Supply Number: SAMPLE

Fonterra
Dairy for life

Farm Insights Report

2020/2021

The Co-operative Difference

Environment
Milk
Animals

Introduction

This report uses the information that you provide in your Farm Dairy Records, together with milk quality and production data that the Co-op holds, to provide useful insights into what is happening on your dairy farm. The metrics included in this report highlight risks and opportunities that may exist in your farming system, helping you to improve your efficiency and reduce your impact.

The Co-operative Difference Achievements

The Co-operative Difference is the framework to ensure that on-farm practices support the achievement of our strategy. The Co-operative Difference metrics show how your farm tracked if the achievements had been in place for the 2020/2021 season to give you an indication of achievement.

Purchased Nitrogen Surplus

Purchased Nitrogen Surplus is at or lower than 137 kgN/ha (75th percentile for Fonterra farms nationally)

2020/2021 season:

124 kgN/ha

Farm Grown Feed

Your herd's diet needs to be made up of at least 80% farm grown feed

2020/2021 season:

90%

Milk Quality Excellence

If Te Pūtake is achieved, to reach Te Puku you need a minimum of 30 days of Milk Quality Excellence to receive 3c per kgMS on all 'Excellence' milk

2020/2021 season:

262 days

To achieve Te Tihi you must achieve an excellence rating on at least 90% of the days that you supplied milk

2020/2021 season:

90%

For more information on The Co-operative Difference please go to **www.fonterra.com/makethedifference**

Your Farm's Key Information

	2018/2019	2019/2020	2020/2021
Dairy farm effective area	356.3 ha	355.8 ha	355.8 ha
Peak cows (maximum cow numbers)	1,030 cows	1,050 cows	1,050 cows
Stocking rate (milking cows)	2.9 cows/ha	3.0 cows/ha	3.0 cows/ha
Production (milk solids produced)	534,137 kgMS	543,683 kgMS	520,764 kgMS
Production per cow	519 kgMS/cow	518 kgMS/cow	496 kgMS/cow
Production per hectare	1,499 kgMS/ha	1,528 kgMS/ha	1,464 kgMS/ha
Nitrogen fertiliser applied per hectare	195 kgN/ha	195 kgN/ha	165 kgN/ha
Imported supplementary feed fed	1,671 t	1,468 t	972 t
Imported supplementary feed fed per cow	1.6 t/cow	1.4 t/cow	0.9 t/cow
Average somatic cell count	135,094 cells/ml	129,533 cells/ml	124,067 cells/ml
Greenhouse Gas Emissions per hectare	-	12,419 $kgCO_2e$/ha	12,811 $kgCO_2e$/ha

Previous seasons data will be shown where data is available and farm ownership hasn't changed.

Environment

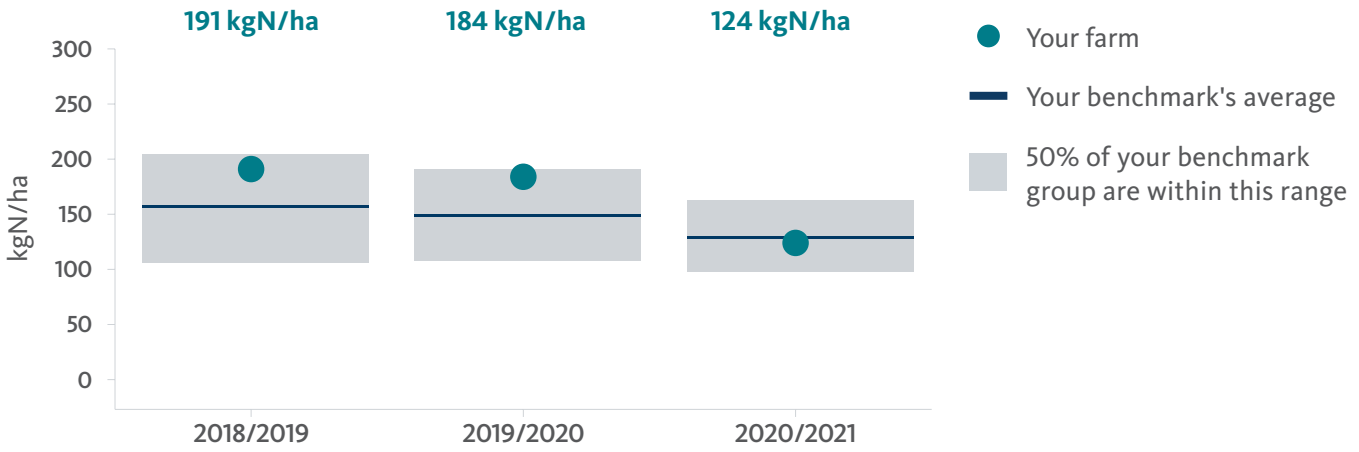
Your farm's environmental insights are broken down into Purchased Nitrogen Surplus, Nitrogen Risk Scorecard and Greenhouse Gas Emissions.

