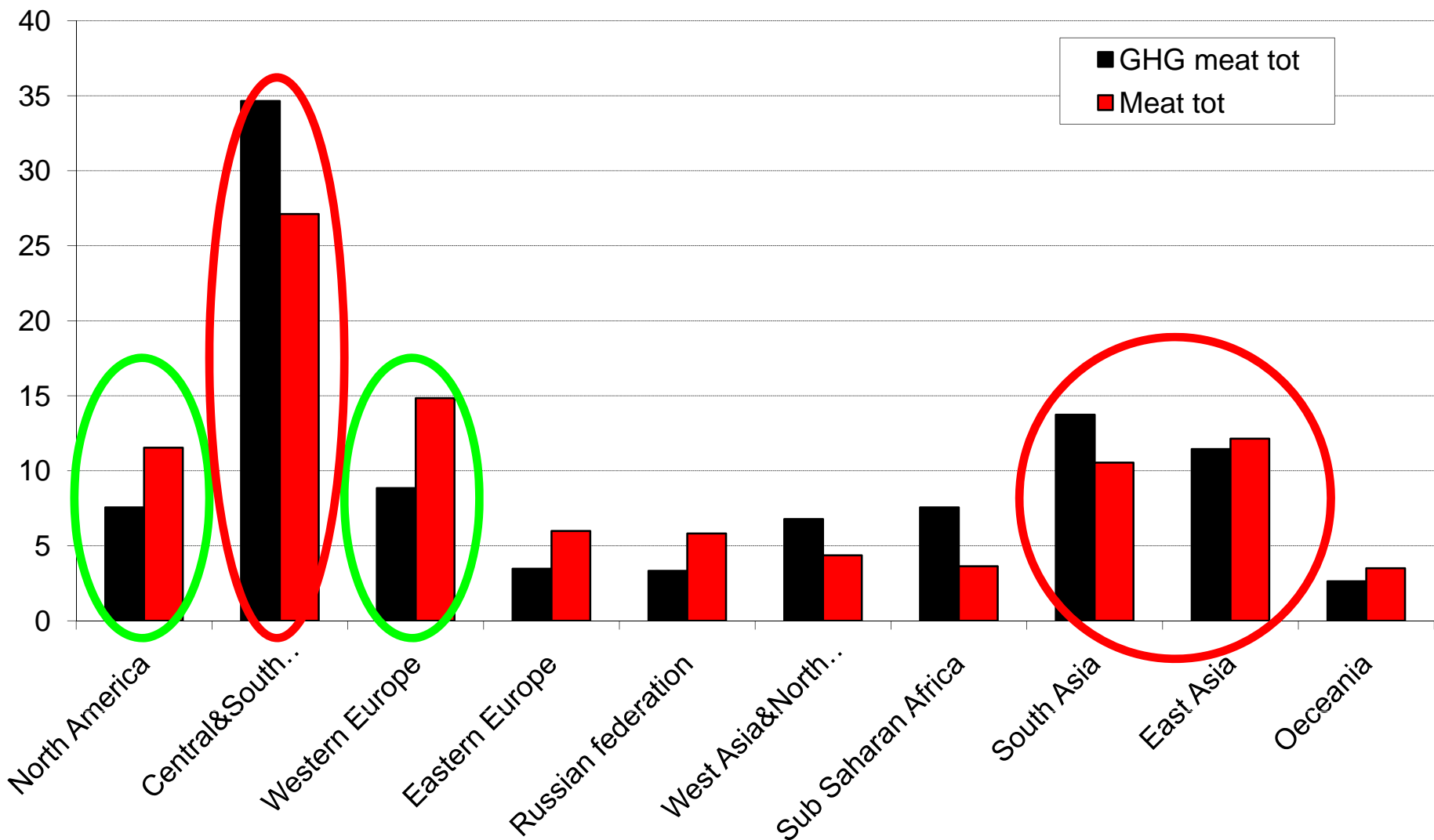
		rr of 33% (3 lactations)	rr of 12.5% (8 lactations)	rr of 12.5% (8 lactations) + Beef production
Meat, carcass weights	t/year	280,428	206,081	280,428
Milk	t/year	10,585,000	10,585,000	10,585,000
Emission per kg milk	kg CO ₂ eq / kg milk	1.55	1.44	1.44
Emission per kg meat	kg CO ₂ eq /kg meat	8.68	8.02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



