



Farm business environmental sustainability plan



The Farm Sustainability Program is Parmalat's commitment to working with our milk suppliers to responsibly manage environmental resources. We believe that the health of our water, land and air is vital to the ongoing sustainable growth and profitability of the Australian dairy industry.

Through adoption of innovation and best management practices, our dairy farmers are striving to meet the minimal impact expectations of our international and domestic customers, as well as the local communities in which they live and operate. Together, we realise there are opportunities to practice and demonstrate improved performance.

The Meadows, Albion Park, NSW, 2527

Owner/ Operators: Phillip & Craig Tate

Farm Profile: Phil and Craig are brothers who, together with their families, operate a 630 milking herd on their 400 hectare (ha) property. They produce an average of 5.3 million litres of milk annually. The brothers are proud to operate the second largest dairy farm within a 100km radius of Sydney's CBD.



Phillip & Craig Tate, The Meadows, NSW, Australia

Farm natural assets: The farm milking platform (approximately 300 ha) is situated on high agricultural value alluvial soils of the waterway, Macquarie Rivulet, which winds through the farm for approximately 3.6km. The rising areas of the property are of lower quality soil types. High pasture consumption figures (Dry Matter (DM) consumed/ ha) independently assessed for the property reflect good, efficient management practices on this valuable agricultural land.

2016 Farm SWOT analysis

Strengths

- ✓ Farm is situated on highly productive alluvial soil to grow quality feed that is efficiently converted to milk (9000 litres/cow).
- ✓ Good business acumen and have identified opportunities to grow the business sustainably.
- ✓ Technical expertise is engaged when required.

Weaknesses

- ✗ Life/ work balance- do not take enough time off away from the farm
- ✗ Applying technology opportunities to the business.
- ✗ Tendency to micro-manage.
- ✗ Lack of agricultural contractors in the region
- ✗ Farm infrastructure is limited to rising areas due to flooding risks.

Opportunities

- ✓ The development of the Albion Park By-pass through the property will allow the property to undertake infrastructure upgrades potentially resulting in labour, water and energy use efficiencies and improve ease of animal and nutrient (effluent) management.
- ✓ Farm proximity to Sydney provides a good "food miles" story for markets and potential to offer consumers "sustainable food production" farm visits.

Threats

- ✗ High rainfall periods causing flooding of the alluvial soils.
- ✗ Access to good, reliable labour.
- ✗ Exposure to commodity prices.



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- ✗ Albion Park By-pass proposal (NSW RMS) will impact current farm layout requiring infrastructure and management changes. Potential impacts to wetland areas on the farm.
- ✗ Impacts to quality stock water from the Macquarie Rivulet due to sediment & nutrient run-off from nearby urban developments.

Farm Sustainability Goals

- ✓ To implement farm practices on our farm that will increase productivity and profitability whilst improving our resilience to external factors and allow us to nurture the land and water resources upon which we rely.
- ✓ To achieve industry excellence in implementation of efficient water and nutrient management practices, undertaking biodiversity and soil quality activities and decreasing waste, emissions and energy use.
- ✓ To increase the health and well-being of our families, staff, animals and community through our efforts to look after our land and water.

Existing farm sustainability activities

- ✓ An industry best practice Fert\$mart Plan is being implemented on the farm.
- ✓ Nitrogen & other fertilisers are applied using the 4Rs principle¹
- ✓ Approximately 4% of the farm is conserved for conservation.
- ✓ Paddock soil erosion is mitigated by the use of no rip cultivation methods.
- ✓ Creek bank erosion is addressed through stabilisations works and planting.
- ✓ Fertiliser is purchased in bulk to reduce the use of polypropylene bags.



- ✓ Effluent solids are being used as a resource and are spread as a fertiliser (pictured above).
- ✓ Silage wrap, twine and oil/chemical drums are stored in a dedicated low run-off risk area and are taken for recycling on a monthly basis (pictured right).
- ✓ Energy use in the dairy and for stock water is considered 'low'² at 34.5 kWhr/ 1000L of milk produced.

