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Dairy greenhouse gases

Understanding greenhouse gas emissions on your farm

We hear a lot about greenhouse gases (GHGs), but what exactly are they? Basically, they are gases in the atmosphere—both naturally occurring and caused by humans—which absorb and re-emit radiation as heat.

GHGs are not inherently a bad thing; in fact, they help make this planet liveable. However, the growing concentrations of GHGs in the atmosphere, and the heat these gases emit back to Earth, have the power to raise global average temperatures, creating many secondary effects.

The important dairy GHGs

The dairy industry is responsible for approximately 10 percent of the GHGs generated by agriculture in Australia. The Victorian dairy industry contributes over one third of all methane and nitrous oxide emissions of Victorian agriculture.

Methane and nitrous oxide are important GHGs because they cause greater warming in the atmosphere than carbon dioxide (CO_2). We compare the warming of all greenhouse gases to carbon dioxide because it's the most abundant GHG in the atmosphere, caused by the burning of fossil fuels, mostly for energy. Comparing a GHG to CO_2 gives us a 'global warming potential' of each gas—methane is 25 times more effective at re-emitting heat and nitrous oxide is 298 times greater.

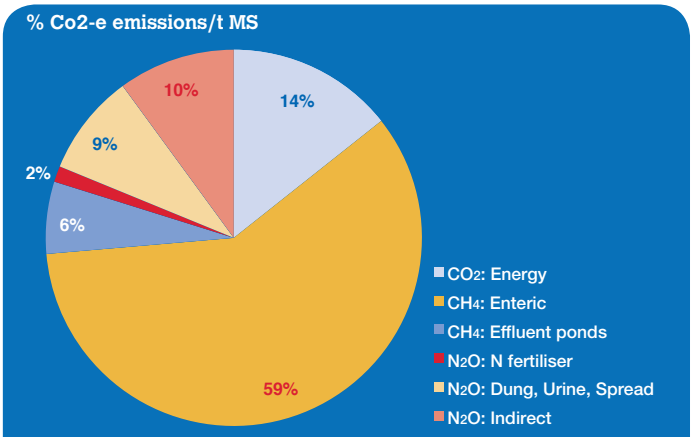
Sources of GHGs on dairy farms

Methane (enteric) is produced by cows burping (or belching) as part of the process of chewing their cud. It's estimated up to 8 percent of food ingested by a cow is lost as methane.

A cow is thought to emit up to 600 litres of methane per day through burping and exhalation. Methane emissions from effluent ponds also contribute.

Nitrous oxide is produced in soil through the use of nitrogen-based fertilisers, soil disturbance and pugging. Urine and dung from dairy cattle also emit nitrous oxide.

Emissions of these gases from individual farms vary depending on the farming systems employed and the intensity of the farm's management.



So why calculate emissions?

Since agriculture is the second largest contributor of Australia's total emissions (16 percent), it is likely agriculture will be expected to contribute to a reduction in national emissions, along with other sectors such as stationary energy.

Key points

- Calculating emissions can help you identify and reduce your production inefficiencies; these can also be your biggest emission sources.
- Options are available to reduce GHGs on-farm, but you can't manage what you can't measure.
- Consumers and markets will increasingly seek evidence of 'green' production systems and 'greenhouse-friendly' produce.
- Understanding your emissions profile will help you prepare for any potential future regulations.

How to calculate your emissions

The Dairy Greenhouse Gas Abatement Strategies (DGAS) calculator allows dairy farmers to find out the source of GHGs on their own farms, and to see the direct impact of changed practices on the emissions profile.

For more information about the DGAS calculator, go to: **www.dairyingfortomorrow.com.au/index.php?id=47**

(Adapted from the FRDS factsheet Dairy Greenhouse Gasses, produced by the Victorian Department of Primary Industries)

What you can do

The loss of methane and nitrous oxide not only contribute to a changing climate, but also represents lost productivity in livestock. Reducing emissions is an opportunity for efficiency gains to be made in Australian agricultural production systems.
Win–win options consistent with best practice can improve production efficiency, whilst reducing methane and nitrous oxide emissions.

Methane management

Key points

Improve Cow Productivity: Decreases the proportion of feed contributing to cow maintenance requirements through efficient feeding of high quality diets and improved pasture management.

Extended Lactation: Reduces the energy demand of the cows, which can reduce methane by around 10 percent. Less heifer replacements are required, which reduces the feed requirement and the number of animals on the farm.

Dietary Oils: Research has shown that for every 1 percent of oil introduced into the diet (maximum of 6 percent), there will be a 3.6 percent reduction in methane. Introducing oils in autumn and summer, when pasture fat content is lower, is a way to reduce methane with no loss in production.

Genetics: Breeding for improved Feed Conversion Efficiency (FCE) also results in the selection for reduced methane.

Nitrous oxide management

Key points

Fertiliser: Currently 40–60 percent of the N inputs into cropping and grazing systems can be lost to the environment (some of which is nitrous oxide), providing plenty of room to improve efficiency. Reviewing the rate timing and source of fertilisers on-farm can reduce N_2O release on-farm.

Inhibitors: Nitrification inhibitor coated fertilisers can reduce nitrous oxide losses by up to 40 percent.

Soil: Minimise tillage and improve irrigation management and drainage. Stand-off pads during winter will also protect the soil from pugging.

Energy savings

While emissions from energy use are often lower than from animals, taking action in this area could be a cost-effective place to start.

Audits of dairy sheds have revealed many opportunities for farmers to reduce their carbon dioxide emissions and save money on their power bills. These range from simply servicing all equipment to ensure that it is running efficiently, to innovations such as refrigeration heat exchange units and solar photovoltaic systems.

Conclusion

By considering these straight forward strategies, you can contribute to a reduction in GHGs and improve your farm efficiency at the same time.

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