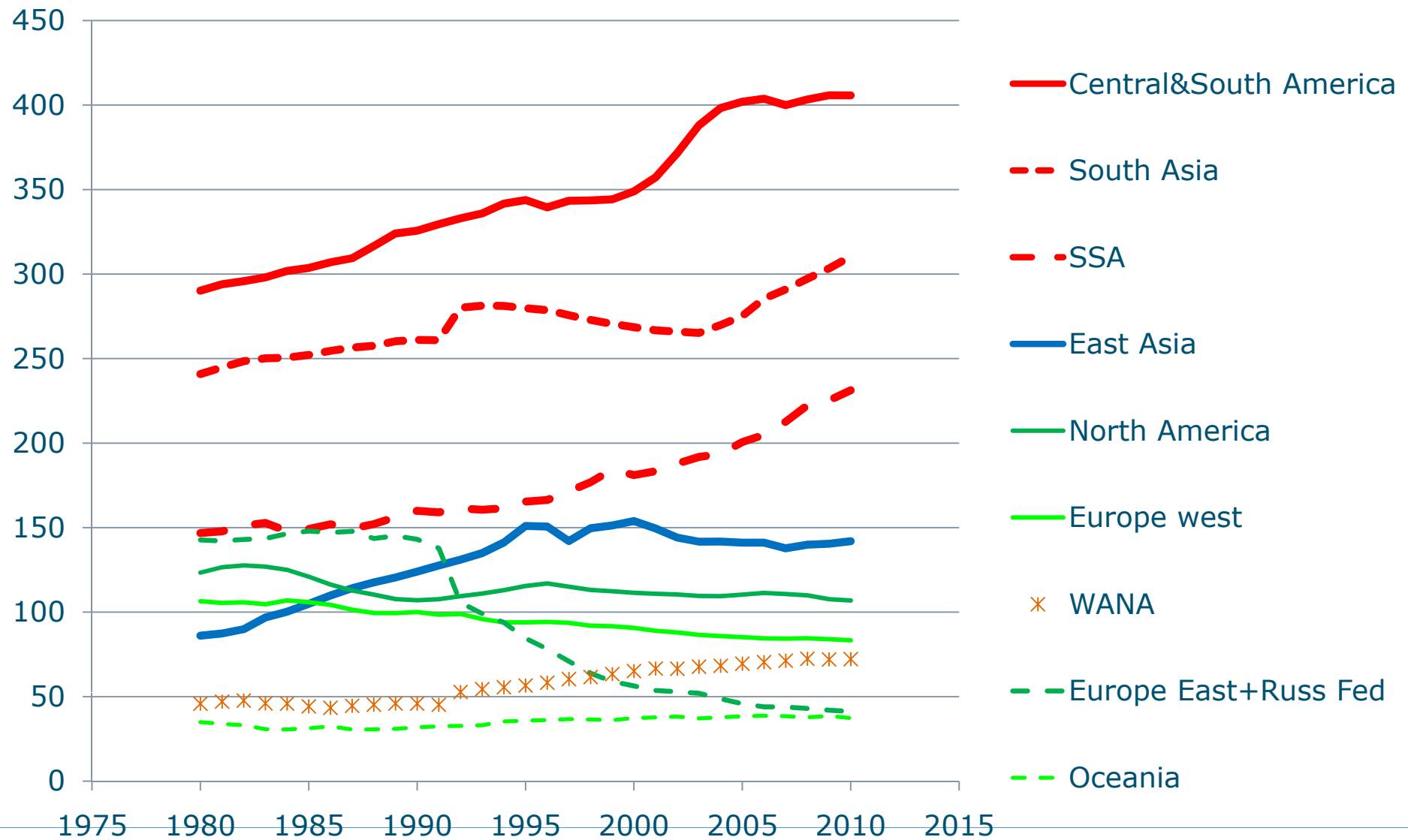
Milk production and emissions

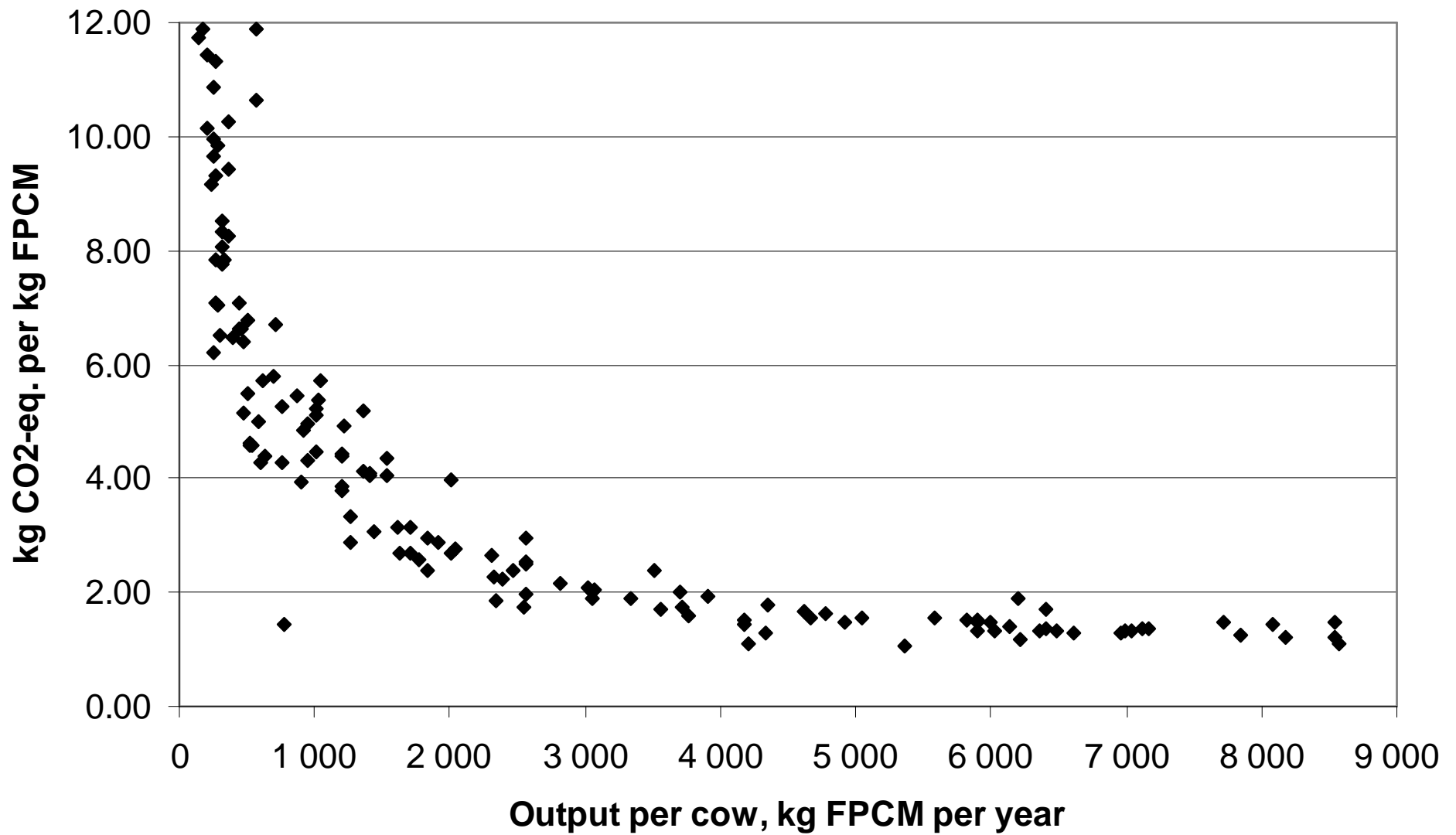


