

2019/2020



37581

ENVIRONMENTAL

REPORT



SUMMARY

Our strategy focuses on using New Zealand milk to drive value for our farmers and customers through sustainability, innovation and efficiency.

The Co-operative Difference helps us to achieve this by supporting all members of the Co-op to understand what needs to be done and the role that we all play. This report will help you to understand environmental considerations such as nitrogen loss and Greenhouse Gas (GHG) emissions, and what that might mean for you in the future. Beyond that, this information also allows the Co-operative to better understand the issues, how we best deal with them and to demonstrate our progress over time to our customers and consumers. This is critical to protecting and enhancing the value that our strategy aims to create.

The Environmental Report contains your Nitrogen Risk Scorecard and your GHG Assessment.

This report reflects what you have told us is happening on your dairy farm, as described in your Farm Dairy Records. The metrics are intended to be used as indicators to highlight areas where you can reduce the risks of nitrogen loss, GHG emissions and increase your farms efficiency.

PURCHASED NITROGEN SURPLUS

69kgN/ha

Purchased nitrogen surplus is the difference between the nitrogen inputs (imported on farm in fertiliser and imported feeds) and the nitrogen outputs (nitrogen exported off farm in milk, meat, crop or supplementary feeds)

GREENHOUSE GAS EMISSIONS

14,059kgCO₂e/ha

This represents the estimated amount of GHG emissions from methane and nitrous oxide that is occurring within your farming system.

KEY INFORMATION

	YOUR FARM	BENCHMARK AVERAGE
Dairy farm effective area	160 ha	224 ha
Cows calved	555 cows	849 cows
Stocking rate (milking cows)	3.5 cows/ha	3.8 cows/ha
Production (milk solids produced)	280,122 kg/MS	421,204 kg/MS
Production per cow	505 kgMS	499 kgMS
Production per hectare	1751 kgMS/ha	1887 kgMS/ha
Nitrogen applied per hectare	169 kgN/ha	246 kgN/ha
Imported supplementary feed fed	244 t	616.5 t
Imported supplementary feed fed per cow	0.4 t/cow	0.8 t/cow

Your farm is benchmarked against other farms in your region with production above 1700 kgMS/ha.

NITROGEN RISK SCORECARD

YOUR FARMS NITROGEN RISKS



STOCK MANAGEMENT

Very High



NITROGEN FERTILISER

Very Low



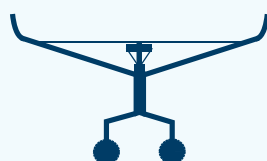
IMPORTED FEED

Very Low



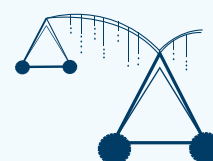
CROPPING & CULTIVATION

Very Low



EFFLUENT MANAGEMENT

Very Low



IRRIGATION

Low

YOUR FARMS PURCHASED NITROGEN SURPLUS

Purchased Nitrogen Surplus is the difference between the amount of nitrogen imported on to farm through fertiliser and feed, and the amount leaving the farm as product. A high number means you may not be using nitrogen efficiently and as a result more nitrogen may be at risk of being lost to the environment. When reductions in purchased N surplus are achieved through improved N use efficiency, benefits will also be financial.