Your Farm's Purchased Nitrogen Surplus

Purchased Nitrogen Surplus is the difference between the nitrogen inputs (fertiliser and imported feeds) and the nitrogen outputs (milk, meat, crop or supplementary feeds). A high number means more nitrogen is at risk of being lost from your farm to the receiving environment.

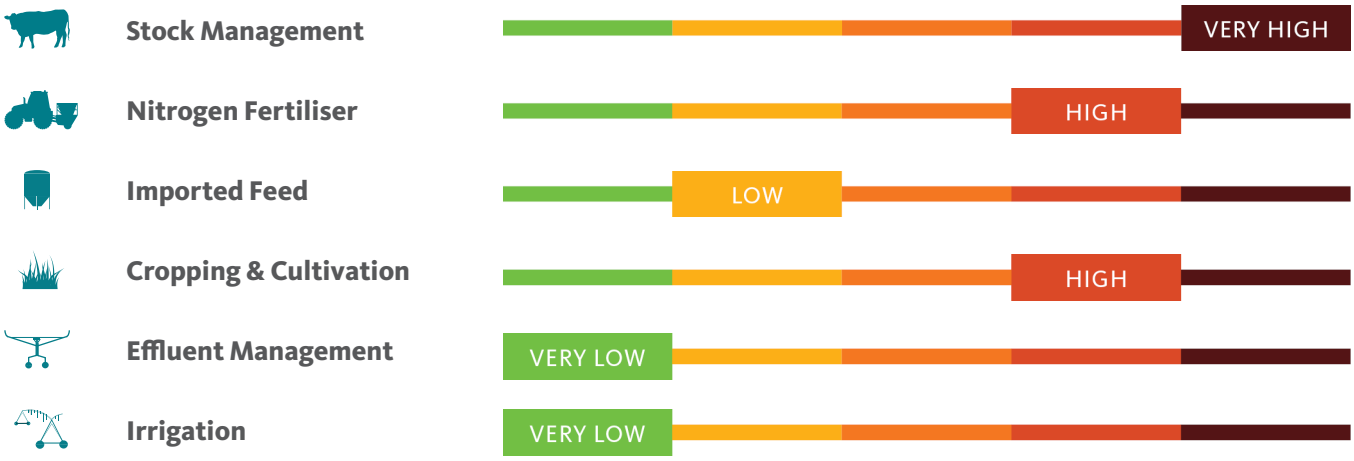
Nitrogen Fertiliser	+	Imported Feed	−	Exported Product	=	Purchased Nitrogen Surplus
165 kgN/ha		60 kgN/ha		101 kgN/ha		124 kgN/ha

Your Farm's Purchased Nitrogen Surplus Per Hectare



Your farm is benchmarked against other farms in the Canterbury region with production **between 1401-1700 kgMS/ha.**

Your Farm's Nitrogen Risk Scorecard



Your Farm's Nitrogen Risks Broken Down

Stock Management

VERY HIGH

Stocking Rate

The higher the stocking rate (peak), the greater the nitrogen loss

Total	**27.5 su/ha**
Milking herd (3.0 cows/ha)	23.6 su/ha
Replacement/other animals	3.9 su/ha

Dry Matter Eaten

The more dry matter eaten per hectare, the more nitrogen ingested by the animal and returned to pasture as dung and urine

Total	**17.3 tDM/ha**
Grown on this farm	
Pasture & crops	14.1 tDM/ha
Imported to this farm	
Pasture & crops *	1.4 tDM/ha
All other feeds	1.8 tDM/ha

Wintering Off/Culling

Reducing the number of animals on farm (from peak numbers) by culling and/or wintering off (May-Aug) will reduce the nitrogen loss risk on your dairy farm effective area

37% off platform

Winter Practices

Reducing the amount of time cows spend on pasture and/or crops over winter will reduce the nitrogen loss risk

Off pasture facility	0%
On pasture	**93%**
Break fed fodder crop	**7%**

Nitrogen Fertiliser

HIGH

Nitrogen Fertiliser Applications

The more nitrogen fertiliser applied, the higher the nitrogen loss risk

165 kgN/ha

Nitrogen Use Efficiency of Fertiliser

The greater the conversion efficiency, the lower the nitrogen surplus available to be lost

9 kgMS/kgN

Timing of Application

Fertiliser applied during the winter months can increase the chance of nitrogen being lost