Beef production and emissions



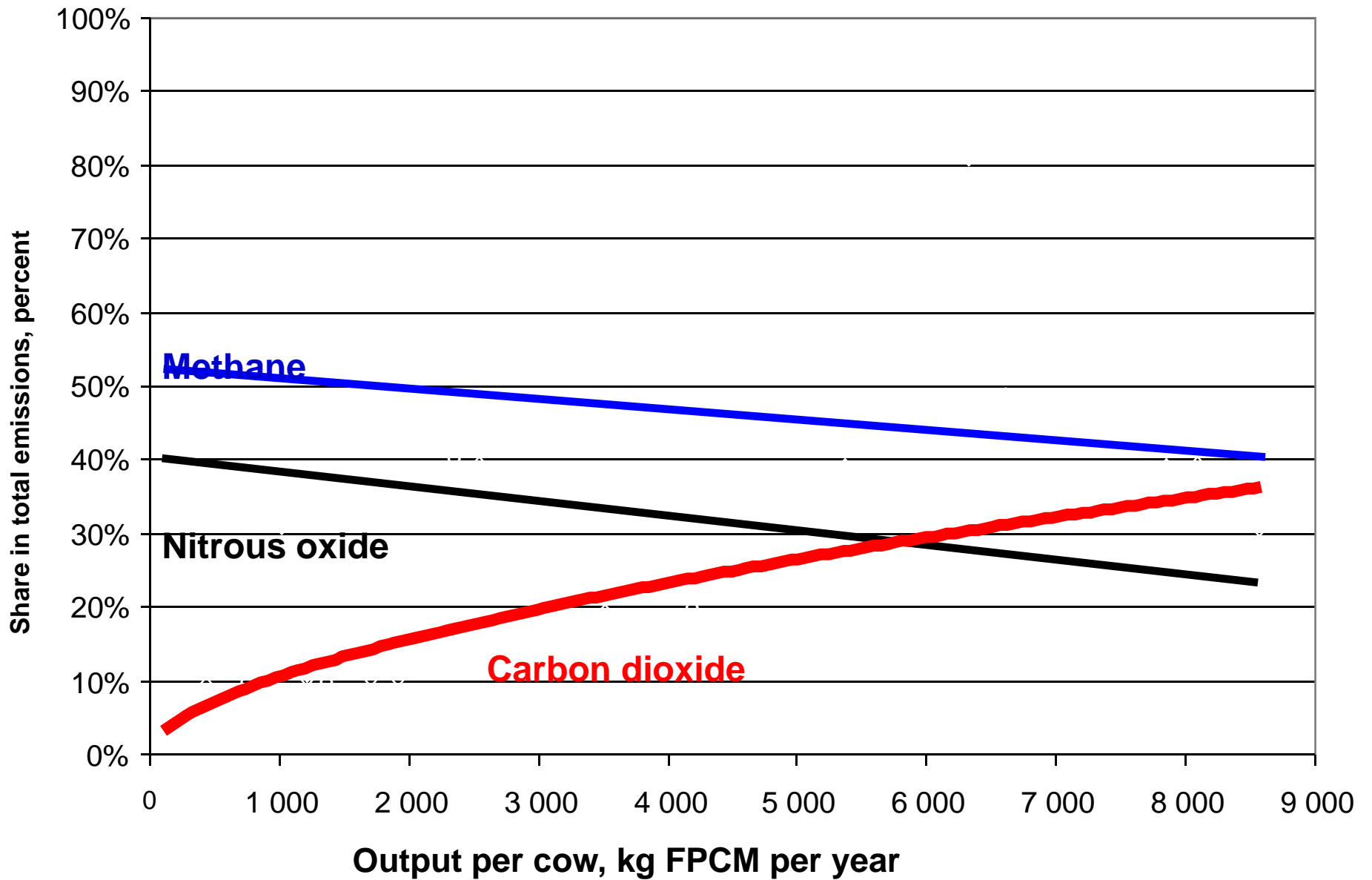
Cattle numbers (million heads)





