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the rural information network

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Briefing 464

Methane, cattle and climate change

Dr Martin J Hodson¹

Summary

Cattle are directly responsible for a relatively small proportion of global warming, but indirect effects arising from fertiliser manufacture, land use changes and processing are much greater. Some mitigation measures (eg breeding, feeding better quality foodstuffs, or modifying ruminant digestion) are possible.

Introduction

We hear an increasing amount about methane emissions from cattle as a factor in climate change. This briefing is based on a presentation given at the Farm Crisis Network Co-coordinators Conference on 20th February 2007 that puts it into perspective.

Very few scientists nowadays deny the fact of climate change though high profile is often given to contrary opinions, which usually come, often obscurely, from vested interests

Methane and Carbon Dioxide

- Carbon Dioxide (CO₂) is the product of burning under aerobic conditions (in the presence of oxygen).
- Methane (CH₄) is mostly a breakdown product liberated under anaerobic conditions (in the absence of oxygen).

Anthropogenic² Methane Production

The Good News

- Methane is responsible for 24% of anthropogenic global warming³.
- Of that ruminants are responsible for 26.4% of methane.
- So ruminants are directly responsible for 6.3% of global warming.
- Cattle (and sheep) will be a percentage of that but the actual figure is difficult to calculate precisely.

Carbon Neutral Cows?

Fossil Carbon

This carbon originates from deep underground. It is unearthed, burned, and liberated into the

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² Generated by people

³ Sources: IPCC (2001) www.ipcc.ch; Livestock's Long Shadow. Environmental Issues and Options. FAO (2006)

atmosphere. This carbon released is added to carbon already present in the atmosphere = global warming.

Cattle

This carbon comes from the atmosphere, as plants take up carbon dioxide. Livestock then eat the plants and release the carbon back into the atmosphere. Therefore, any carbon released by the cows was previously in the atmosphere. This is known as "carbon neutral", and leads to no additional global warming.

This is partly true, but methane has about twenty times more impact on global warming than carbon dioxide. There are also indirect effects of agriculture on annual world production of CO₂ per year ...

- Fertilizer production - 41 million tonnes
- On farm CO₂ production - 90 million tonnes
- Land use changes - 2.4 billion tonnes
- Livestock related releases from cultivated soils - 28 million tonnes
- Livestock induced desertification - 100 million tonnes
- Processing - several tens of million tonnes

Methane and Cattle

- Enteric fermentation = 86 million tonnes methane per year (due to breakdown products released in the rumen)
- Animal manure = 18 million tonnes methane per year

Mitigation – Cattle

A major problem is that the largest share of methane production is from poor countries and livestock fed on poor quality feed. Potential reduction by:

- Tweaking diet and genetics
- Increased digestibility of foodstuff – but this might mean more concentrated feed - (more intensive feeding)
- Advanced technologies in development: stimulation of certain bacteria to decrease hydrogen production; decrease certain protozoa; vaccination to reduce methanogens

Mitigation- Manure

- Manure with high nitrogen content increases methane production
- Lower temperatures decrease methane production
- Anaerobic fermentation to produce biogas for local heating and electricity

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RuSource briefings provide concise information on current farming and rural issues for rural professionals. They are circulated weekly by email and produced by Alan Spedding in association with the Arthur Rank Centre, the national focus for the rural church. Previous briefings can be accessed on the Arthur Rank Centre website at http://www.arthurrankcentre.org.uk/projects/rusource_briefings/index.html

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