Sep - Apr

Jul - Aug

May - Jun

Highest Application Rate

Lower application rates reduce the nitrogen loss risk

Below 25 kgN/ha

Above 25 kgN/ha

Feed Budget

Using a feed budget or wedge to help plan strategic fertiliser applications is a good farming practice

No feed budget used

Feed budget used

Imported Feed

LOW

Nitrogen Imported From Feed

The greater the amount of imported feed, the more nitrogen that enters the system

60 kgN/ha

Nitrogen Content

The greater the average nitrogen content, the higher the amount of nitrogen that enters the system

Average N content of 2.19%

Nitrogen Use Efficiency of Imported Supplements

The greater the conversion efficiency, the lower the nitrogen surplus available to be lost

25 kgMS/kgN

Energy model calculations based upon the DairyBase model developed by DairyNZ.

** Includes feed fed to stock grazed off the dairy farm effective area*

Your Farm's Nitrogen Risks Broken Down Continued...

Cropping & Cultivation

Conventional

This is the greatest risk method for sowing a crop and the risk increases as the cultivated area increases

6% of farm cultivated annually

Minimum Tillage

This is a lower risk activity than conventional cultivation, however the risk increases with the total area cultivated

Not Applicable

Direct Drill

This is a lower risk activity than both full cultivation and minimum tillage for establishing a crop

Not Applicable

Season of Harvest/Grazing

Crops harvested/grazed during winter pose a higher risk to nitrogen leaching

Summer harvest

Winter harvest

Timing of Fertiliser Application

There is greater risk if fertiliser is applied to crops during high risk months of May, June, July and August

No fertiliser applied during winter

Fertiliser applied during winter

Effluent Management

Effluent Discharge Method

Discharging treated effluent to land is the lowest risk

Irrigate to pasture

Irrigate to pasture (low storage)

Discharge to water

Discharge to water and pasture

Effluent Irrigation Area

An undersized effluent area can result in the average amount of nitrogen per hectare applied exceeding local rules and regulations

22ha/100 cows (incl. feed pad)

Application Depth

Low rates will ensure greater flexibility of management with more irrigation days available and increase the chance of the plant utilising the nutrients within the effluent rather than it being lost

> 12mm application depth

Irrigation

Irrigation Method

Irrigation generally increases the nitrogen loss risk due to the potential for over irrigating to induce drainage events. Some systems are inherently riskier than others irrespective of management

No fresh water irrigation

Irrigation Scheduling

Deciding when to start or stop irrigation is important as poor management of an irrigation event can lead to induced drainage

Not Applicable

Irrigation Application Method

Having control over the amount and how often water is applied can greatly influence nitrogen loss risk with poor management of irrigation events leading to induced drainage

Not Applicable

Greenhouse Gas Emissions

This section describes the greenhouse gas emissions on your farm. It has been designed to give you a better understanding of what is happening on your farm in relation to agricultural sources of biological greenhouse gas emissions.

Your Farm's Greenhouse Gas Emissions

Greenhouse Gas Emissions Per Hectare

This number indicates the biological greenhouse gas emissions per hectare from your farm which is made up of both methane and nitrous oxide gases

12,811 $kgCO_2e/ha$

Methane

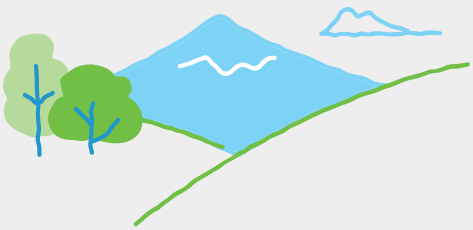
Total Methane emissions per hectare of your farm

10,399 $kgCO_2e/ha$

Nitrous Oxide

Total Nitrous Oxide emissions per hectare of your farm

2,412 $kgCO_2e/ha$



9,599 $kgCO_2e/ha$

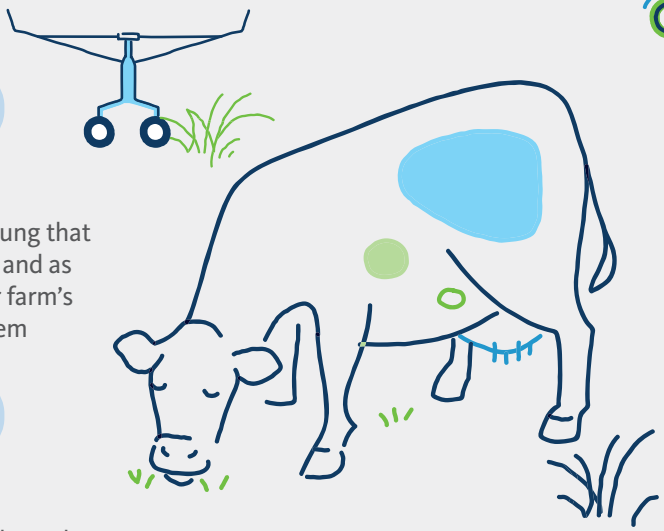
Enteric Methane

Methane is the single biggest contributor to on-farm emissions and is produced by microbes that are naturally present in the gut of ruminants (e.g. cows, sheep) and is emitted when they burp