Source: Gerber et al., 2011





Source: Gerber et al., 2011



A dichotomy of the livestock sector

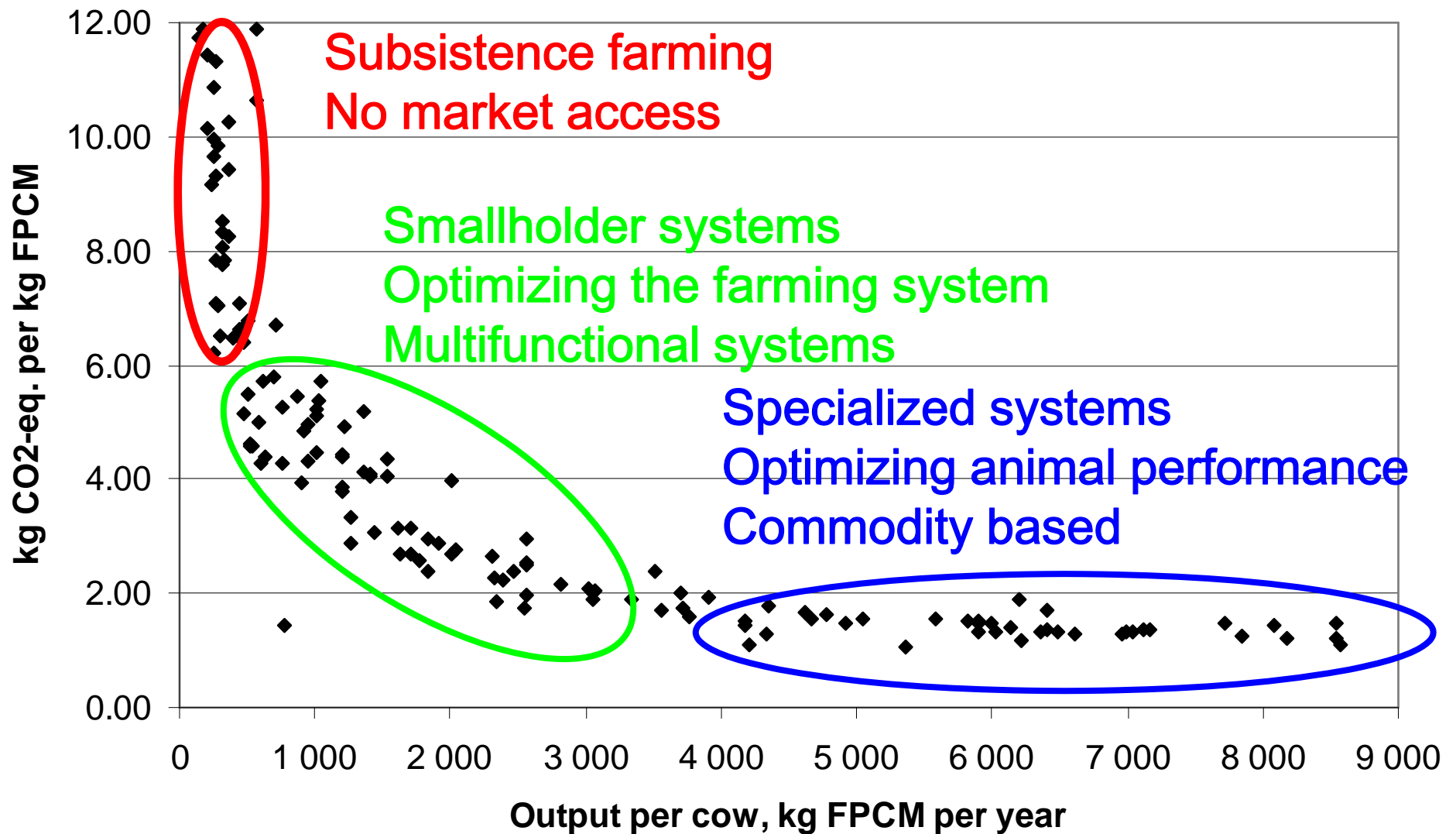
Industrial, specialized

- Commodity based
- Optimising animal
- Primary crops, good land
- Trade-off to environment
- Global sources, markets
- High energy input
- High CO₂ profile

Smallholder

- Multifunctional
- Optimising system
- Crop residues, marginal land
- Trade-off to animal
- Local sources, markets
- Low energy input
- Low CO₂ profile





