Dairy Australia
Your Levy at Work

Profitable dairy farming: Good business management reduces greenhouse gases

Getting the diet right: more profit, fewer emissions

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

Why focus on the diet?

Methane emitted from rumen fermentation and nitrous oxide lost from dung and urine are in part due to the inefficient utilisation of feed and nutrients by dairy cows. By improving diet quality and better matching feeds with dietary requirements you can improve the efficiency of your farm system and reduce these greenhouse gas emissions at the same time.

A best-practice management approach to pasture and supplements, using high quality, high digestibility feed, together with a balanced protein content, will maximise milk production and minimise greenhouse gas emissions per kg of milk solids.

As Australian agriculture makes its way in an increasingly a carbon-constrained world, understanding and implementing emission reduction strategies makes good business sense as part of the everyday management of profitable dairy farms – especially in cases like diet management where improvements in diet quality are good for production and for reducing emissions.

How does it work?

High quality pasture and forages will reduce energy lost as methane

The rumen microbes that produce methane in the gut of cows thrive on high-fibre feeds. By replacing high-fibre, low digestibility feeds (e.g. hay and mature pasture) with more digestible feeds (e.g. less mature pastures, cereal grains, legumes) you can reduce methane production whilst increasing milk production.

This results in more milk per unit of feed and less emissions per unit of milk solids.

High-fat feeds will reduce methane and potentially provide CFI income

High-fat feeds reduce methane emissions. Feed additives with high fat content, such as canola meal, cold-pressed canola meal, brewers grain, hominy meal and dried distillers grain are all suitable for cows, and if they add energy to the existing diet then you'll also see an increase in milk production.

In southern Australian dairy systems they should be used in summer, when natural grass oils are low, to achieve the greatest production and methane responses.

The Carbon Farming Initiative (CFI) allows dairy farmers to earn carbon credits by feeding specific high-fat supplements, meaning more milk, less emissions and extra income from CFI payments. However use of these high-fat supplements should only be considered where they are cost-effective in their own right first as most of any profit increase will come from increased milk production.

Key points

- Greenhouse gas emissions are highest per kg of milk solids when cows are fed poor quality diets
- High quality, high digestibility feed will maximise milk production and minimise greenhouse gas emissions per kg of milk solids.

Key recommendations

- Monitor and supplement diets to ensure nutritional requirements are met when pasture quality is low
- Use low protein, high energy supplements when pastures are high in nitrogen to improve milk production efficiency, avoid excessive dietary nitrogen and minimise nitrous oxide emissions
- Include fats and oils as feed supplements to increase milk production if dietary fat levels are below 2-3%, to reduce methane emissions and potentially generate income through the Carbon Farming Initiative.

To see how feeding high-fat supplements works in theory and in practice, see the modelling and case study examples in this fact sheet series.

Optimal energy-to-protein ratio will minimise nitrogen loss

You can also reduce the nitrogen lost from your system by altering your feeding regime. Dairy cows are poor converters of dietary nitrogen to milk, excreting 70 to 90% of ingested nitrogen in urine and dung. Much of this is then lost to the environment, some of which becomes nitrous oxide. In addition, dairy cows can expend significant energy to convert excess nitrogen into urea to excrete in the urine; this energy loss can cost as much as 1.5 L / cow / day at peak lactation.

By using feeds and pastures with a balanced energy-to-protein ratio, you can better match nitrogen intake with dietary requirements. This means extra energy for milk production, less energy expended to excrete nitrogen and less excess nitrogen, which is wasted energy lost from your farming system.

Case study: Incorporating high-fat supplements into the diet

Graeme Nicoll farms at Fish Creek in South Gippsland, Victoria. Montrose Dairy a pasture-based dairy farm, producing around 160,000 kg milk solids per year.

Graeme introduced fat supplements to the cows' diet in 2006 as a way of controlling dust in the dairy. Vegetable oil is mixed into the crushed grain that cows are fed in the dairy. It is used in addition to the grain mix, so cows are getting additional energy in their diet.

Graeme says although they were aware of the potential for methane reduction when they implemented the strategy, it wasn't the primary reason for the change.

Graeme: "When we first started using oil in the dairy we were aware there was some talk of methane reduction back then and that's an added bonus I guess of using it."

For Graeme, the strategy works in his system because it solves the dust issue. The main economic benefit is in having happy staff, with the impact on production and emissions difficult to quantify.

Conclusions

Managing diet to improve quality and better match feeds with production demands is good for dairy businesses. Farmers should first and foremost consider the productivity and profitability impacts of potential emissions reduction strategies. But with a range of practical dietary options available that minimise emissions and increase profits, incorporating these into your farming operation makes good business sense.

Further information

Dairy Climate Toolkit:
http://www.dairyaustralia.com.au/Environment-and-resources/Climate/MicroSite1/Home.aspx

CFI methodology for feeding dietary fats and oils:
http://bit.ly/1gdgwCd

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