574 $kgCO_2e/ha$

Nitrogen Fertiliser

Nitrous oxide emissions from the applications of nitrogenous fertiliser



415 $kgCO_2e/ha$

Effluent System

Methane emissions from dung that is emitted while in storage and as it is spread to land via your farm's effluent management system

29 $kgCO_2e/ha$

Effluent System

Nitrous oxide emissions from urine that is emitted while in storage and as it is spread to land via your farm's effluent management system

385 $kgCO_2e/ha$

Dung

Methane emissions from dung that is deposited on to the pasture

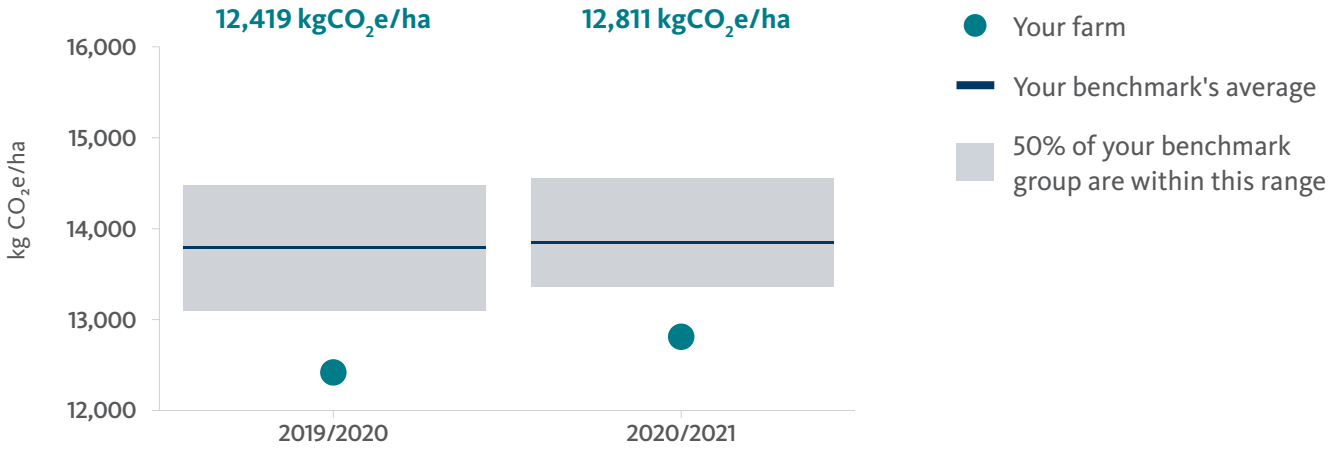
1,809 $kgCO_2e/ha$

Urine & Dung

Nitrous oxide emissions when dung and urine is deposited on to pasture

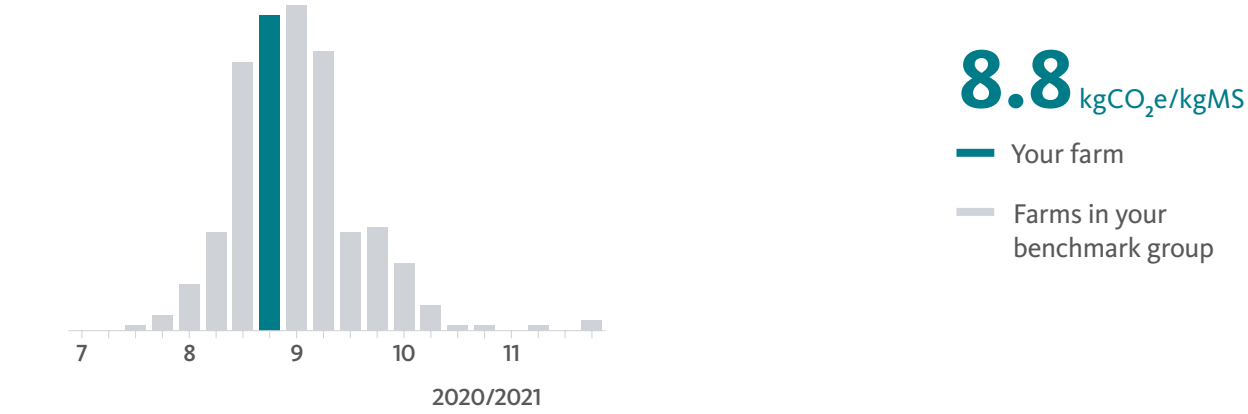
All emissions are given as a total amount of carbon dioxide equivalents (CO_2e). This is done to create a universal metric to compare greenhouse gases regardless of sectors and sources. This takes into account the different lifespans and warming potential of the different gas types.