Source: Gerber et al., 2011





DANGER CO₂W



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Mitigation strategies

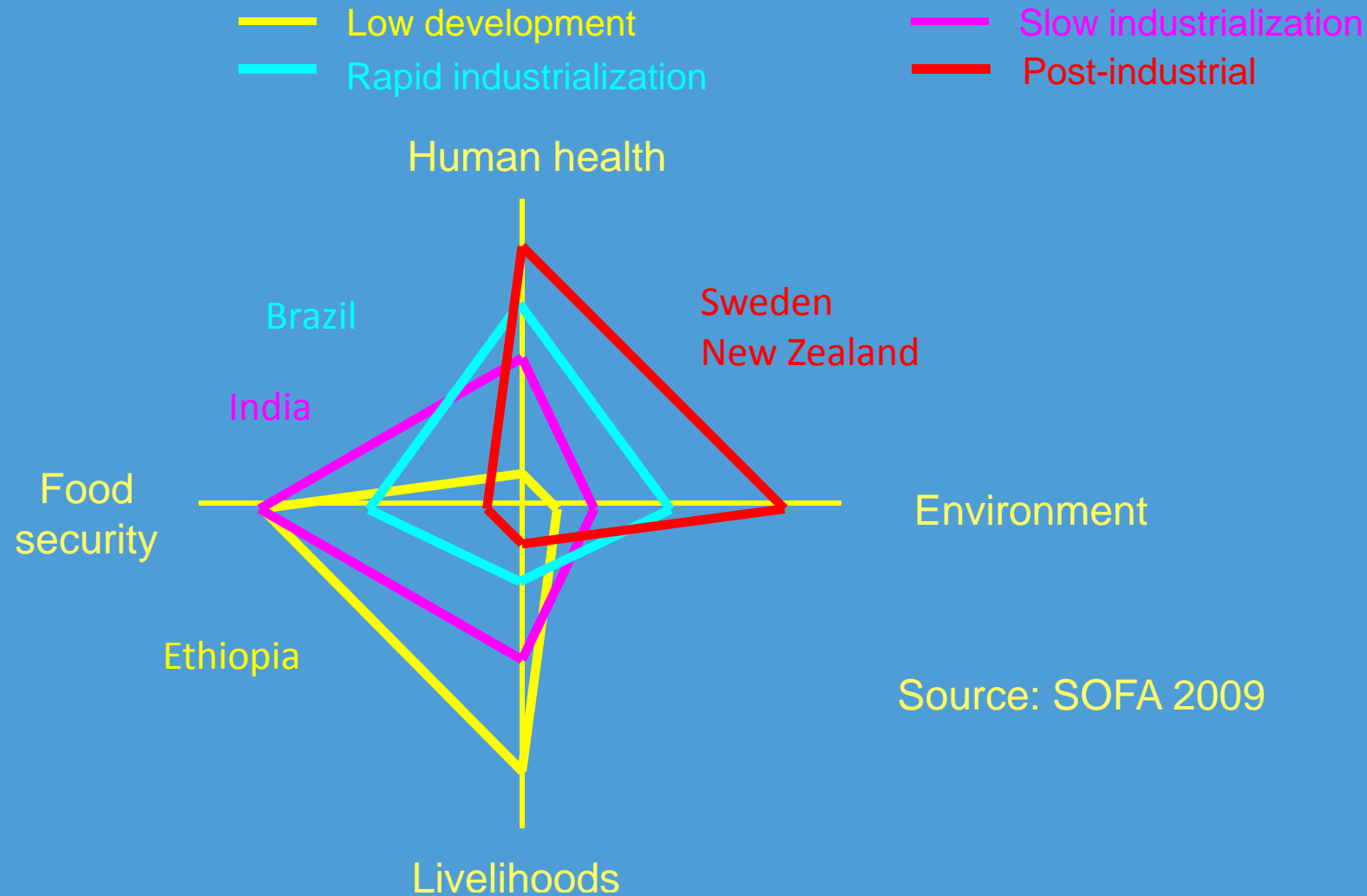


It is urgent

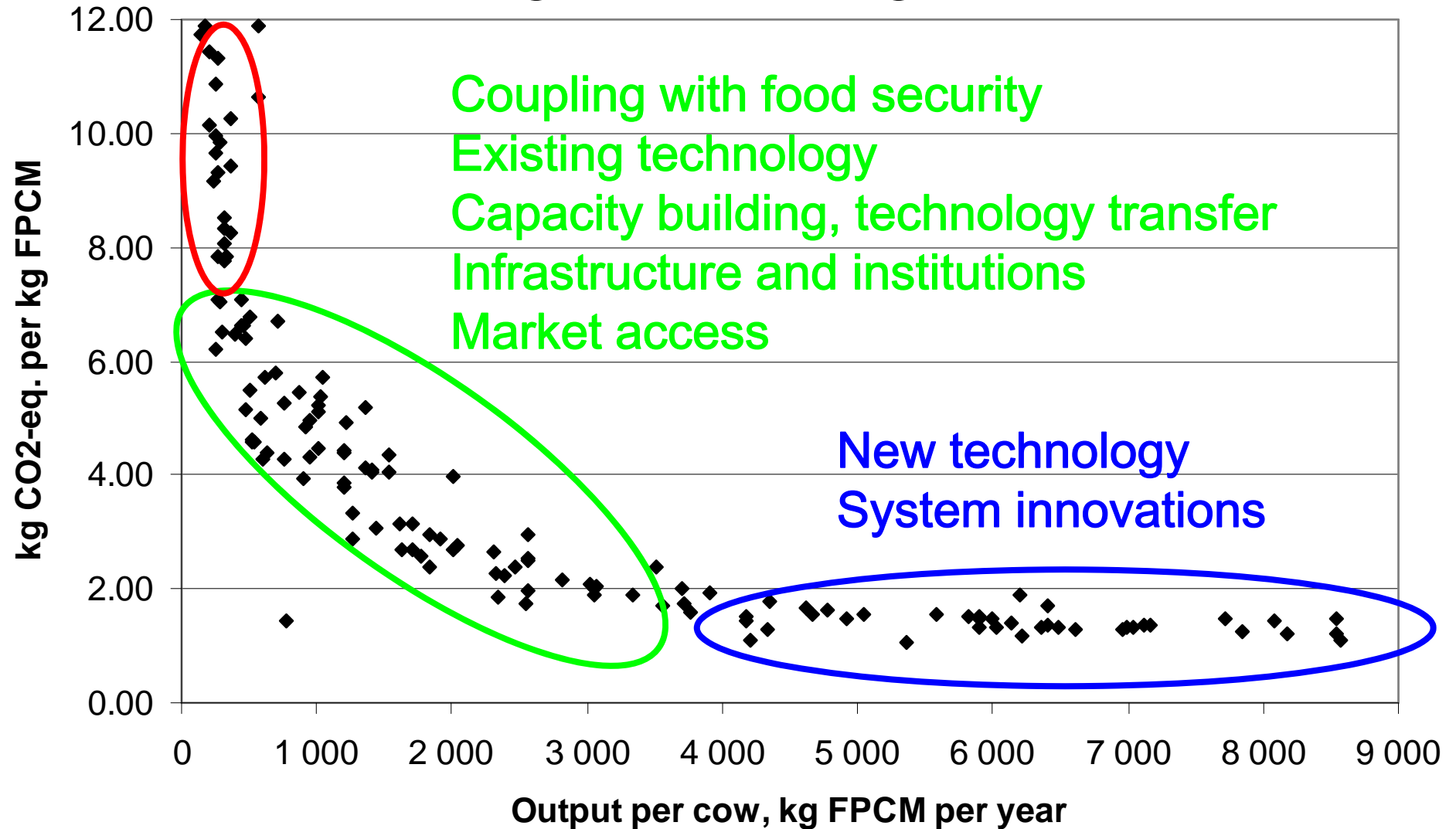
- World Food Summit stressed on increasing food security
 - Millennium Development Goals are not yet met
- IPCC 4AR stresses on fast reduction of GHG's
 - Worst case scenarios become reality
- Depletion of natural resources
 - Phosphate (30-40 years), water, biodiversity
- Biofuels: competitor for land, provider of by products?
- Diseases threaten human health and livestock productivity
 - Rift valley fever, Avian Influenza, Foot & Mouth Disease
 - 80 % of animal diseases are zoonotic