NITROGEN FERTILISER

169kgN/ha

+



IMPORTED FEED

24kgN/ha

-



EXPORTED PRODUCT

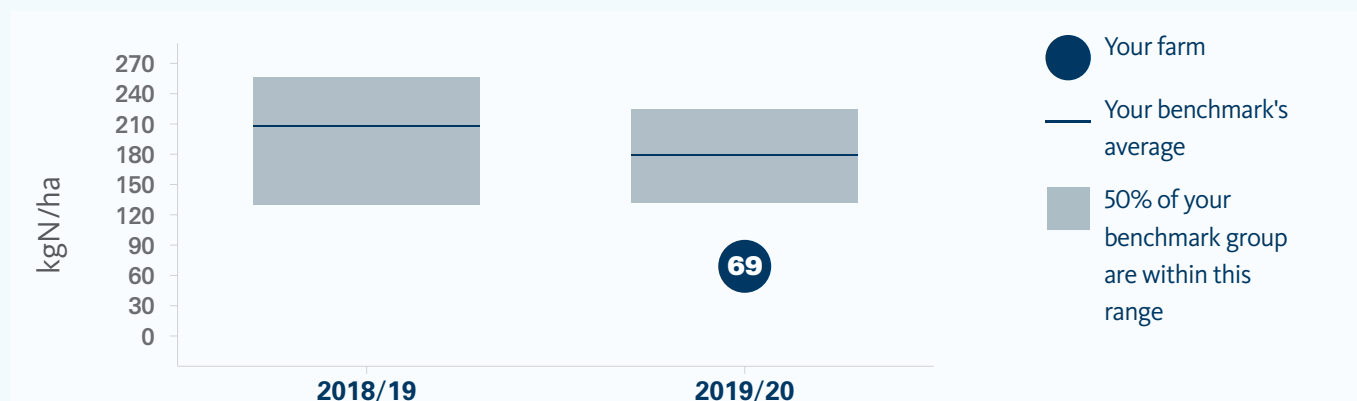
124kgN/ha

=

PURCHASED NITROGEN SURPLUS

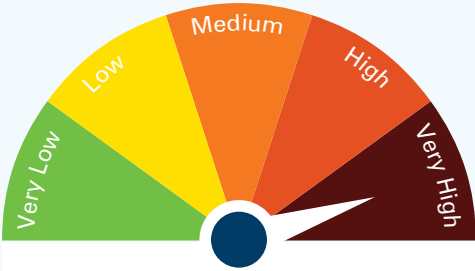
69kgN/ha

YOUR FARMS PURCHASED NITROGEN SURPLUS PER HECTARE



Your farm is benchmarked against other farms in your region with production above 1700 kgMS/ha.

YOUR FARMS NITROGEN RISKS BROKEN DOWN



STOCK MANAGEMENT

STOCKING RATE

The higher the stocking rate, the greater the nitrogen loss risk

Total 27.8 su/ha

Milking herd (3.5 cows/ha) 27.8 su/ha
Replacement/other animals 0 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 18.9 tDM/ha

Pasture & Crops 17.6 tDM/ha
Imported Feed 1.3 tDM/ha

WINTERING OFF DURING MAY - AUG

Wintering animals off the farm reduces nitrogen loss risk on the milking platform

49% off platform

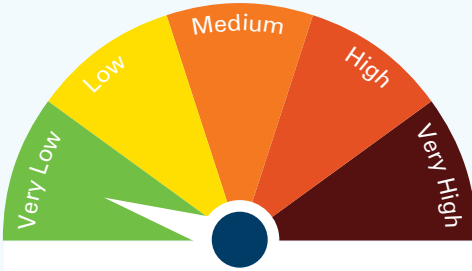
WINTER PRACTICES

Reducing the amount of time cows spend on pasture will reduce the nitrogen loss risk

Off pasture facility 0%

On pasture 100%

Break feed fodder crop 0%



NITROGEN FERTILISER

TOTAL NITROGEN FERTILISER APPLICATIONS

The higher the amount of applied nitrogen, the greater the nitrogen loss risk

169 kgN/ha

NITROGEN FERTILISER USE EFFICIENCY

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

10 kgMS/kgN

TIMING OF APPLICATION

Fertiliser applied during the winter months will significantly 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

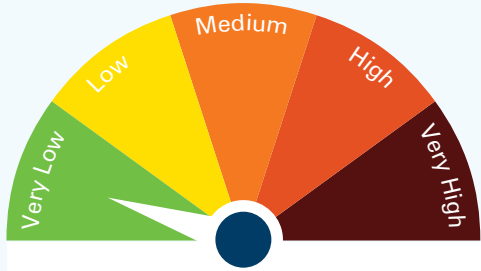
Above 25 kgN / ha

FEED BUDGET

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

Feed budget used

No feed budget used



IMPORTED FEED

TOTAL NITROGEN IMPORTED FROM FEED

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

24 kgN/ha

AVERAGE NITROGEN CONTENT

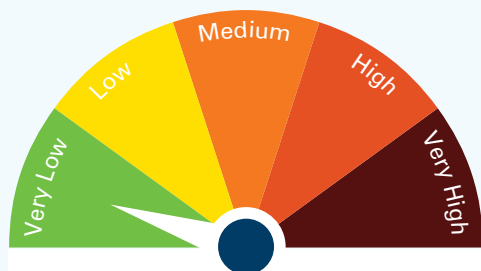
The greater the average nitrogen content, the higher the amount of nitrogen that enters the system

