

30 WAYS

AUSTRALIAN DAIRY IS TACKLING CLIMATE CHANGE

WE'RE TALKING
DAIRY
MATTERS



THE AUSTRALIAN DAIRY INDUSTRY'S PROMISE

Comprising a dairy herd of 1.41 million cows, a workforce of 43,500 and farmgate production valued at \$4.8 billion, the Australian dairy industry is the lifeblood of our rural and regional economies.

Although the carbon footprint of Australian dairying is one of the lowest internationally, there is still scope to improve efficiency. Accounting for 10% of agricultural greenhouse gas (GHG) emissions (primarily through methane from livestock) and 2% of total national emissions (pre and post farmgate), the sector is positive contribution to addressing climate change committed to making a positive contribution to addressing climate change.

The Australian dairy industry's promise is to provide nutritious food for a healthier world. This promise is underpinned by commitments to its people and their communities, consumers, its animals and protecting the natural environment and reducing emissions. The **Australian Dairy Sustainability Framework** embodies this promise and commitments and underpins the industry's continual improvement to meet emerging issues and community expectations.

Reducing environmental impact is one of the key commitments under the framework, with measurable targets in place for 2030. To achieve this, the industry is engaged in cutting-edge innovations focused on improving land management, increasing water use efficiency, reducing waste and decreasing GHG emissions intensity by 30% by 2030.

As outlined in the industry's **Sustainability Report 2020**, a review is underway in 2021 to ensure Australian dairy is on track for meeting its goals and targets which are aligned with the United Nations' Sustainable Development Goals, delivering a truly global outlook.

In the meantime, significant progress is being made across Australia. In 2020, 94% of dairy farms implemented practices to reduce GHG emissions, while 93% of waste from dairy companies, processing approximately 80% of the nation's milk, was diverted from landfill. And there's more....

Read about the 30 ways Australian dairy is meeting the challenge of climate change and reducing environmental impact, ensuring a more sustainable industry into the future.



EMISSIONS

1. BOOSTING DIET QUALITY

Approximately 60% of the dairy industry's methane emissions are a by-product of feed digestion in the rumen of dairy animals. Farmers are constantly upskilling their knowledge to better balance feed rations, ensuring correct proportions of energy, protein and fibre in diets which leads to a well-functioning rumen (stomach fermentation chamber). This generates greater milk production responses per unit of feed, reducing the overall emissions intensity.

- » **Outcome:** Greater unit of output (milk) per unit of input (feed) is being achieved by improved feed management practices and providing animals with nutritionally balanced diets, resulting in lower GHG emissions intensity at a whole farm level.

2. IT'S IN THE GENES

DairyBio, the dairy industry's leading research innovation program and joint venture between Dairy Australia, Agriculture Victoria and the Gardiner Foundation, is looking at genetic improvement for traits associated with cow health, fertility, efficiency and longevity which lead to improved sustainability and animal welfare outcomes.

- » **Outcome:** Research that addresses genetic improvements helps reduce the number of cows being replaced in herds, as well as the total amount of methane emissions produced by all animals on farm.

3. BETTER FEEDING TO HELP REDUCE DAIRY'S CARBON FOOTPRINT

Research has found that the addition of dietary lipid supplements to cow diets such as cottonseed, brewers' grains, cold-pressed canola, hominy meal and grape marc, as well as feeding higher amounts of wheat, can help to reduce the carbon footprint of Australian milk production by reducing methane emissions from cattle.

- » **Outcome:** Feeding lipid rich supplements is one of the strategies available to dairy farmers to reduce their GHG emissions intensity.

4. FOCUS ON FERTILITY TO IMPROVE HERD PERFORMANCE

Dairy Australia's **InCalf program** is helping farmers to improve their herd's fertility. Good dairy herd fertility means better cow retention and less replacements are required to be reared for the herd each year, meaning that the lifetime production efficiency of the herd increases, thus lowering methane emissions.

- » **Outcome:** Farmers are implementing a range of approaches to improve herd fertility as well as herd management in general. The InCalf Program looks at areas such as calving patterns, cross breeding, heat detection and individual cow management.