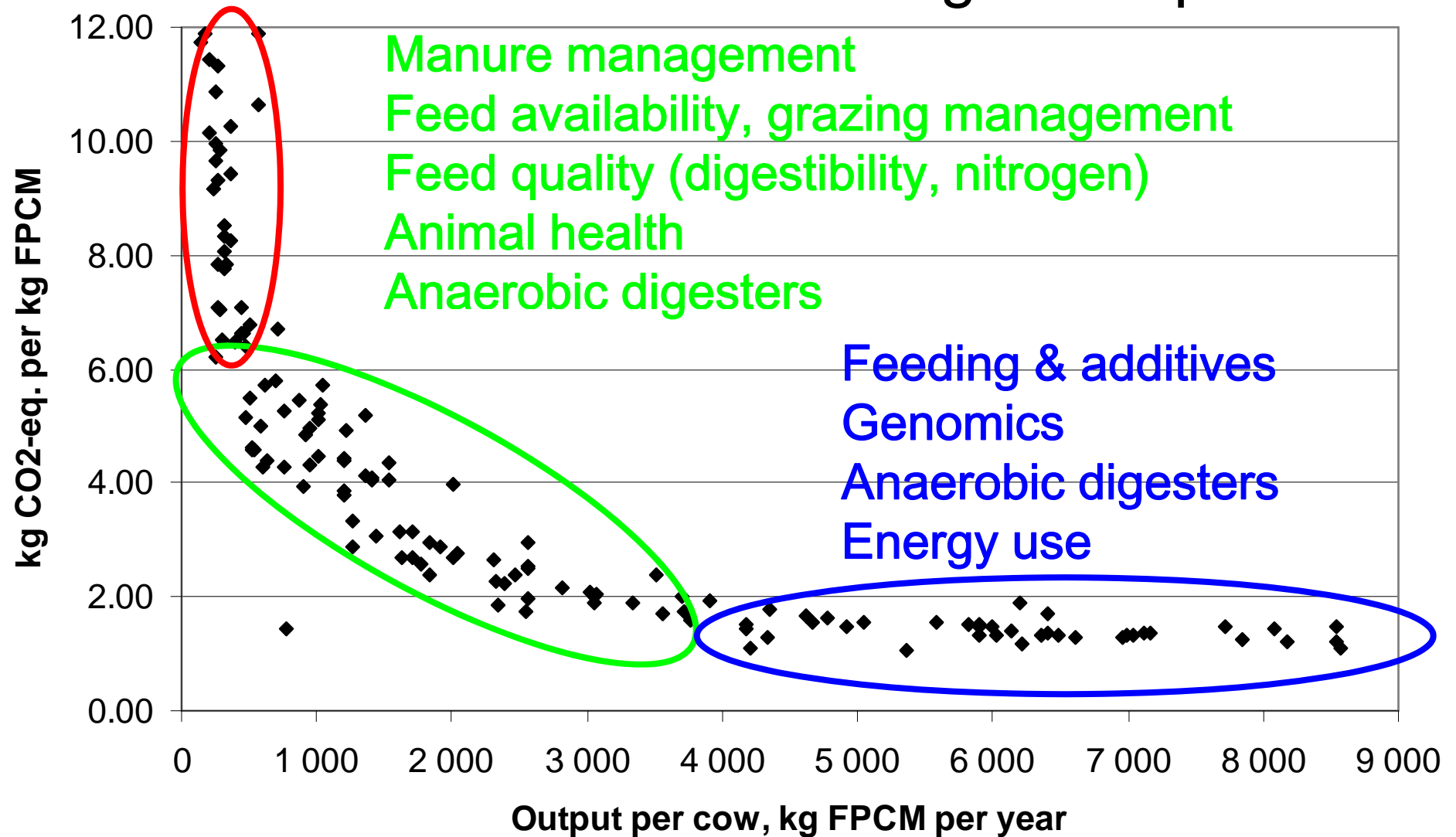
A shared interest with different priorities



Mitigation strategies



Technical mitigation options



Mitigation in developing countries ?

- Larger potential
- More cost effective
- Existing knowledge, implementation today
- Coupling with millennium goals of the UN

- Current available instruments:
 - Clean Development Mechanism
 - Small scale farmer projects



Mitigation: Clean Development Mechanism

- Combine Sustainable Development & Mitigation
- Payment in CER's: *Certified Emission Reductions*
- More than 2500 projects
- Agriculture:
 - Only waste management is eligible: biodigesters



CDM projects August 2012

	Projects (#)	Annual GHGtot (Mtons)	Annual GHGavg (Ktons)
Energy	3701		
HFC's	29		
Agriculture	153	11	65
...	
Total	5177	631	121



But...

