Dairy Australia

Reducing manure emissions

Strategies to reduce greenhouse gas emissions

Fact sheet 3 of 6

Methane is a harmful greenhouse gas which can be generated in a variety of ways, including on-farm storage of manure.

Reducing the methane emissions from the storage of manure can help reduce the overall greenhouse gas emissions emitted from a dairy farm.

The term, manure methane interventions, refers to products and strategies that are used to reduce the methane emitted from manure storage ponds.

Two manure methane interventions currently available include:

- EcoPond®, an effluent additive.
- Covered anaerobic ponds (CAPs) or methane digesters.

Both are already commercially available in Australia, and both have the potential to produce alternative revenue streams or offset existing costs – for example, supplement energy and fertiliser requirements.

EcoPond®

Developed in New Zealand, **EcoPond®** uses polyferric sulphate – a waste water treatment product – to reduce methane emissions, phosphate leaching and *E. coli* (bacteria). It's suitable for systems with a sump and pump effluent pond.

While there are no Australian dairy studies of the effectiveness of EcoPond® on dairy farms, impressive results have been reported from studies in piggeries. For example, a study in 2021 demonstrated a 99 per cent reduction in manure methane emissions. Large reductions in manure methane – more than 80 per cent – were reported for pork systems in Australia and these led to whole-farm reductions in piggery emissions of 31–64 per cent.

KEY POINTS

Storing manure on-farm generates methane emissions

These emissions account for about 10% of total dairy farm emissions

Effluent additives and CAPs – methane digestors – are both forms of manure methane interventions

Both forms can be effective in reducing methane emissions but are also expensive due to high up-front and ongoing costs

CAPs or methane digestors can also generate heat or electricity

However, careful consideration needs to be given to the long-term cost associated with using the effluent additive EcoPond®. Upfront, or capital, costs include the installation of a coil system that mixes the additive into the effluent to ensure the correct amount of additive has been applied. Although the system is low maintenance and easy to use, the additive itself is an ongoing cost. The cost of this technology is expected to fall with efficiency improvements and increased adoption.

There are also some co-benefits of EcoPond®, including improved hygiene and reductions in other farm emissions such as carbon dioxide and hydrogen sulphide from effluent ponds. It's also associated with large reductions in phosphate leaching and *E. coli*. These could make it a more attractive proposition for a dairy farm. There is also the option of incorporating other products to separate the water from the solids. This separated water could be recycled for farm use.

DELIVERING for DAIRY

Covered anaerobic ponds/ methane digesters

Covered anaerobic ponds, or methane digesters involve covering a manure storage pond to prevent gas from escaping into the atmosphere and redirecting it to become an energy source.

Co-benefits of this option include potential alternative revenue sources, such as fertiliser for use on farm or for sale.

Covered anaerobic ponds have the potential to reduce 60–90 per cent of yearly manure methane emissions but there is limited knowledge about using covered anaerobic ponds in Australian dairy systems.

Australian piggeries have reported large reductions of manure methane with the use of covered anaerobic ponds (CAPs) or methane digestors. Research studies have reported the reductions contributed to whole-farm piggery emissions reductions of 31–64 per cent.

More practical and operational information is needed about using CAPs on Australian dairy farms to better understand the total impact on emissions. It's understood that dairy farms milking less than 500 cows would not produce enough effluent to run a CAP, which means it is better suited to dairies milking more than 500 cows.

The costs associated with CAPs can be offset by electricity generation; however, for electricity to be fed back into the grid, the farm must be close to a central portion of the grid.

Calculating the value of emission reduction strategies

- A review commissioned by Dairy Australia has estimated the costs and effectiveness of different greenhouse gas emission reduction strategies across the Australian dairy farm industry as a whole, based on the most recent information available.
- Each strategy was analysed for its ability to reduce the total greenhouse gas emissions (mitigation potential). The cost of this action was calculated per tonne of carbon dioxide equivalent or CO_2e.
- Combining the mitigation potential and the cost of the reduction paints a picture of the value for money that each strategy could deliver.
- This information will be used to guide research and investment decisions.
- This fact sheet and others in the series provide a summary of the information from research most relevant to individual farmers. They provide a useful starting point for farm businesses looking to understand their options. Farm businesses will need to do further analysis to figure out which option(s) are appropriate for their own business.

FURTHER INFORMATION

This fact sheet is one of a series:

1 Reducing dairy's greenhouse gas emissions
2 Reducing rumen emissions
3 Reducing manure emissions
4 Reducing nitrous oxide emissions
5 Reducing fossil fuel emissions
6 Storing more carbon.

You can find these on the Dairy Australia **website**.

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