Average N content of 1.60%

EFFICIENCY OF NITROGEN IMPORTED VIA IMPORTED SUPPLEMENTS

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

72 kgMS/kgN



CROPPING & CULTIVATION

CONVENTIONAL

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

Not Applicable

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 CROP WAS GRAZED

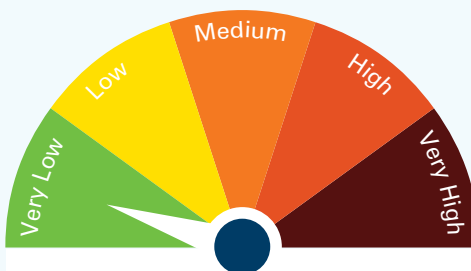
Crops grazed in winter pose a higher risk to leaching

Not Applicable

TIMING OF FERTILISER APPLICATION

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

Not Applicable



EFFLUENT MANAGEMENT

EFFLUENT IRRIGATION AREA

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

5 ha/100 cows

EFFLUENT DISCHARGE METHOD

Discharging treated effluent to land with sufficient storage to store effluent during wet conditions is the lowest risk

Discharge to land

Discharge to land (Low Storage)

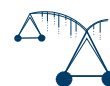
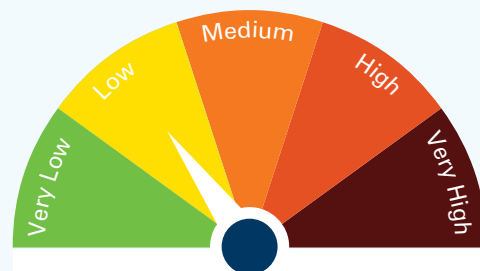
Discharge to water

Discharge to land and water

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

Pivot or linear 84%

Rotary boom, gun or k-line 16%

Border dyke 0%

IRRIGATION SCHEDULING

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

Soil moisture meters / budget 100%

Fixed routine / visual assessment 0%

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

Variable Rate Irrigation 0%

Deficit irrigation 100%

Fixed depth and return 0%

GREENHOUSE GAS EMISSIONS

This report provides you with farm specific performance indicators related to GHG. It has been designed to give you a better understanding of what is happening on your farm in relation to agricultural GHG.

YOUR FARMS GREENHOUSE GAS EMISSIONS MODEL

All numbers on the diagram below refer to kilograms of carbon dioxide equivalents per hectare (kgCO₂e/ha)

14,059
kgCO₂e/ha

GREENHOUSE GAS EMISSIONS PER HECTARE

This indicates the GHG emissions per hectare from your farm. This number is made up of both Methane and Nitrous Oxide GHG

11,655
kgCO₂e/ha

FROM METHANE

This indicates the methane emissions per hectare from your farm

2,404
kgCO₂e/ha

FROM NITROUS OXIDE

This indicates the nitrous oxide emissions per hectare from your farm

10,736

ENTERIC METHANE

Methane emissions created in the digestive processes of the rumen

431

DUNG METHANE

Methane emissions from dung that is deposited on to the pasture

488

EFFLUENT METHANE

Methane emissions from dung that is captured and spread via your farms effluent management system

1,781

URINE & DUNG (Paddock)