Your Farm's Greenhouse Gas Emissions Per Hectare



Your farm is benchmarked against other farms in Canterbury with production between 1401-1700 kgMS/ha.

Your Farm's Greenhouse Gas Emissions Per Kg Milk Solids



Your farm is benchmarked against other farms in Canterbury with production between 1401-1700 kgMS/ha.

He Waka Eke Noa Partnership

Primary Sector Climate Action Partnership

Farmers, Government, and Māori working together to reduce Aotearoa New Zealand's agricultural emissions while continuing to sustainably produce quality food and fibre products for domestic and international customers. This partnership aims to equip farmers with the knowledge, tools and support they need to reduce emissions and adapt to a changing climate.

For more information

More information relating to agriculture and climate change is available on the He Waka Eka Noa and AgMatters websites.

www.hewakaekenoa.nz

www.agmatters.nz

Your Greenhouse Gas Emissions were calculated using the Agriculture Inventory Model (AIM), which was developed by Ministry for Primary Industries.

Milk

This section of the report provides you with key insights into potential savings and opportunities for your farm. These insights have been calculated using existing tools and calculators that have been tested and developed through industry research.

Somatic Cell Count

Mastitis is usually caused by bacteria, which enter through the teat canal and infect the udder. Effective mastitis prevention will ensure more milk in the vat, higher quality milk, less use of antibiotics and more time saved on farm. If your bulk somatic cell count (SCC) is greater than 100,000 cells/ml this indicates some cases of sub-clinical infection are present with the potential to impact milk production.

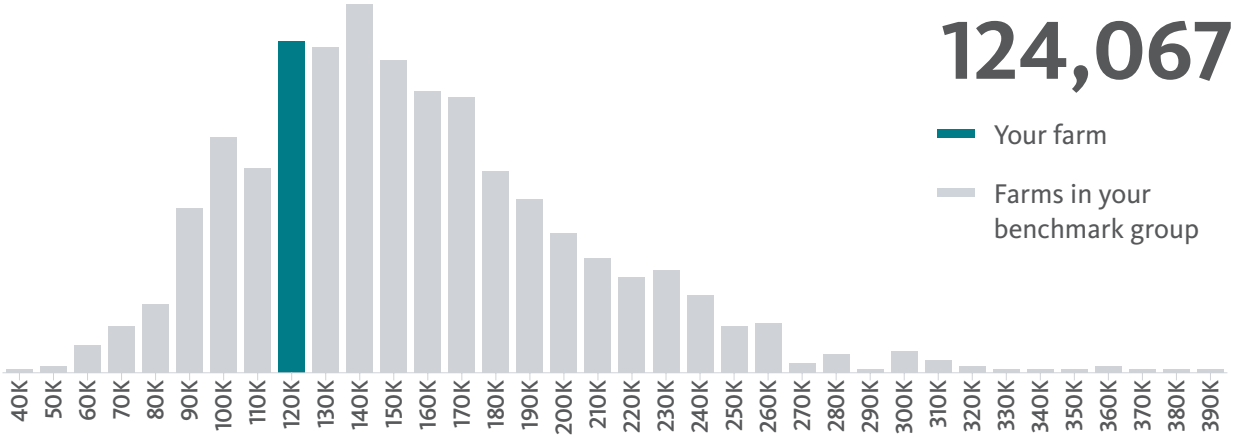
Research has shown there is a 2.1% loss in production for every doubling of somatic cell count over 100,000 cells/ml.

Potential Benefit

$25,900

By reducing your cell count to 100,000 cells/ml there is the potential to increase production on your farm that could be worth up to $25,900. This does not include the cost of treatment or culling and is based off a milk price of $7.60.