- ~~CDM only accepts bio-energy production on wastes~~
 - No carbon sequestration, no farming systems
- Agriculture is a diffuse source
 - Many smallholders are needed
 - 1 project of 65 Ktons: about 60 000 dairy cows
 - High transaction costs
- Monitoring, reporting & verification (MRV) needs improvement
 - GHG are only calculated
 - Find representative key parameters
 - Sampling technique
 - High MRV costs



Mitigation in developing countries: 6 * F

- Food security: a basic right!
 - And prerequisite for development
- Financial, market access, banking infrastructure
- (Female) Farmers: knowledge transfer
- Feed improvement: quality and availability
- Fertilizer use: manure, synthetic fertilizers

- Climate Smart Agriculture:
 - Combine food security, adaptation and mitigation



Mitigation in industrialised countries

- As CO₂ is >30 % of the emissions: energy saving along the complete chain should be considered
- Nitrogen Use Efficiency
- Waste and waste utilization!



The Livestock Partnership

- Goal:

- contribute to improved environmental performance while considering social and economic viability.

- Means:

- support to decision-making by providing guidance on environmental assessments and their subsequent application.
- exchange of data and information, technical expertise and research geared towards improving and harmonizing assessment and monitoring.

<http://www.fao.org/ag/againfo/livestock-benchmarking/livestock-partnership/en/>



Partners:

- Private Sector:
 - International Feed Industry Federation – IFIF
 - European Vegetable Oil and Proteinmeal Industry – FEDIOL
 - International Meat Secretariat – IMS
 - International Egg Commission – IEC
 - International Poultry Council – IPC
 - International Federation for Animal Health – IFAH
 - International Dairy Federation – IDF

- Countries: New Zealand, Ireland, France, the Netherlands

- NGO's: World Wildlife Fund

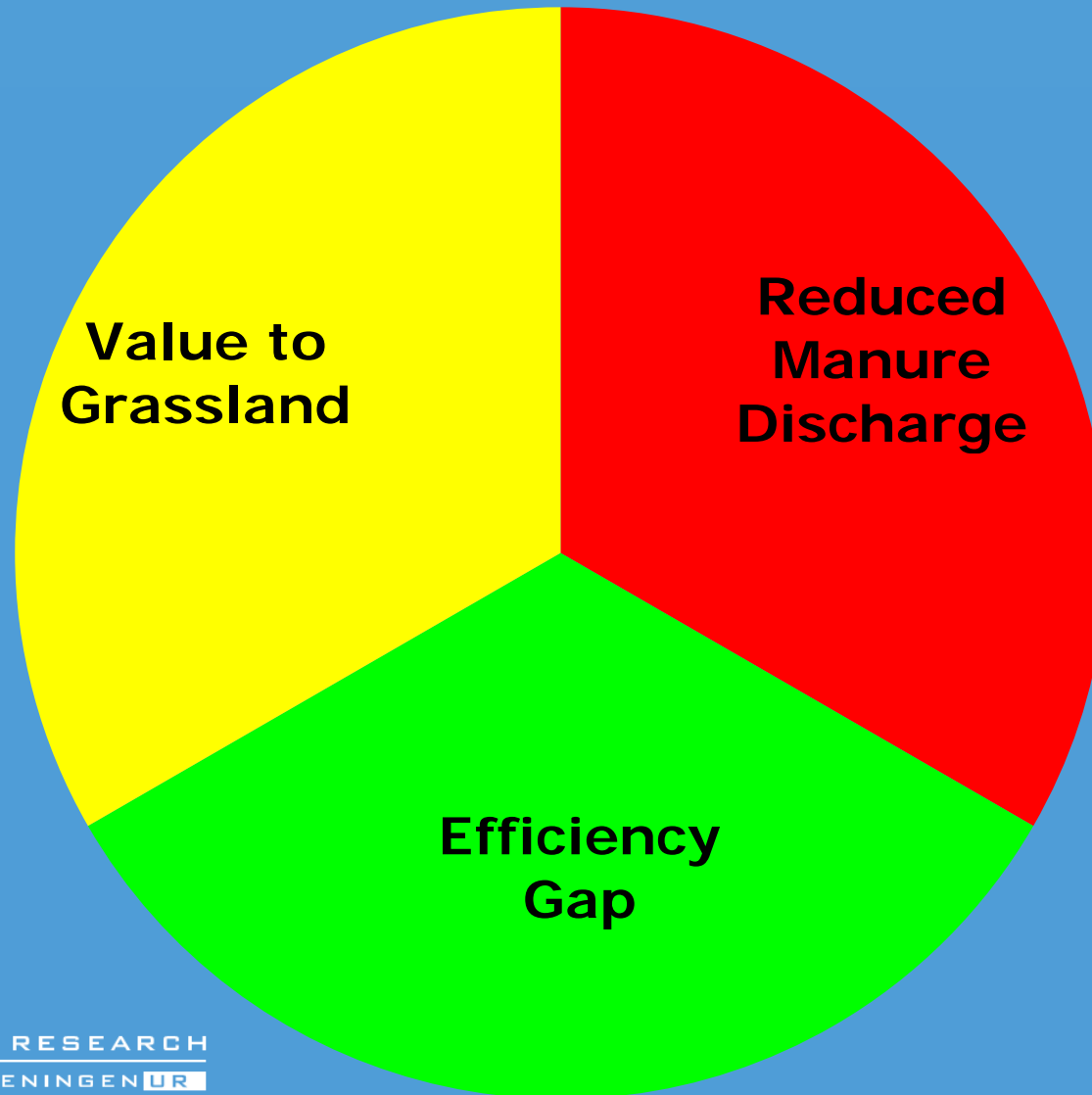


The Livestock Dialogue and the Global Agenda of Action

- Focus:
 - the improvement of resource-use efficiency in the livestock sector
- To support:
 - livelihoods,
 - long-term food security and
 - economic growth
- Safeguarding other environmental and public health outcomes.
- Consensus building among key stakeholders

www.livestockdialogue.org

Focus areas of the GAA



What about animal welfare ?!