5. PERFECTING PASTURES TO COMBAT CLIMATE CHANGE

Pastures with lower fibre and higher soluble carbohydrates can reduce methane production in dairy cows. Ways to improve pasture quality include through plant breeding or by switching from tropical (C4) to temperate (C3) grasses that use different pathways to capture carbon dioxide and contribute to reducing methane emissions.

- » **Outcome:** Improving the quality of pastures results in reduced levels of fibre and greater levels of carbohydrates in the plant. Methane emissions are greater in higher fibre pastures so these improvements towards higher pasture quality, increase animal performance, milk yield responses and also reduce overall methane production in the rumen.

6. DAIRY FARMING INTO THE FUTURE

Dairy Australia has launched a **Climate Change Strategy 2020–2025** outlining how it will support dairy farmers over the next five years to respond to the opportunities and challenges of climate change. This will be realised through cost-effective and achievable actions that ensure sustainable, productive and resilient dairy farms.

- » **Outcome:** By 2025 it is expected that dairy businesses will be adapting to climate challenges and that the Australian dairy industry's low carbon footprint and positive contribution to addressing climate change will be recognised locally and internationally.

7. BIOLOGY BRINGS EMISSION REDUCTION NEW LIFE

Biological control methods such as vaccines are being examined as techniques for farmers to reduce methane production from livestock by targeting the microbes that produce methane.

- » **Outcome:** Farmers have new and an increased number of options for reducing the production of methane from dairy cows.

8. 'SEA' WHAT WE'RE DOING HERE

In a bid to reduce enteric methane emissions, **FutureFeed** and dairy company Fonterra are trialling the use of seaweed in stockfeed on commercial dairy farms. The cows are being fed *Asparagopsis*, a native red macroalgae that has already been shown to reduce methane emissions from beef cattle by up to 80%. Overseas trials have shown similar strong results in dairy cattle but more research is needed to know it's safe and effective at scale.

- » **Outcome:** The seaweed supplement is not only showing enormous potential in reducing methane emissions from dairy cattle but there is a growing understanding of how to use it commercially in a way that is good for cows and makes sense for farmers.

9. RESEARCHING THE POTENTIAL FOR METHANE INHIBITORS IN DAIRY

Researchers in the United States have published **research co-authored by scientists from Victoria's Ellinbank Centre** that has Australian dairy farmers looking at methane inhibitors such as 3-nitrooxypropanol (3-NOP) which has been shown to significantly reduce methane emissions from lactating dairy cows. A study in the US showed the inhibitor persistently decreased enteric methane emissions by 30%, without negatively affecting animal productivity.

- » **Outcome:** The use of such methane inhibitors in Australian dairy could lead to a substantial reduction of GHG emissions without negatively affecting feed intake or milk production and composition.

10. ELLINBANK SMARTFARM RESEARCH FACILITY TARGETS CARBON NEUTRALITY

Funded through the government's \$5 million 'Smarter, Safer Farms' initiative, the 231-hectare, 500-cow **Ellinbank** research facility in Gippsland, Victoria, is fast tracking innovative technologies to optimise productivity, welfare and environmental outcomes on-farm. The SmartFarm is also working towards becoming carbon neutral by 2026 by reducing methane emissions, improving fertiliser and manure management, and generating electricity through solar, wind, hydro and bio-digestion, demonstrating research findings in a way that is accessible and applicable to the dairy industry.

- » **Outcome:** Ellinbank aims to be the world's first carbon-neutral dairy farm, along with reducing GHG emissions and ensuring gains in biodiversity. Learnings from this trial site can then be extended to the wider industry.

11. LEARNING ON THE JOB: DAIRY NUTRITION AND FEED MANAGEMENT

Dairy Australia is offering a range of courses aimed at equipping dairy farmers with increased knowledge of herd nutrition practices on farm. Courses include **Nutrition Fundamentals, Advanced Nutrition in Action** and **Feeding Pastures for Profit**.