Your Farm's Annual Average Somatic Cell Count 2020/2021



124,067 cells/ml

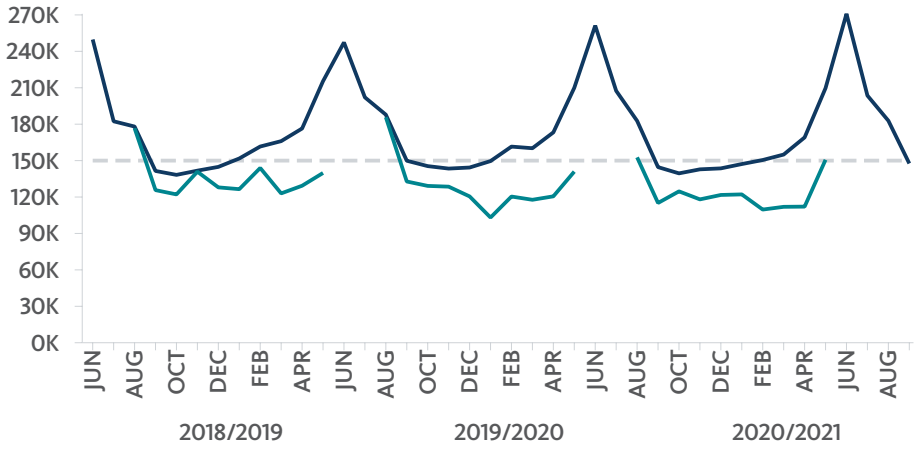
Your farm

Farms in your benchmark group

Your farm is benchmarked against other farms in your region. This placed you in the top 50% of suppliers in the Canterbury Region for the 2020/2021 season.

SmartSAMM Powered by DairyNZ

Your Farm's Historical Monthly Average Somatic Cell Count



Your farm is benchmarked against other farms in your region.

Your farm

Farms in your benchmark group

The Co-operative Difference Milk Quality Excellence target

Previous season's trends will be shown for up to three seasons where data is available and farm ownership hasn't changed.

Milking Efficiency

More efficient milking leads to better outcomes for people, cows and farm profitability. Simple changes that save seconds per cow can quickly add up to minutes saved per milking, and hours saved per day.

This section of the report uses milk vat monitoring data for your **month of peak production** to benchmark your milking efficiency. It uses DairyNZ research to provide an estimate of the amount of time that could be saved by changing the way your dairy is operated.

Your Farm's Peak Milk Production Data		
Shed Type	54 bail rotary	
Herd Size	1050 cows	
Peak Month	October	
Peak Volume	25347 L/day	
Milking Frequency	TAD (9.2-14.8 h interval between milkings)	
Milking*	**Times**	**Volume**
1	03:52 to 08:28	15 L/cow
2	13:02 to 16:28	9 L/cow
3	-	-
Total	**8 hours/day**	**24 L/cow**

*Milking is defined as the start of milk flow to the end of milk flow into the vat

Based On Your Information We Estimate You Could Save

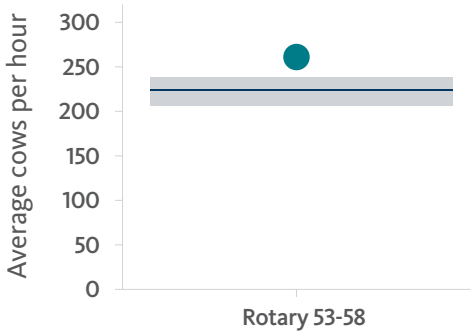
11 to 20 hours per week

This estimate is based on your farm reaching 80-100% of its potential milking efficiency using the maximum milking time (MaxT) strategy.

The insights provided in this section of the report will not be accurate if you are a split calving herd. For more detailed information please use the DairyNZ Milksmart App.

www.dairynz.co.nz/milking/milking-efficiently/milksmart-app

Average Cows Milked Per Hour During Your Peak Month

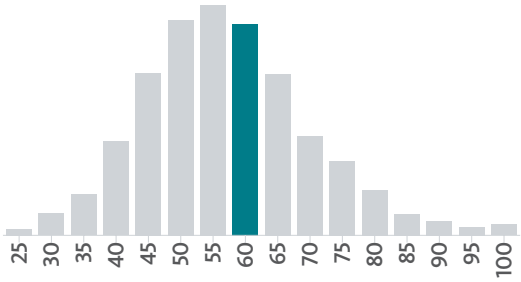


This benchmark is influenced by the number of clusters in the dairy and the herds level of production. Therefore, you are benchmarked against similar sized dairies nationally.

261 cows per hour

- Your farm
- 50% of your benchmark's group are within this range
- Your benchmark average

Average Litres Per Cluster Per Hour During Your Peak Month



This benchmark allows a fair comparison of all dairy types, sizes and production levels.

For context, if your cow's average milk flow rate is 2 L/min, then the maximum potential would be 120 L per cluster per hour (2 L/min × 60 min/hour).

58 L/cluster/hr

- Your farm
- All Fonterra farms

Animals

Heat Stress

The heat generated by rumen fermentation means that cattle are more tolerant to cold conditions than humans, but it also makes them more likely to get too hot. Cows that are too hot will seek shade, drink more, and their appetite and rumination times will reduce, depressing production. Severe heat stress can also have impacts on reproductive performance.