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

34

EFFLUENT STORAGE

Nitrous oxide emissions from the farms effluent management system

589

NITROGEN FERTILISER

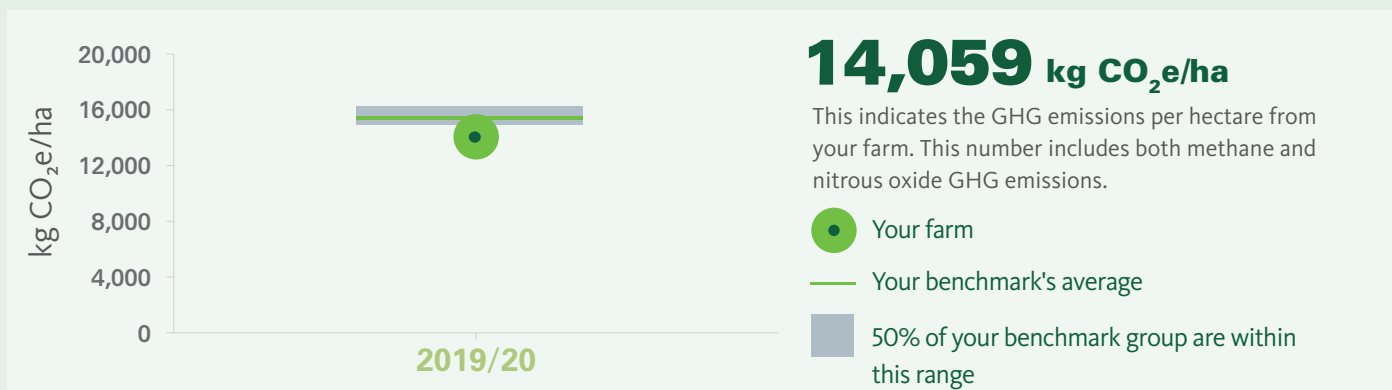
Nitrous oxide emissions from nitrogenous fertiliser

Agricultural GHG emissions on dairy farms arise from processes related to ruminant digestion, manure deposited to soils, effluent management and fertiliser use. The main agricultural GHGs are methane (CH₄) and nitrous oxide (N₂O). Methane is produced by ruminants (e.g. cows and sheep) by methanogen microbes that are naturally present in the rumen. Most methane is emitted when cattle burp. The amount of methane produced for each farm is directly related to the total feed intake for that farm whereas Nitrous oxide is emitted from soil when urine, faeces and fertilisers are broken down by microbes in the soil.

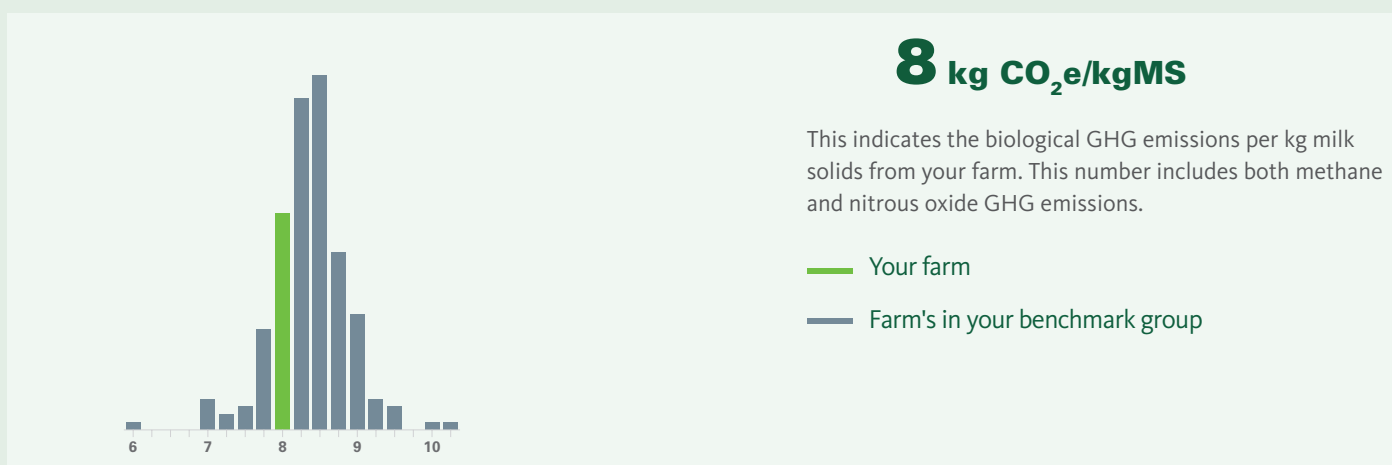
Reducing the GHG emissions footprint of milk production requires effort to maximise the percentage of farm dry matter utilised for milk production while also minimising use of other farm inputs. Managing these two factors will also support farm efficiency and profitability.

All emissions are given as a total amount of carbon dioxide equivalents (CO₂e). 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 FARMS GREENHOUSE GAS EMISSIONS PER HECTARE



YOUR FARMS GREENHOUSE GAS EMISSIONS PER KG MILK SOLIDS



Your farm is benchmarked against other farms in your region with production above 1700 kgMS/ha.