- » **Outcome:** Farmers are adopting better herd feeding and nutrition practices on farm, resulting in greater efficiency of feed use per litre of milk produced. Improved management of feed resources reduces wastage of feed on farm, contributing positively to the environment.



LAND AND WATER

12. FARMERS FOCUSING ON FERTILISERS

Nitrogen (N) is critical for pasture growth and many farmers rely on synthetic N fertilisers to get additional nutrients into the soil, but these fertilisers can cause nitrous oxide emissions (a powerful greenhouse gas). To help farmers use nitrogen fertilisers more efficiently, Dairy Australia (DA) established the **'Fert\$mart' program** that aids farmers in developing a strategic, accurate plan for fertiliser use and soil management. Similarly, the **'More Profit from Nitrogen'** project, part funded by DA, is also seeking to increase nitrogen use efficiency by validating best practices on-farm that reduce GHG emissions while optimising nitrogen use for pastures.

» **Outcome:** Farmers are avoiding nitrous oxide emissions by minimising N loss through more efficient fertiliser application and usage. Soil testing on-farm is also helping farmers ensure they are using fertilisers at the right rate, in the right place, and at the right time.

13. TREES PLEASE

Tree planting is an important part of a long-term climate strategy in dairy regions, providing animals with shelter from direct sunlight, rain and high winds. Trees act as carbon sinks, sequestering carbon dioxide (CO₂) from the atmosphere, and air filters, releasing oxygen. Shelter belts on-farm can also become a natural highway for animals, offering habitat and food sources for native species.

» **Outcome:** Shelter belts are mitigating heat stress in animals as well as reducing the carbon footprint on dairy farms.



14. SEEING THE WOOD AND THE TREES

The Australian dairy industry is committed to achieving zero net deforestation by 2030 as a key target under the **Australian Dairy Sustainability Framework** and critical to reducing GHG emissions. The clearing or removal of trees leads to loss of plant and animal species due to loss of habitat; greater amounts of GHGs in the atmosphere and less carbon absorption by trees; and poorer atmospheric water cycle regulation affecting soil and crops.

- » **Outcome:** Dairy farmers are ensuring native vegetation or shelter belts are included on their farms and are working to end deforestation.

15. MANAGING PASTURES TO MAINTAIN SOIL CARBON

Increased soil fertility and improved pasture production and persistence are supporting the sustainable operations of Australian dairy farms. When soils are ploughed or otherwise disturbed, the soil carbon levels can deplete as stored carbon is released into the atmosphere. More carbon tends to build up under pastures than under crops, so by managing pastures effectively, the depletion of soil carbon can be mitigated.

- » **Outcome:** Dairy farmers are implementing best management practices such as more effective fertiliser application, improved rotational grazing, efficient irrigation and improved pasture species to help increase pasture production and persistence, and maintain soil carbon levels.

16. REDUCING NITROUS OXIDE EMISSIONS AND NITRATE LEACHING THROUGH MULTISPECIES PASTURES

The 'Dairy HIGH 2', \$6.5 million joint research project between the Tasmanian Institute of Agriculture and Dairy Australia, is investigating how mixing pasture species that have complementary growth characteristics can help reduce fertiliser use. The species being tested have been shown to help reduce nitrous oxide emissions and nitrate leaching associated with reduced fertiliser use, and this will now be tested at a whole farm systems level. This research will also look at how multispecies pastures could increase the rates of carbon sequestration and provide enhanced biodiversity.

- » **Outcome:** Farmers are provided with new ways of minimising the release of nitrous oxide into the atmosphere and increasing carbon sequestration.

17. ADOPTING MODERN RYEGRASS VARIETIES TO IMPROVE PASTURES

The selection of ryegrass varieties can impact the yield, nutritional value, and persistence of pastures. To assist with this decision making, Dairy Australia develops a **Forage Value Index (FVI)** each year to help farmers select the highest yielding varieties of ryegrass. In 2021 this was expanded to include Annual Ryegrass and Italian Ryegrass. Selecting varieties with higher yields increases both feed and pasture persistence on-farm, leading to less cultivation and sowing on dairy pastures each year.

