Dairy Australia
Your Levy at Work

Profitable dairy farming: Good business management reduces greenhouse gases

Getting effluent management right: more profit, fewer emissions

Tips for managing effluent to improve efficiency, increase profit and reduce emissions

Why focus on effluent?

Although effluent management comprises typically only 8% of total farm greenhouse gas emissions, managing effluent storage and re-use to minimise emissions can provide broader benefits for on-farm efficiency, profitability and the environment. By viewing effluent as a valuable source of nutrients rather than a waste product there are opportunities to save money on fertiliser, improve soil fertility and condition, and minimise the risk of water pollution, as well as reduce emissions.

More than 90% of emissions from managing effluent are produced during storage, so reducing the amount of waste that goes into this system will have a big impact on total emissions from the effluent. Beyond the ponds, best-practice management of effluent re-use can both reduce emissions and maximise nutrient recycling back into the farm system.

As the Australian dairy industry makes its way in an increasingly carbon-constrained world, implementing practices that reduce farm emissions while increasing profitability and environmental outcomes makes good business sense.

How does it work?

Reducing unnecessary load on the effluent system will reduce emissions

Less effluent from the dairy means fewer emissions from the farm, because emissions from stored effluent are higher than from dung and urine deposited in the paddock. Minimising the time cows spend at the dairy is a simple strategy to reduce both effluent volume and emissions.

Stressed cows will deposit more dung and urine than calm cows. You can reduce stress through calm stockmanship in the yards and shed, and by avoiding overcrowding. Diet will also influence effluent load and nutrient loss – use high digestibility feeds with a balanced energy-to-protein ratio to minimise dung volumes and nitrogen loss.

Methane capture from covered ponds reduces emissions but isn't feasible for most farms

The Emissions Reduction Fund enables dairy farmers to generate carbon credits by reducing methane emissions from effluent ponds through gas capture and combustion. However uptake by the dairy industry has been minimal, for the simple reason that for most farms the scale of their operation and the cost of the infrastructure makes establishing methane capture economically unviable.

The feasibility of capturing methane to generate either carbon credits or electricity will change as research progresses and costs, technologies and policies evolve. You can find out more about the technology and its feasibility in the methane capture fact sheet in this series.

Key points

- Effluent should be viewed as a valuable source of nutrients which can be recycled into the system to offset fertiliser inputs, save money and reduce emissions
- Reducing effluent volume will significantly reduce methane emissions from ponds
- Methane capture technologies are highly effective at reducing emissions from effluent, but aren't currently economically feasible in typical, grazing-based Australian dairy systems
- Management of effluent beyond the pond system will influence nitrous oxide and ammonia emissions and environmental pollution

Key recommendations

- Use effluent and soil tests to match re-use applications with soil fertility deficits and plant requirements
- Spread effluent regularly, over large areas of the farm to allow better utilisation of nutrients, and minimise the likelihood of nutrient overload and nutrient rich runoff
- Apply best-practice nitrogen management to effluent re-use to minimise nitrous oxide and ammonia emissions and other forms of nitrogen pollution.

More research is needed on other options for reducing emissions from stored effluent

Solids separation and composting reduce emissions from ponds by reducing the amount of digestible organic matter in effluent, but the 'downstream' implications are unclear. There is some evidence that you may end up with higher nitrous oxide losses during composting compared to the more typical management of effluent via ponds.

Research projects studying whole-of-cycle emissions from solids separation, composting and other waste management practices will provide recommendations to the industry in the coming years.

Spread effluent more frequently

Other research is currently attempting to show that you can reduce emissions from your ponds by spreading effluent more frequently. That is, if you minimise the time that effluent spends in the anaerobic pond under conditions that are conducive to methane production, you will minimise emissions. However, as methane is also generated from the settled solids or sludge, it may mean that those solids need to be removed to achieve a significant reduction.

When applying effluent, follow best-practice nitrogen management

By using effluent in this manner, you're able to recapture and more efficiently utilise nutrients within the farm system. In this sense, best practice effluent application follows the same principles as responsible use of nitrogen fertilisers: use effluent strategically, when pasture and crops are actively growing and when extra feed is needed, to avoid losses and maximise nutrient uptake and yields. By utilising the nutrients in effluent you'll save on synthetic fertiliser costs, and reduce both pre- and on-farm emissions.

Avoid applying effluent on wet soils and during wetter times of the year, so that you minimise the risk of run-off and nutrients leaching into waterways, as well as excessive production of nitrous oxide. Spreading effluent across a large number of paddocks will avoid nutrient overloading, and may allow you to reduce your fertiliser requirements.

You should apply effluent based on soil type, pasture demand and existing nutrient supply. Test effluent to determine nutrient composition, and test soils pre- and post-application to match effluent applications with nutrient requirements to ensure subsequent fertiliser applications are not adding excessive nitrogen.

Case study: Saving on fertilisers through effluent re-use

Hans van Wees is a sharefarmer at Tinamba in Gippsland, Victoria, milking 700 cows on the 251 ha irrigated property.

His effluent system features a 10-megalitre dam, into which liquids are pumped following solids separation. The dam feeds into the property's irrigation channels, enabling Hans to irrigate 120 ha directly from the dam at a rate of one part effluent to two parts fresh water.

Soil testing carried out shortly after the system was built revealed the opportunities for fertiliser savings. "Nutrient levels on the areas that were being irrigated with effluent water went through the roof," Hans said.

The result encouraged him to add a pump to the system, enabling effluent to be pumped to a second dam further away. The system can now distribute effluent water and nutrients across the entire property through the irrigation system. Regular testing of dam water and soil lets Hans identify imbalances and opportunities for fertiliser savings, and adjust the regime accordingly.

"Now, we don't purchase any potash, and we're saving a reasonable amount of nitrogen," he said. "It's good for the environment because there's no run off, and it saves us a lot of money in fertiliser."

Further information

Find out more about Hans' effluent system on the Dairying for Tomorrow website: http://bit.ly/SM7XcF

Conclusion

Managing effluent to capture and re-use nutrients benefits the environment and farm profitability. Good effluent management saves on fertiliser costs, improves soil quality and boosts pasture production. The environmental benefits of returning to the paddock nutrients that would otherwise be lost from the farm extend beyond the property boundaries, with less nutrients entering waterways or leaching into ground water. While practical options for reducing emissions from manure management are still being resolved, improving the utilisation of nutrients in effluent makes good business sense.

The Australian dairy industry has committed to reducing greenhouse gas emissions intensity by 30% by 2020.
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