LIVESTOCK'S LONG SHADOW

put in an optimistic perspective, with emphasis on Europe and climate change

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AIM OF THIS PRESENTATION

Aim of this presentation is to:

- Give an overview of livestock keeping related environmental issues
- Highlight EU approaches to abate environmental pollution from animal husbandry
- Summarize some aspects of pollution and abatement from livestock keeping systems around the globe, with emphasis on the only global pollution topic: greenhouse gases

CONTENT

- Introduction
- Environmental issues
- European dimension
- Global dimension
- Final statements and outlook

INTRO: FOOD AND ENERGY 'crisis'

Recent increase in food (and energy) prices are the opportunity to put agriculture back on the international political agenda again

- Continuously growing human population
- Increasing welfare of human society
- Non-infinite sources of fossil fuel, increasing the interest of agricultural products for production of bio-fuels (e.g. Bio-ethanol)
- But also: diminished attention (political, scientific) for primary production (agriculture)

INTRO:increasing public interest

These developments coincide with the growing attention for severe environmental problems, mainly climate change, and the role of agricultural (including livestock) production

- Films like “An Inconvenient Truth” (Al Gore, USA), and “Meat the truth” (Animal Party, NL)
- Books like “Livestock’s Long Shadow” (FAO/LEAD, It)
- Studies like “Spatial impacts of climate and market changes on agriculture in Europe” (WUR, NL)

Environmental pollution issues -1

Starting point: livestock production systems are ‘leaky’ by nature, with (far) less than 100% efficiencies

So: ‘zero’ pollution from livestock production systems is utopia

But: current production systems and environmental technologies are mostly ‘first generation’, with much room for improvement

Environmental pollution issues - 2

- Losses of nutrients (N, P) → water pollution (eutrophication)
- Volatilization of ammonia → acid deposition and contribute to PM formation (health issue)
- Release of methane and nitrous oxide → global warming
- Consumption of energy → global warming
- Use of water → water shortage
- Use of land → soil pollution, deforestation

Environmental pollution issues - 3

Pollution not only arises from primary production (on farm), but also from other locations in the production chain (off farm)

Life Cycle Assessment and Environmental Foot Print are powerful tools to evaluate production systems in a realistic (more integrated/holistic) way

However: current policies mostly focus on 1 environmental topic, not (fully) taking into account this integration (pollution swapping)

Environmental pollution issues - 4

Comparison of conventional and organic milk production systems (per kg of FPCM):

		Conventional	Organic
Land use	- ON	0.64	1.1
(m2)	- OFF	0.64	0.7
Energy	- ON	0.60	0.96
(MJ)	- OFF	*4.40*	2.17
Climate	- ON	0.7	*0.9*
(kg CO_2-eq)	- OFF	0.7	0.55

Source: M. Thomassen, 2008. Environmental impact of dairy cattle production systems. An Assessment (LCA). PhD Thesis, Wageningen University.

Environmental pollution issues - 5

EU Directives form the basis for pollution abatement from livestock production:

- Nitrates Directive and Water Framework Directive (N and P)
- IPPC Directive (pollutants from large operations, including pig and poultry farms; not cattle (yet))
- NEC Directive (emission ceiling; e.g. Ammonia)
- UNECE Protocols (e.g. Best Available Techniques)
- Compliance with IPCC – Kyoto protocol (greenhouse gases)

But: mono-thematic; need to integrated approach

EUROPEAN DIMENSION - 1

Recent study by Tia Hermans & Jan Verhagen (Wageningen University)

Outline:

- Impact of climate change and market changes on EU-27 agriculture
- Outlook for 2050
- Impacts on agricultural (wheat, potatoes) and livestock (grassland) production

EUROPEAN DIMENSION - 2

General trends:

- Increase in number of people (more people served by the EU production))
- More land needed for food production
- Land price will increase
- Climate change will shift agriculture between regions in EU-27

EUROPEAN DIMENSION - 3

Main conclusion: Increase in production (despite regional variations and depending on scenario)

Due to:

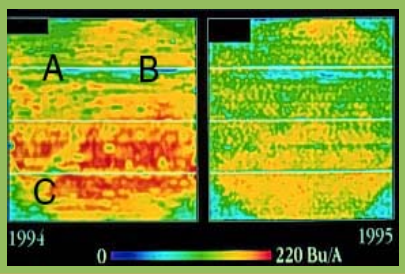
- Technology development and implementation (most important)
- Climate change – more areas with favourable production conditions (less important)
- Increase in CO2 concentration (least important)

EUROPEAN DIMENSION - 4

Focus on technology to

Increase productivity:

- Animal and plant breeding
- Increased use of fertilizers and innovative animal feed
- mechanization



NEWSPAPER HEADLINE

Newspaper Trouw, 17 May 2008 headline: "African farmer has to start using chemical fertilizer". Is this a clever strategy ?

Chemical fertilizer:

.... has a near to 100% working coefficient

.... has great physical and chemical properties

But:

....makes organic manure become a waste

....costs a lot of energy to produce + transport

....may easily be used exessivily (cheap); cause water pollution and produces N_2O

GLOBAL DEVELOPMENTS

Animal manure as an asset on small holder farms

- Small holders mostly need support, training/education, and simple technology
- Breeding, feed, labour/farm organisation, basic waste management (nutrient recycling)

GLOBAL DEVELOPMENTS

Intensification of livestock farming will and must occur. Environmental issues, notably climate change, have to be an can be mitigated:

- Licence to produce for intensive farms
- Inclusion of Best Available Techniques
- Stimulation of technological innovations

GLOBAL DEVELOPMENTS

One of the most promising instruments to abate climate change related to livestock production is the Clean Development Mechanism (CDM) under the Kyoto-protocol

However, CDM focuses on implementation of existing technologies (mostly 1st generation; biogas, composting)

CDM would have to stimulate 2nd generation technologies, to further reduce non-CO_2 GHG emissions, and to save energy

GLOBAL DEVELOPMENTS

Globally shared knowledge and clever planning helps to abate environmental problems, including climate change

GLOBAL DEVELOPMENTS

Step 1 must be: use animal manure as resource

Dried manure as fuel (CO_2, CH_4)

Fully closed nutrient cycle (N_2O, CH_4)

Final statements and outlook

Further development and global dissemination of livestock production and environment related knowledge and technologies need high priority

Animal breeding and nutrition hold ‘source’ solutions for environmental problems

Ag and Env Eng provide solutions further in the chain of pollutions (2nd generation systems and technologies)

Animal & Ag Eng & Env Eng studies must harmonize/integrate and be made ‘sexy’ again (number of students and institutes in decreasing in EU)

THANK YOU !