- » **Outcome:** Reducing soil disturbance will help maintain higher soil carbon levels, helping to combat the effects of climate change.

18. IMPLEMENTING EFFECTIVE DAIRY EFFLUENT SYSTEMS ON-FARM

Dairy effluent (liquid waste) can be a valuable resource for farmers and an important opportunity to reduce fertiliser usage on-farm. By reintroducing effluent back into the soil, farmers are able to provide a natural fertiliser for the pasture by returning and reusing valuable nutrients back onto the farm.

- » **Outcome:** The use of effluent on dairy farms is standard practice for most dairy farmers who benefit from increased pasture production, and reduced fertiliser usage and on-farm emissions.

19. MOTIVATION TO MOVE MANURE

A **Tasmanian dairy farmer** is using an innovative approach to scrape clear the manure from the milking floor and deposit it in a custom-built storage area. This technique uses almost no water, leaving effluent (liquid waste) that is undiluted and higher in nutrients, providing a natural fertiliser for the pastures.

- » **Outcome:** This approach is providing a high concentration, natural fertiliser which is reducing the need for synthetic fertilisers on farm, as well as cutting water use and leaving a better effluent product in the process.

20. EFFECTIVE IRRIGATION MANAGEMENT TO REDUCE NITROUS OXIDE EMISSIONS

Irrigation and rainfall events can lead to the emission of nitrous oxide on-farm, with preliminary research suggesting that the timing and amount of irrigation water can help reduce emissions.

A research project being delivered under the **'More Profit from Nitrogen'** project, part funded by Dairy Australia, is researching ways that nitrogen use efficiency could be optimised through efficient irrigation practices. Aiming to develop best management practice guidelines around emission reduction strategies, these farming practices seek to deliver economic and environmental benefits.

- » **Outcome:** By ensuring effective irrigation management, farmers are contributing to reducing GHG emissions as well as enhancing productivity on-farm.

ENERGY AND RESOURCES

21. METHANE AND WASTE CONVERSION PROVIDING RENEWABLE ENERGY

Australia's first bio-gas plant is in the process of being built near Nowra on the NSW South Coast, at a cost of \$5 million and due for completion at the end of 2021. The plant will connect 18 dairy farms in the area to one main plant where manure would be converted to electricity which will then be used by the farms and the excess provided to the grid for community use.

- » **Outcome:** The conversion of manure to energy helps take care of dairy waste and reduces reliance on traditional energy sources and therefore emissions on farm.

22. GETTING SMARTER WITH ENERGY USE ON-FARM

Educational resources are being developed for dairy farmers to enable them to identify their own energy use on-farm in an effort to reduce emissions and their overall carbon footprint. This includes improving their understanding of practices that have the most impact on energy use, such as efficient milk cooling/heating systems, harvesting technologies that rely less on diesel consumption, and coal-fired power stations to generate electricity and produce carbon dioxide.

- » **Outcome:** Dairy farmers are taking action to reduce their energy use and looking to alternative energy sources, including the use of LED lighting and installing insulation to prevent heat gain or loss. Dairy Australia's latest farm survey shows 44% of farmers have installed solar photovoltaic panels and 20% have solar water heating.

23. REACHING FOR RENEWABLE ENERGY

Australia's dairy farmers are already adopting renewable energy technologies, such as solar and wind, in a bid to reduce energy costs, promote energy security and reduce GHG emissions. Support for these activities is being made available through various government initiatives and other investors including low-cost loans for energy equipment through the Clean Energy Finance Corporation.

- » **Outcome:** According to Dairy Australia's latest farm survey, 71% of farmers have at least one renewable energy installation on their property. Dairy farmers are looking to use renewable energy technologies which is helping to reduce GHG emissions.

24. DAIRY MANUFACTURERS GO GREEN TO REDUCE ENERGY USE

The latest dairy Sustainability Report 2020, shows that dairy manufacturers that dairy manufacturers have reduced their absolute emissions by 27% since 2010/11. Reductions have been made through gradual gains in processing and energy efficiencies and through farmers buying renewable energy through renewable power purchase agreements.