Previous New Zealand research (AgResearch and DairyNZ) has shown that milk production decreases relative to increasing temperature and humidity. Combining this research with actual and modeled weather data supplied by NIWA for your farm location, along with your herd size and breed, we have calculated the impact of unmitigated heat stress for your farm.

Farm Details	
Herd size:	1,050
Predominant breed:	Friesian x Jersey
Predicted production loss due to heat stress:	163 - 599 kgMS
Days above threshold:	10 - 27 days
Nearest virtual climate station:	0.62 kms

There are lots of things you can do to reduce the impact of heat stress on your cows aside from planting trees or building a shelter. Changing milking routines so cows aren't walking when it's hot, checking and upgrading water troughs so they are large enough for the herd, and installing fresh water sprinklers at the shed are all relatively straight forward ways to keep your cows cool.

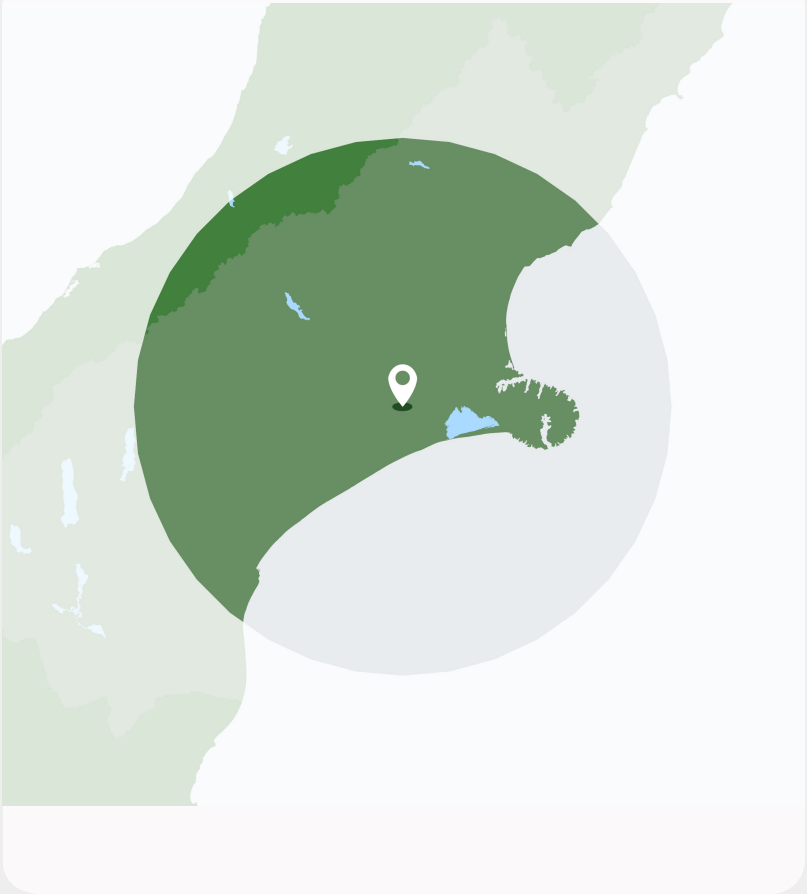
Estimated Impact of Heat Stress For Your Farm

$1,300 - $4,600 per year

Lost revenue range (predicted production loss @$7.60/kgMS) based on three most recent seasons of weather data from your nearest virtual climate station.

To find out more in depth information about the impact heat stress can have on your herd visit DairyNZ website or scan the QR code.

www.dairynz.co.nz/animal/cow-health/heat-stress



Estimates based on a collaborative NZ Bioeconomy in the Digital Age project between AgResearch, DairyNZ, NIWA and Fonterra funded by NZ taxpayers and Milksolids levy payers through the Strategic Science Investment Fund and DairyNZ Incl. In preparing NIWA VCSN data for this insight, all reasonable skill and care was exercised and the best available data and methods were used. NIWA accepts no liability for any loss or damage (whether direct or indirect) incurred by any person through the use of or reliance on this information

Lameness

As well as being painful for affected animals, lameness can add considerable costs to a farming operation with impacts on milk production, reproduction and staff time required to treat and manage lame cows.

The cost of a case of lameness varies depending on the stage of lactation and pregnancy, but DairyNZ suggests $250 per case as a conservative starting point. Even mild cases of lameness have a cost as cows will stand to graze less, reducing milk production and potentially causing loss of body condition.

Most cases of lameness are mild and may not be identified if the cow is able to maintain her normal position when walking with the herd. Studies suggest the true prevalence of lameness may be three times higher than the number of animals treated. Taking time locomotion scoring the herd may allow you to identify lame cows early and improve their speed of recovery.