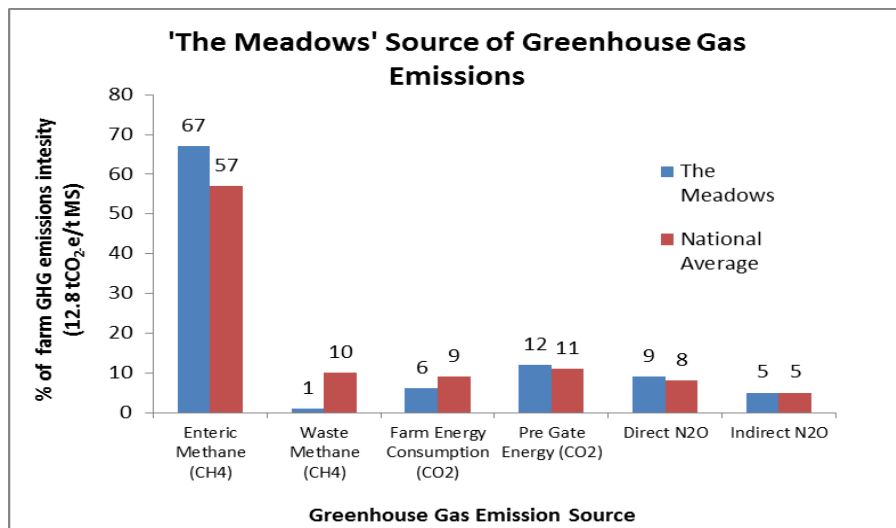


1. 4R Nutrient Stewardship Principles- Right Source, Right Rate, Right Time, Right Place
 2. Source: Smarter energy use on Australian Dairy Farms- Analysis of regional assessment data: NSW (Dairy Australia, 2015)

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- ✓ The farm has had an industry best practice greenhouse gas emissions assessment undertaken so that abatement options can be explored.



Source: Tate DGAS Calculation, March 2016

Planned actions to achieve farm targets


- 🌍 **Improve farm layout to increase efficiencies and opportunities for best practice implementation-** Amendments to the farm layout will increase feed conversion efficiencies (feed pad/ grazing management), identify conservation areas for biodiversity, shade & shelter and decrease dependency on employed labour.
- 🌍 **Reduce energy use-** A new planned dairy will consider design and orientation to capitalise on natural cooling and heating benefits.
- 🌍 **Reduce energy use -** Equipment decisions for the dairy upgrade will include energy efficiency criteria for heating of hot water, milk cooling, milk harvesting (pumps) and recycling of water.

- 🌍 **Reduce reliance on external power sources-** Install solar PV panels on the new dairy to match peak demand, including stock water pumping.
- 🌍 **Increase effluent & water re-use/ recycling as valuable resources-** Apply effluent across a greater percentage of the farm through the installation of dedicated irrigators with scheduling capability.
- 🌍 **Increase fertility of soils and reduce likelihood of nutrient loss-** Implement the farm Fert\$mart Plan and introduce a nutrient application register (IT programs to be investigated such as AgWorld).
- 🌍 **Increase efficiency of cow feed conversion -** Installation of a herd management & monitoring system. The system will reduce wastage by more accurately evaluating the feed intake requirements of individual cows (reducing enteric methane) and provide early detection of cow ill health.
- 🌍 **Increase percentage of total cow diet from home grown feed sources-** DM intake from quality home feed is cheapest, reduces exposure to commodity prices and decreases GHG emissions from pre-gate sources.
- 🌍 **Improve best practice in safe storage & use of chemicals-** Dedicated storage room to be developed and management procedures to be prepared. All staff are to be trained in the procedures.
- 🌍 **Improve documentation of business performance-** A farm mapping & data management program will be introduced to improve collection, storage and analysis of information related to increasing production/ profitability more efficiently (For example: Pasture yield (DM/ha) pasture consumption (DM/cow), harvest yield (DM/ha), nutrient application (NPKS kg/Ha), soil fertility levels).
- 🌍 **Enhance the existing farm waste program-** Implement further waste abatement initiatives to reduce need to recycle and reuse.

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2016 Farm Sustainability Targets