- » **Outcome:** The Australian dairy industry has reduced post-farmgate greenhouse emissions by roughly 250,000 tonnes per year. This equates to having 53,350 less cars on the road per year. This has resulted in a 23.5% decrease in emissions intensity by dairy companies since 2010/11.

25. PUMPING UP DAIRY EQUIPMENT EFFICIENCY

The vacuum pump is responsible for around 80% of power used when it comes to milking equipment, with its constant speed usually exceeding normal operating requirements. To improve efficiencies, pumps and motors used in dairies have gradually been improving over the years.

- » **Outcome:** Farmers are updating their equipment to variable speed vacuums which can reduce energy costs of operating the vacuum pump by 30-80%.



WASTE

26. GOT MILK? GLASS BOTTLES ARE BACK!

Victoria's **Schulz Organic Dairy** has been selling its milk in glass bottles since April 2019, reducing the need for plastic and making its milk packaging better for the environment.

The bottles include a refundable deposit that aims to have bottles returned, further minimising waste and creating a circular economy.

The company also supplies the food service industry with milk in 10L bladders made of soft plastic that are recyclable through RedCycle, and milk in 20L stainless steel milk pails.

» **Outcome:** By looking at alternative packaging for milk, including the use of glass bottles that are returnable and refillable, tonnes of plastic is being diverted from landfill and recycling systems.

27. THAT'S A WRAP!

Dairy farms use between 5,000 and 10,000 tonnes of plastic annually to preserve cut grass for animal feed. Grant funding through the National Product Stewardship Investment Fund to Dairy Australia is enabling the development of a collection and recycling system for silage wrap. Dairy Australia is working with key stakeholders including suppliers, plastics re-processors, farmers and other stewardship schemes to build practical and commercially viable collection infrastructure across dairy regions.

» **Outcome:** Grant funding will help accelerate a key dairy industry target of recycling 100% of silage wrap by 2030.

28. WASTE NOT, WANT NOT

The **C4MILK initiative**, supported by the QLD State Government and Dairy Australia, is encouraging farmers to explore alternative foraging options for cattle, which helps reduce farmers' upfront costs and the amount of food and by-product going to waste.

This initiative re-purposes by-product destined for waste and sees dairy cows across Queensland devouring the likes of brewers' grain from local distilleries, bread and even chocolate and discarded hot chips.

» **Outcome:** The dairy industry's long-term resilience is supported through not only financial sustainability by reducing its reliance on traditional feed, but by also minimising environmental impact.

29. COMING FULL CIRCLE ON WASTE

It's never been more important than now to address the issue of food waste, with Victoria alone producing 2.4 million tonnes of food waste a year.

Dairy Australia has partnered with Sustainability Victoria and Stop Food Waste Australia to deliver a workshop and roundtable designed to find the next steps towards reducing food waste and achieving greater circularity in the dairy sector. This partnership aims to contribute to the national target of halving Australia's food waste by 2030.

» **Outcome:** The industry aims to develop feasible options to reduce and better utilise dairy waste across the supply chain, for example, the use of new technologies in processing, modern milk treatments to extend shelf life, and packaging adjustments.

30. DAIRY PRODUCTS PACKING A PUNCH

Packaging is a serious issue when it comes to ensuring dairy products can make their way around Australia and the rest of the world and maintain quality and consistency. The dairy industry is introducing packaging that is either made from recycled content or can be recycled and is lighter than previously used materials. This move is having the impact of reducing emissions and the amount of resources used in the packaging.

» **Outcome:** Manufacturers are investing in new technology and processes to ensure their packaging is more sustainable. Brownes Dairy is changing its traditional tetra-pak packaging to include the use of a sugarcane alternative to the plastic coating that has been previously used. This breaks down more easily and means less plastic in use. Additionally, Lion Dairy has removed 1,700 tonnes of plastic from its manufacturing process by using an improved milk bottle that is lighter than its predecessor.

**FOR MORE INFORMATION AND
CASE STUDIES ON SUSTAINABLE
PRACTICES IN THE AUSTRALIAN
DAIRY INDUSTRY VISIT**

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