Locomotion scoring is easy to do, but it requires someone to solely focus on watching the cows walking back to the paddock. For information on how to locomotion score cows visit the DairyNZ website.

Estimated Cost of Lameness For Your Farm

$45,000

The cost calculator utilises industry research to estimate the cost of lameness through lost milk production, cost of treatment, wastage through cull cows and discarded milk, and the impact on reproductive performance.

The Lameness Cost Calculator is a valuable resource when trying to calculate the cost to your farm. Based on the conservative estimate of $250 per case and the 180 lame cows you reported in last season's Farm Dairy Records the cost of lameness on your farm is at least $45,000.

Factors Contributing To Lameness

Body condition

Thinner cows have less fat in their heel to distribute the impact of walking

Management factors

Hurrying cows on the race or keeping them on concrete for extended periods increases the risk of damage to their feet

Nutrition

Sub-clinical rumen acidosis can lead to inflammation within the foot and increased risk of lameness

Weather

Wet skin and hooves are softer and more susceptible to trauma and infection

Genetics

Claw conformation and hoof strength are both influenced by genes

Previous lameness

One of the biggest risk factors for a cow to be lame is if she has been lame before

Infectious lameness

Digital Dermatitis is the most common cause of infectious lameness in other countries, and is becoming more common in New Zealand

Calving

Cows' connective tissues soften around the time of calving, increasing their risk of injury

Mastitis

Mastitis is very painful for the affected animal. It takes time and money to treat and can have long term impacts on reproduction, somatic cell count and increases the risk of culling.

Most of the antibiotics used in the dairy industry are for the treatment of mastitis, which is both a financial cost to farmers but also contributes to the risk of developing antibiotic resistant bacteria.

Treatment costs and withheld milk are thought to cost farmers around $150 per case of clinical mastitis. DairyNZ have developed a gap calculator to help you better understand the costs of mastitis on your farm.

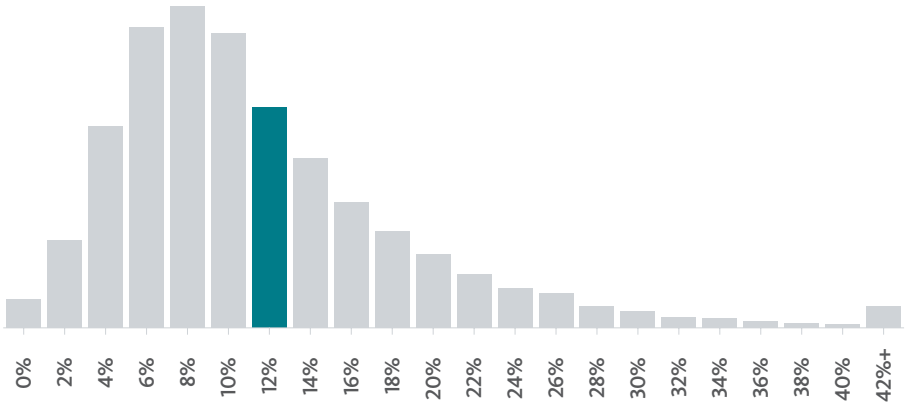
Estimated Cost of Mastitis For Your Farm

$19,200

Mastitis can have a significant effect on your herd's performance. Based on the numbers you provided Fonterra through the Farm Dairy Records the industry calculator has determined mastitis is roughly costing you $19,200.

This figure does not include potential lost milk production due to infecton impacting yield.

Your Farm's Mastitis Cases



12%

Percentage of reported mastitis cases

Your farm

All Fonterra farms

To find out more about the impact lameness and mastitis can have on your herd, visit the DairyNZ website links below or scan the QR codes.

www.dairynz.co.nz/animal/cow-health/lameness/

www.dairynz.co.nz/animal/cow-health/mastitis/

The information and insights provided to you in this report are sourced from information that you have provided through your Farm Dairy Records, together with milk quality and production data that we hold and third party industry research. While the information and insights provided may identify risks and opportunities, such information is general information only and is not in the nature of advice. We have done our best to align historical data to the new Milk Quality Framework. We make no representations or warranties (whether express or implied) as to whether information or data provided in this report is accurate, reliable or complete. You are solely responsible for your own assessment and evaluation of the information and for the actions or decisions you take in reliance on the information or data generated. Accordingly, Fonterra shall not be liable for any loss arising from any actions or decisions taken by you in reliance on the information contained in this report.

Our Team Is Here To Help

If you would like to discuss the details of this report please contact the Service Centre on **0800 65 65 68.**

FARM SOURCE

Fonterra

Dairy for life