Managing Emissions from Farming Livestock

Introduction

Opportunities already exist to reduce and offset greenhouse gas emissions from the farm. Initially emissions will be charged as a levy on produce and are unlikely to account for changes at the farm level. However, they will result in a general improvement in on-farm efficiency and profitability.

The Big Picture

Globally there are 3.5 billion ha available for grazing and only 1.5 billion available for growing crops. The number of grazing animals has increased nearly two fold since the 1900s and will continue to be an important food source. It is crucial that agriculture, like other industries, reduces greenhouse gas emissions where possible and adapts to this evolving area of expertise. The Emissions Trading Scheme will add to the cost of production (see info sheets 8 to 11). However, doing nothing about emissions may cost NZ farmers valuable market access.

What can be done to reduce emissions on the farm?

Livestock

Livestock produce around 90% of the greenhouse gas emissions from dairy, sheep, beef and deer farms (see info sheets 8 to 10 for details). Consider:

- Improving performance per stock unit such as lambing percentage, live weight gain and milk solids per cow.
- A shift away from sheep and deer toward beef would reduce emissions cost per kg of meat produced[1].
- Feeding condensed tannins from plants such as lotus or sulla which reduce methane emissions in comparison to ryegrass by about 15%.

Nitrification Inhibitors

Nitrous Oxide comprises one third of agricultural greenhouse gas emissions, around 84% is from dung and urine and 16% from synthetic nitrogen fertiliser use. Applying nitrification inhibitors to damp, cool soils has a large potential to reduce nitrous oxide emissions in grazed pastoral systems. The availability of liquid and granular formulations means all livestock sectors can access

1 Projected impacts of the New Zealand Emissions Trading Scheme at the farm level http://www.maf.govt.nz/climatechange/reports/

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METHANE: While methane is the largest source of agricultural greenhouse gas emissions (65%) it is the one we can do least about. $5 million per annum of research effort, coordinated by the Pastoral Greenhouse Gas Research Consortium (PGgRc) is going in to the development of technologies to reduce methane emissions. However such technology is least 10 to 20 years away from practical application at farm level.

MODELLING: Whole farm system models such as FARMAX® and OVERSEER® can analyse alternative management policies to optimise emissions, production and profit.

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the technology. Other benefits include reduced nitrate leaching and increased dry matter production.

Other management options to reduce nitrous oxide emissions include:

- Remove animals from pasture during wet periods
- Use feeds which are relatively high in energy and low in nitrogen in comparison to ryegrass like maize silage where possible although carbon dioxide emissions may increase (for example, losses from soil and fuel consumption).

Fertiliser

Emissions from conventional, synthetic fertilisers include carbon dioxide released during manufacture and nitrous oxide from its use. These emissions can be reduced by:

- Reduced reliance on fertilisers produced using non-renewable fossil fuel sources such as urea, and enhanced legume growth.
- Improving fertiliser application accuracy using Spreadmark certified equipment and global positioning satellites (GPS) to ensure efficient use of nitrogen fertilisers by avoiding wastage and lost production.
- Ensuring the timing and rate of nitrogen application is optimised for pasture response and avoid application to nonproductive areas.

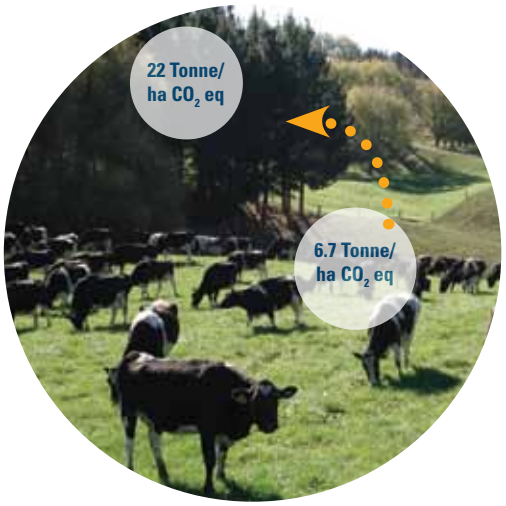
Energy

There are a range of options to reduce the relatively small amount of carbon dioxide emissions from energy use on farms. Investment in technology can improve energy efficiency in a number of ways:

- 25% electricity savings are possible from using heat recovery systems, variable speed vacuum pumps, milk vat insulation and energy efficient lighting in milk harvesting systems.
- Exploiting renewable energy sources such as wood, solar, wind, water or even biogas from effluent for power generation.
- Investing in fuel efficient farm machinery.
- Adopting no-tillage techniques can save two thirds of fuel used (17l/ha) in comparison with conventional cultivation (50l/ha) while minimising losses of soil carbon, retaining soil structure and long term viability of cropping soils (see info sheet 2).
- Maximising irrigation water use efficiency. For example uniformity of application is estimated to be typically 70%. Increasing this to 90% could increase the total area that can be irrigated with the same amount of water by about 50%, improving the energy efficiency of irrigation.

Offsetting liabilities using Forestry

Trees use the sun's energy to convert carbon dioxide into organic compounds using photosynthesis and store carbon for between 70 and 500 years. Currently landowners will be able to generate carbon credits (NZUs) from forests planted after 1989 on land not previously planted (see info sheets 3 and 4 for more detail). These units could be sold to pay for the additional cost of greenhouse gas emissions. There is scope to conservatively manage sales of carbon credits through the life of the forest so that sufficient credits are retained to balance forest harvest and livestock emissions. The figure below describes the principle of using forestry as an offset against greenhouse gas emissions from agricultural livestock. Aside from this there are a range other benefits from forestry including protecting waterways, reducing soil erosion, provide shelter and shade for livestock, increase biodiversity and diversify income from carbon and timber. Retiring less productive areas of the farm to forestry can improve overall profitability because inputs are focused on the more productive features.



Further Reading

Carbon Farming Information Report www.carbonfarming.org.nz

www.ew.govt.nz/PageFiles/1189/farmmanagementissues5.pdf

www.maf.govt.nz/climatechange

Information prepared by P.A.Handford and Associates Ltd in conjunction with the Carbon Farming Group

Go to www.carbonfarming.org.nz for other Info Sheets on: ➤ Greenhouse Gases and Farming Livestock ➤ International Agreements ➤ Soil Carbon ➤ Carbon Trading ➤ NZ Government Initiatives ➤ Practical Case Studies ➤ Carbon Forest Management ➤ Voluntary Carbon Market ➤ Risks and Liabilities