JOINT INDUSTRY, GOVERNMENT AND MAORI ACTION CLIMATE ACTION PLAN

In October of 2019 the Agri Food and Fibre sector, Government and Māori announced the He Waka Eke Noa partnership approach to work together to manage and reduce emissions from our farms and adapt to a changing climate. This partnership aims to equip farmers and growers with the knowledge, tools and support they need to reduce emissions and adapt to a changing climate. This helps farmers to know and understand their emissions.

This joint partnership includes an agreement that all farmers and growers within New Zealand are required to have a GHG report detailing their farm specific emissions profile. This report fulfils this requirement for Fonterra farmers.

THIS REPORT WAS GENERATED USING THE AIM MODEL

As part of continuing efforts to improve New Zealand's annual reporting of GHG emissions by the Ministry for the Environment, the Ministry for Primary Industries has developed the Agricultural Inventory Model (AIM), and supporting documentation, to estimate agricultural GHG emissions. AIM has been developed to be consistent with international good practice guidelines for the measurement of emissions.

ENVIRONMENTAL CONSIDERATIONS

This report focuses on the farm management practices within your control that can influence nitrogen surplus, and the potential for this to be lost from your farm system. However, it does not attempt to model the specific environmental factors unique to your farm (such as soils and climate) that play a significant role in determining how much of this surplus nitrogen is actually lost from your farm (in particular lost to water through leaching).

Basic soil and rainfall data has been sourced for your farm and should be considered along with the other nitrogen loss risk factors when looking at this report.

RAINFALL

The amount of rainfall influences the potential drainage volume. The greater the amount of rainfall, the greater the amount of drainage you will have.

Annual Rainfall 606 mm

SOIL

A soil's water holding capacity determines how much water is retained within the soils profile. Lighter soils have a much lower water holding capacity meaning more drainage will occur than with a heavier soil.

Main soil type(s) on your farm:

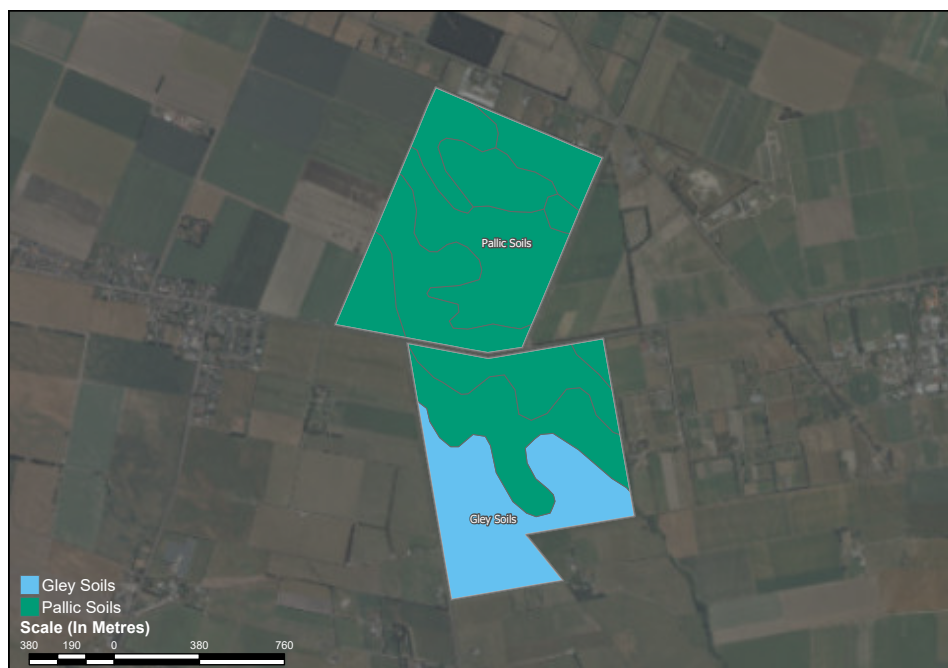
Pallic (Imperfectly drained) 42%

Pallic (Moderately well drained) 29%

Gley (Poorly drained) 23%

Pallic (Well drained) 6%

YOUR FARM'S SOIL MAP



OUR TEAM IS HERE TO HELP

If you would like to discuss the details of this report and / or develop a Farm Environment Plan, please contact your local Sustainable Dairying Advisor or the Service Centre on **0800 65 65 68**.