Reducing Environmental Impact Priorities	Relevant 2020 Dairy Industry Target (& 2015 NRM Survey status)*	Farm Baseline	Farm Target 2020	Indicator	Annual Performance Progress
Improve nutrient, land & water management 	8.1 90% of stock are excluded from waterways	✓ 100% (3.6km) of the Macquarie Rivulet is excluded from stock along both embankments.	Whole farm plan in place to identify new opportunities on small waterways & wetlands.	Managing greater % of farm for biodiversity & conservation.	Projects being undertaken which conserve areas and provide shade and shelter for stock.
	8.2 80% of dairy farms implement nutrient plans (2015 measure is 58%)	✓ Fert\$mart Plan prepared March 2016 ✓ Effluent tested to analyse nutrient value Nitrogen Use Efficiency (NUE) to be determined.	100% of identified Farm Management Zones (FMZ) within desired regional fertility parameters.	Farm fertility levels are tracking towards desired regional fertility levels for PKS.	Nutrient application register is in place to track NPKS application according to Fert\$mart Plan (kg/ha), including effluent applications. Fert\$mart Plan is updated annually by an Fapproved agronomist, including analysis of fertility trends.
			100% of effluent is used as a resource on farm.	Effluent rates are determined using existing industry tools (L/ha).	Seasonal effluent testing undertaken and rates modified accordingly. Data/calculations are documented.
			CP % of home grown feed is maintained between 16% to 20%. Nitrogen Use Efficiency is known over each season and is exceeding industry best practice.	Nitrogen application rates are determined to maintain Crude Protein (CP) of pasture between 16%-20%. NUE is measured and is above industry best practice.	Plant tissue testing and CP% trending analysis is undertaken. NUE is improving annually.
	8.3 80% of dairy farms with irrigation having some level of automation implemented (2015 measure is 54%)	No irrigation currently in place for water or effluent.	Effluent irrigation equipment in place that is programmable for application rate, appropriate placement and automated timing.	Effluent irrigation equipment is used to apply determined effluent rate to Fert\$mart identified area.	Irrigated effluent application rates, timing and placement are documented.
8.4 80% of dairy farms managing land for conservation & biodiversity (2015 measure is 45% at an average of	✓ 11 hectares fenced & managed along Macquarie Rivulet (4% farm area)	Embankment erosion stabilised within the existing conservation area.	Priority sites identified on farm map.	Stabilisation works undertaken annually to ensure 100% priority erosion sites stabilised by 2020.	




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	7% of area per farm)		Conservation area on the farm increased to 6% by way of new shelter-belts along paddocks.	Area (ha) dedicated to conservation has increased.	Area available for biodiversity conservation is increased at an average of 0.8 % per year.
	8.5 100% of dairy farms actively managing noxious weeds	✓ LGA weed classifications known and an active seasonal weed control management practices in place (32 hrs/year)	No noxious weeds existing on the farm area. Pasture weeds actively managed on the farm.	Land area (ha) requiring treatment and mortality rates documented. Labour hours required to eradicate infestations.	Reduction in area and labour time required to manage noxious weed infestations.
	8.6 100% of dairy farms have practices in place to recycle water on farm ¹	✓ Dairy water recycling of in place for milk cooling.	20% reduction in consumptive water intensity in the dairy (L/ML Milk). All water emanating from the dairy is used for multiple applications.	Baseline water consumption requirements have been determined according to use. All opportunities for safe recycling and use of water have been identified in the dairy and necessary equipment upgrades undertaken. Water is used to match water quality to necessary quality for use.	Reduction in water consumption, based upon water usage meterage for 14/15, at an average rate of 6% annually.
<p>Reduce greenhouse gas emissions intensity by 30%</p> 	10.2 Farm emissions abatement actions ² (2014 NSW measured range is 9.4 to 17.2 tCO ₂ -e/ t MS)**	DGAS industry best practice calculations demonstrate a current emission intensity of 12.8 tCO ₂ -e/t MS produced on the farm.	15% reduction in emissions intensity (tCO ₂ -e/t MS)	Annual DGAS calculation undertaken to determine intensity (tCO ₂ -e/t MS). Recommendations of the Tate DGAS Summary Report are being implemented.	Reduction in emissions intensity (tCO ₂ -e/t MS) by an average of 5% per year.
<p>Reduce waste to landfill by 40%</p> 	11.2 On farm measurement to be developed from DairySAT tool ³	<ul style="list-style-type: none"> ✓ 100% of silage wrap, twine and oil/chemical drums recycled. ✓ 80% paper & cardboard recycled. ✓ Reduction & re-use practices in place to mitigate impacts of 	<p>No recyclable or reusable materials going to landfill.</p> <p>20% reduction in waste generation across the farm.</p> <p>Of the waste generated, 40% reduction in waste to landfill intensity (t waste/ ML Milk</p>	<p>Baseline waste generation figure determined (t).</p> <p>Baseline waste to landfill (t) and waste to landfill intensity (t waste/ML Milk produced) determined.</p> <p>Written procedures</p>	<p>Reduction in waste generation by an average of 5% per year.</p> <p>Reduction in waste to landfill intensity (t waste/ ML Milk) tracking at an average of 10% per year or tracking to achieve no more than 10% of overall farm waste (t) going to landfill.</p>