- Is animal welfare under threat with intensification?
- Freedom from:
 - Hunger and thirst
 - Discomfort
 - Pain, injury or disease
 - Fear and distress
 - To express normal behaviour



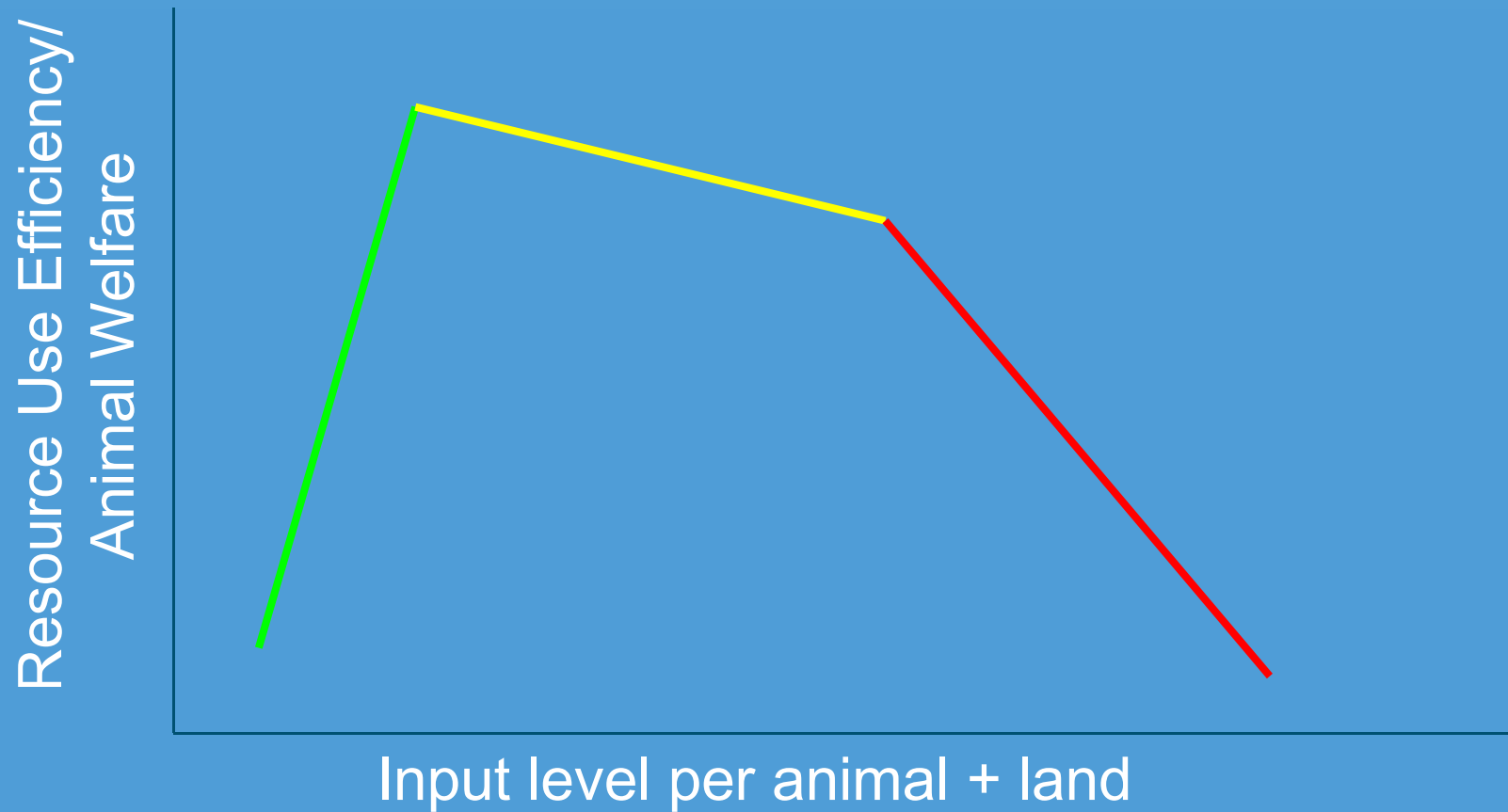
What does sustainable intensification mean to animals

- Better nutrition
 - In arid regions, malnutrition for several months
 - Mixed systems, feeding large fractions of crop residues = malnutrition
 - Higher resilience
- Improved animal health

- Intensification is not automatically linked to a decrease in animal welfare.
- Animal welfare to acceptable levels in industrial systems



Resource use efficiency and intensity



Conclusions

- Ruminants!
- Developing countries:
 - Combine food security, adaptation and mitigation
 - Existing knowledge, market access, institutional change, infrastructure
- Industrialised systems:
 - CO₂ is a large fraction and should get more attention
- Develop an approach to affect a diffuse sector
 - Simple indicators
 - It's more than technology
- Animal welfare is not under threat



Thank you
for listening