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		<p>plastics & polypropylene use.</p> <p>✓ Timbre (pellets) re-used</p>	<p>produced) or only 10% of overall farm waste (t) going to landfill.</p>	<p>prepared to manage waste streams.</p> <p>Dedicated refuse management area in the new farm layout.</p>	<p>Waste management program is continuing and captures accurate performance data- weight (t) of waste generated and managed via recycling (t), reuse (t) or landfill (t).</p>
<p>Farm determined priorities***</p> 	<p>Effluent Management System is considered best practice.</p>	<p>Effluent directly applied to 3% of the milking platform through a pipe system.</p>	<p>Effluent treated via a best practice two pond system and irrigated onto at least 10% of the milking platform.</p>	<p>Effluent Management Plan prepared for the farm by a registered expert.</p> <p>Effluent being applied at best practice rates to at least 10% of the milking platform.</p>	<p>Effluent management storage and reuse implemented according to the EMP.</p> <p>Annual effluent testing is undertaken to formulate annual application rates. Volume totals (ML) and rate of application (kg NPK/ha) are recorded in the nutrient application register.</p>
	<p>Chemical storage and management meets environmental and OH&S compliance.</p>	<p>✓ Plans for the new dairy development include a dedicated chemical storage area.</p> <p>Currently chemicals are not stored in a dedicated bunded and ventilated storage shed.</p> <p>No process in place to document chemical inventory, MSDS or chemical usage.</p>	<p>No reportable environmental or OH&S incidences on farm.</p> <p>Dedicated storage area complying with regulation.</p> <p>Documented procedures in place for safe storage and handling of chemicals.</p> <p>All staff trained in risk mitigation procedures and incident management.</p>	<p>Storage, procedures and training comply with regulation.</p>	<p>Bi-annual AgSafe (or similar) audit undertaken.</p>

¹Potential links with Target 10 of the Australian Dairy Industry Sustainability Framework - 20% Reduction in the water consumption intensity of dairy manufacturers (L/ML milk processed). Baseline is 1.7L/ ML processed.

²This target has been identified in the Australian Dairy Industry Sustainability Framework with no targets set at this time. Target 10.1 sets a level of 30% reduction in emissions intensity by dairy manufacturers (tCO₂-e/ ML Milk). Baseline is 178.7 tCO₂-e/ ML milk processed.

³Potential links with Target 11.1a of the Australian Dairy Industry Sustainability Framework – Waste to landfill intensity of dairy manufacturers (t waste/ ML Milk processed)

*Dairy Australia Sustainability Survey, September 2015 (Down to Earth Research)

**Dairy Australia Dairy Farm Monitor Project, New South Wales, Annual Report 2014-15.

***Priorities were determined by undertaking Dairy Australia's Dairy Self-Assessment Tool (DairySAT), September 2015



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Value to the farm operation

The following is an overview of potential costs associated with implementing activities where cash investment will be required. This has been estimated using current cost information, estimates from potential suppliers and estimated labour (\$40/hr).

Action	Initial estimated cost (\$)	Annual estimated operational cost (\$)	Measurable annual value to farm (\$)	Compliance associated benefits
Fert\$mart Planning	3,000	1,000	7,000	✓ Nutrient retained on farm
Upgrade to energy efficient equipment options	20,000	500	5,000	✓ Nutrients retained on farm
Alternative energy source PV Solar Panels (30kW)	60,000	500	5,000	
Farm data mgt (web based system)		1000	5,000	Document control for compliance recording
Herd Recording System (De Laval)	30,000	2,000	8,000	✓ Animal Health & Welfare ✓ Food Safety
Conservation Projects	5,000	2,000		✓ Native animal & vegetation protection ✓ Water quality ✓ Animal Health
Ongoing Waste mgt program implementation	800	2,500	2,500	✓ Animal Health ✓ Employee OH&S ✓ Food Safety ✓ Environmental Incidents(EPA)
Chemical mgt	12,000	2,000		✓ Animal Health ✓ Employee OH&S ✓ Food Safety ✓ Environmental Incident (EPA)

Supporting Documentation

Performance progress and value should be considered with reference to the following documents which underpin the indicators and targets established for The Meadows:

Tate DGAS Summary Report, March 2016

Tate DairySAT Action Plan, September 2015

Tate Fert\$mart Plan (prepared by AgriMilk Consulting), March 2016

The Meadows Energy Assessment Action Plan, December 2012 & May 2010